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U.S. Nuclear Regulatory Commission
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Watts Bar Nuclear Plant, Unit 1
Facility Operating License No. NPF-90
NRC Docket No. 50-390

Watts Bar Nuclear Plant, Unit 2
Facility Operating License No. NPF-96
NRC Docket No. 50-391

Subject: **Application to Modify Watts Bar Nuclear Plant, Units 1 and 2 Technical Specifications 3.8.9 Regarding Alternating Current (AC) Vital Buses (WBN-TS-17-19)**

In accordance with the provisions of Title 10 of the *Code of Federal Regulations* (10 CFR) 50.90, "Application for amendment of license, construction permit, or early site permit," Tennessee Valley Authority (TVA) is submitting for Nuclear Regulatory Commission (NRC) approval, a request for an amendment to Facility Operating License Nos. NPF-90 and NPF-96 for Watts Bar Nuclear Plant (WBN) Units 1 and 2, respectively.

WBN Units 1 and 2 Technical Specification (TS) 3.8.9, "Distribution Systems - Operating," requires the operability of "Train A and Train B AC, four channels of vital DC, and four channels of AC vital bus electrical power distribution subsystems." TS 3.8.9 is applicable during Modes 1 through 4.

TS 3.8.9, Condition B, requires a two-hour completion time with one or more 120-volt (V) alternating current (AC) vital buses in one channel inoperable. Prior to the initial start-up of WBN Unit 2, maintenance of the AC vital buses was typically performed when WBN Unit 1 was in cold shutdown (Mode 5), refueling (Mode 6), or defueled, that is when TS 3.8.9 was not applicable. With the transition of the WBN site to a two-unit operating plant, and with the sharing of systems between WBN Units 1 and 2, the two-hour completion time is posing an

undue burden when performing maintenance on the AC vital buses when one unit is operating and the other unit is in Mode 5, Mode 6, or defueled. As noted in the enclosure, the design of the 120V AC vital buses creates a challenge to performing the maintenance within the two-hour completion time. Failure to satisfactorily complete this maintenance on the unit specific or common loads would require the operating unit to commence transitioning the plant to cold shutdown.

Therefore, the proposed amendment revises the WBN Units 1 and 2 TS 3.8.9 to add a new Condition C with an eight-hour completion for performing maintenance on the opposite unit's vital bus when the opposite unit is in Mode 5, Mode 6, or defueled. The proposed change allows greater operational flexibility for two-unit operation at WBN. Without this proposed change, a dual unit outage may be required to perform the associated 120V AC vital bus maintenance. In the event the opposite unit's vital bus is inoperable for reasons other than planned maintenance, new TS 3.8.9, Condition D, would still require a two-hour completion time for restoration of the inoperable vital bus to operable status.

The enclosure to this letter provides a description of the proposed changes, technical evaluation of the proposed changes, regulatory evaluation, and a discussion of environmental considerations. Attachments 1 and 2 to the enclosure provide the existing WBN TS pages marked-up to show the proposed changes. Attachments 3 and 4 to the enclosure provide the existing WBN TS Bases pages marked-up to show the proposed changes. Attachments 5 and 6 to the enclosure provide the proposed WBN TS pages retyped to show the changes incorporated. Attachments 7 and 8 to the enclosure provide the proposed WBN TS Bases pages retyped to show the changes incorporated. Changes to the existing TS Bases are provided for information only and will be implemented under the Technical Specification Bases Control Program.

Based on the information provided in Section 3.0 to the enclosure, increasing the completion time from two to eight hours for performing maintenance on the opposite unit's vital bus is justified based on:

- An eight-hour completion time is more reasonable and representative of the time needed to perform reliable and efficient maintenance on the 120V AC vital busses, thereby increasing the reliability of the Class 1E AC Electrical Power Distribution System.
- An assessment of the affected Technical Specifications for the safety related common systems, shared between the units, demonstrates that the eight-hour limit is more conservative than the Completion Times associated with these systems.
- An increase in plant equipment reliability and safety by reducing the number of entries into numerous TS Applicable Conditions and Required Actions and providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected equipment.

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The WBN Plant Operations Review Committee and the TVA Nuclear Safety Review Board have reviewed this proposed change and determined that operation of WBN Units 1 and 2 in accordance with the proposed change will not endanger the health and safety of the public.

TVA has determined that there are no significant hazards considerations associated with the proposed change and that the TS change qualifies for a categorical exclusion from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9). Additionally, in accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter and enclosure to the Division of Radiological Health - Tennessee State Department of Environment and Conservation.

TVA requests approval of this proposed license amendment within 12 months of the date of this letter, with implementation within 60 days following NRC approval.

There are no new regulatory commitments associated with this submittal. Please address any questions regarding this request to Ed Schrull at 423-751-3850.

I declare under penalty of perjury that the foregoing is true and correct. Executed on this 28th day of February 2018.

Respectfully,



J. W. Shea
Vice President, Nuclear Regulatory Affairs and Support Services

Enclosure: Evaluation of Proposed Change

cc (Enclosure):

NRC Regional Administrator - Region II
NRC Senior Resident Inspector - Watts Bar Nuclear Plant
NRC Project Manager – Watts Bar Nuclear Plant
Director, Division of Radiological Health - Tennessee State Department of
Environment and Conservation

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**TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT UNITS 1 AND 2**

EVALUATION OF PROPOSED CHANGE

Subject: **Application to Modify Watts Bar Plant, Units 1 and 2 Technical Specifications
3.8.9 Regarding Alternating Current (AC) Vital Buses (WBN-TS-17-19)**

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2. WBN Unit 1 and Unit 2 Common System Applicable Technical Specifications

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1. Typical 120V AC Vital Power Source Alignment
2. Vital Instrument Power Boards
3. 120V Vital Distribution Board
4. 120V Vital Distribution Board Maintenance

ATTACHMENTS

1. Proposed TS Changes (Mark-Ups) for WBN Unit 1
2. Proposed TS Changes (Mark-Ups) for WBN Unit 2
3. Proposed TS Bases Changes (Mark-Ups) for WBN Unit 1 (For Information Only)
4. Proposed TS Bases Changes (Mark-Ups) for WBN Unit 2 (For Information Only)
5. Proposed TS Changes (Final Typed) for WBN Unit 1
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7. Proposed TS Bases Changes (Final Typed) for WBN Unit 1 (For Information Only)
8. Proposed TS Bases Changes (Final Typed) for WBN Unit 2 (For Information Only)

1.0 SUMMARY DESCRIPTION

The Tennessee Valley Authority (TVA) is requesting a license amendment to amend the Watts Bar Nuclear Plant (WBN) Units 1 and 2 Technical Specifications (TS) 3.8.9 to add a new Condition C to support maintenance of the 120-volt (V) alternating current (AC) vital buses when one unit is operating and the opposite unit is shutdown.

WBN Units 1 and 2 Technical Specification (TS) 3.8.9, "Distribution Systems - Operating," requires the operability of "Train A and Train B AC, four channels of vital DC, and four channels of AC vital bus electrical power distribution subsystems." TS 3.8.9 is applicable during Modes 1 through 4.

TS 3.8.9, Condition B, requires a two-hour completion time with one or more 120-volt (V) alternating current (AC) vital buses in one channel inoperable. Prior to the initial start-up of WBN Unit 2, maintenance of the AC vital buses was typically performed when WBN Unit 1 was in cold shutdown (Mode 5), refueling (Mode 6), or defueled, that is when TS 3.8.9 was not applicable. With the transition of the WBN site to a two-unit operating plant, and with the sharing of systems between WBN Units 1 and 2, the two-hour completion time is posing an undue burden when performing maintenance on the AC vital buses when one unit is operating and the other unit is in Mode 5, Mode 6, or defueled. As noted in the enclosure, the design of the 120V AC vital buses creates a challenge to performing the maintenance within the two-hour completion time. Failure to satisfactorily complete this maintenance on the unit specific or common loads would require the operating unit to commence transitioning to a plant shutdown.

Therefore, the proposed amendment revises the WBN Units 1 and 2 TS 3.8.9 to add a new Condition C with an eight-hour completion for performing maintenance on the opposite unit's vital bus when the opposite unit is in Mode 5, Mode 6, or defueled. The proposed change allows greater operational flexibility for two-unit operation at WBN. Without this proposed change, a dual unit outage may be required to perform the associated 120V AC vital bus maintenances. In the event the opposite unit's vital bus is inoperable for reasons other than planned maintenance, new TS 3.8.9, Condition D, would still require a two-hour completion time for restoration of the inoperable vital bus to operable status.

Based on the information provided in Section 3.0 to this enclosure, increasing the completion time from two to eight hours for performing maintenance on the opposite unit's vital bus is justified based on:

- An eight-hour completion time is more reasonable and representative of the time needed to perform reliable and efficient maintenance on the 120V AC vital busses, thereby increasing the reliability of the Class 1E AC Electrical Power Distribution System.
- An assessment of the affected Technical Specifications for the safety related common systems, shared between the units, demonstrates that the eight-hour limit is more conservative than the Completion Times associated with these systems.
- An increase in plant equipment reliability and safety by reducing the number of entries into numerous TS Applicable Conditions and Required Actions and providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected equipment.

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The WBN Units 1 and 2 TS 3.8.9 Bases are also revised to reflect the changes.

2.0 DETAILED DESCRIPTION

2.1 PROPOSED CHANGE

The following is a detailed description of the proposed WBN Units 1 and 2 TS 3.8.9 changes:

- Add new Condition C that applies when an AC vital bus in one channel in the opposite unit's AC vital bus is inoperable. Note 1 states that this new condition applies during planned maintenance. Note 2 states that this new condition applies when the opposite unit is in Mode 5, Mode 6, or defueled. The Required Action is to restore the opposite unit's AC vital bus to operable status with a Completion Time of eight hours.
- Add new Condition D that applies when the opposite unit's vital bus is inoperable for reasons other than Condition C. The Required Action is to restore the opposite unit's AC vital bus to operable status with a Completion Time of two hours and 16 hours from discovery of failure to meet the Limiting Condition for Operation (LCO).
- Renumber Conditions C, D, and E as E, F, and G, respectively.

Attachments 1 through 4 to this enclosure provide the existing WBN Units 1 and 2 TS and Bases pages marked-up to show the proposed changes. Attachments 5 through 8 to this enclosure provide the clean typed TS and Bases pages with the proposed changes incorporated.

The proposed Bases changes are provided to the NRC for information only.

2.2 CONDITION INTENDED TO RESOLVE

The current two-hour completion time for TS 3.8.9, Condition B poses an undue burden when performing maintenance on the AC vital buses when one unit is operating and the other unit is in Mode 5, Mode 6, or defueled. As discussed in Section 3.0 of this enclosure, the design of the 120V AC vital buses creates a challenge to performing the maintenance within the two-hour completion time. Failure to satisfactorily complete this maintenance on the common loads would require the operating unit to commence transitioning to a plant shutdown. The proposed changes will allow greater operational flexibility for two-unit operation at WBN. Without this proposed change, a dual-unit outage could be required to perform 120V AC vital bus maintenance.

3.0 TECHNICAL EVALUATION

3.1 SYSTEM DESCRIPTION OF ELECTRICAL POWER DISTRIBUTION SYSTEM

The safety function of the standby AC power system is to supply power to support the functioning of components and systems required to assure that (1) fuel design limits and reactor coolant pressure boundary design conditions are not exceeded due to anticipated operational occurrences, and (2) the core is cooled and vital functions are maintained in the event of postulated accidents subject to loss of the preferred power system and subject to any single failure in the standby power system. To accomplish its safety function, the onsite Class 1E AC distribution system supplies electrical power to two power trains for each unit. Each power train includes two Class 1E 6.9 kV shutdown

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boards (SDBs) powered from one of two separate and independent offsite power lines or dedicated onsite DGs. Two DGs in one train can provide the safety related functions to mitigate a LOCA in one unit and safely shut down the other unit. The core cooling and containment cooling system loads are unitized to the respective unit's 6.9 kV SDBs such that orderly shutdown and cool down can be assured. Although the core cooling systems and containment systems credited in the mitigation of an anticipated operational occurrence (AOO) or postulated DBA are unitized and powered from the associated unit's shutdown boards, some safety-related systems ((e.g., Essential Raw Cooling Water (ERCW), Component Cooling System (CCS)) are shared between the units. The AC sources for these loads are supplied from A Train and B Train AC electrical power subsystems from either one or both units. Therefore, in addition to requiring the associated unit's AC electrical power subsystems to be operable, the opposite unit's AC electrical power subsystems supplying power to a required shared load are also required to be operable.

The safety function of the 120V AC vital system is to provide a reliable source of instrument and control power for reactor protection circuits and other critical instrumentation systems and components within the plant. The vital instrument power is provided by DC to AC solid-state inverters. Each unit has four independent supplies consisting of four independent uninterruptible power supplies (UPSs) and the distribution, instrumentation, and protection devices required to ensure a reliable source of instrument and control power. The system is configured and the loads arranged to preclude the loss of any redundant essential and/or protective function due to a single failure within the system. The 120V AC vital power system consists of four divisions of separation, designated channels I, II, III, and IV, respectively. Each channel consists of a unit UPS, a spare UPS (shared between units), and distribution panels. Redundant loads are assigned to different distribution panels that are supplied from different UPSs. Each distribution board supplies reactor protection instrumentation and control systems, ESF instrumentation and control systems, separation and interlock relay panels, and other safety related components. Each of the eight vital instrument power boards has an alternate supply transfer switch that aligns the spare inverter as the alternate power supply for either Unit 1 or Unit 2 boards on each channel.

Figure 1 shows a schematic of the 6.9 kV System. Figure 2 shows the vital instrument power boards. Figure 3 shows a 120V vital distribution board.

3.2 EVALUATION OF TS 3.8.9 CHANGES

3.2.1 Assessment of Maintenance of the 120V AC Vital Buses

With one unit operating, the proposed new Condition C establishes an eight-hour completion time when performing planned maintenance on the opposite unit's 120V AC vital buses when the opposite unit is in Modes 5 or 6 or defueled. The eight-hour completion time provides the necessary time to perform maintenance to ensure reliability of the system performance, minimizes unnecessary cycling of operations personnel in preparation for down powering, minimizes unnecessary unit transients due to down powering, and ensures personnel have adequate time to be able to practice good human performance techniques when conducting manipulations of vital equipment.

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The design of the WBN 120V AC vital buses poses challenges to performing the maintenance of the vital buses within the current two-hour completion of TS 3.8.9 Condition B with one unit operating and the other unit shutdown. Specifically, maintenance activity on a 120V AC vital bus necessitates removal of a panel cover that is required to be in place for the seismic integrity of the bus (see Figures 3 and 4). Each row bus on the board is seismically supported by the cover. Removal of the cover to access the breakers renders the board inoperable, but available. Other maintenance activities involve inspections and cleaning to ensure equipment reliability. There are 12 breakers mounted on each of the four panel/bus sections per board for a total of 48 breakers (see Figure 2). That makes 192 120V vital molded-case circuit breakers (MCCB) per unit, including the spares. There will be less impact to both the vital bus segment and other TS Required Actions if maintenance can be performed on multiple MCCBs with each panel cover removal. Replacing multiple MCCBs or encountering problems with a replacement may jeopardize the current two-hour completion time for a 120V AC vital board and call for an otherwise unwarranted down power based on the plant configuration and associated load impact. In the event the opposite unit's vital bus is inoperable for reasons other than planned maintenance, new TS 3.8.9, Condition D, would still require a two-hour completion time for restoration of the inoperable vital bus to operable status.

Satisfying the following requirements includes testing of the individual molded case circuit breakers (MCCBs) mounted on the 120V AC vital buses. Access to the MCCBs requires removal of seismic covers and renders the associated 120V AC vital Board inoperable, but available because actual de-energizing of the bus is not required. Typically, MCCBs are bench tested and the existing installed MCCBs are replaced with the pre-tested MCCBs. This replacement method enables a minimum of TS Required Action exposure with work that can be performed in approximately 20 minutes for one MCCB; however, that is under ideal (i.e., no problem encountered) conditions. Based on a unit's required loads during an outage and the actual associated load impact (i.e., common loads) to the operating unit, replacing multiple MCCBs or encountering problems with a replacement may jeopardize the operating unit's current two-hour completion time for a 120V AC vital Board. The result of this would be an otherwise unwarranted downpower when only common loads with greater than eight-hour completion times are affected.

The current two-hour completion of TS 3.8.9 Condition B leaves little margin if problems are encountered during the maintenance of the vital buses. For example, Work Order 115868741 performed on October 8, 2015, took approximately five hours to perform. Surveillances are normally scheduled to be performed within 50 percent of the allowed TS completion (i.e., one hour in the case of TS 3.8.9 Condition B). The current two-hour completion of TS 3.8.9 Condition B necessitates performing maintenance on only one breaker at a time (there are 12 breakers per bus). The proposed completion time of eight hours will allow the plant to perform multiple breaker changes (as many as four breaker changes) and minimize the impact to the plant and number of TS Required Action entries.

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A representative timeline for performing maintenance on four breakers is provided below:

Activity	Time
Install tie wraps to support cover removal	15 minutes
Remove front cover bolts	15 minutes
Lift load cables	30 minutes
Remove breakers	30 minutes
Install new breakers	40 minutes
Land load cables	40 minutes
Install cover and bolts	20 minutes
Align breakers	60 minutes
Remove tie wraps and exit LCO Action	5 minutes
Subtotal	255 minutes (approximately four hours)
Contingent repair time ¹	120 minutes
Total	375 minutes (approximately six hours)

The preceding timeline supports the request to extend the completion for TS 3.8.9 Condition B from two to eight hours. Even if the contingent repair is not taken into consideration, the above timeline would equate to approximately four hours, which would be about 50 percent of the requested completion time of eight hours.

Therefore, an eight-hour completion time is more reasonable and representative of the time needed to performing reliable and efficient maintenance on the 120V AC vital busses, thereby increasing the reliability of the Class 1E AC Electrical Power Distribution System.

3.2.2 Assessment of Affected Technical Specifications

The WBN Units 1 and 2 TS were reviewed for Required Actions that the operating unit would enter when an opposite unit's 120V AC vital power bus is inoperable. This assessment was performed by WBN Operations (including Senior Reactor Operators) and Engineering. The 120 V vital AC busses were first assessed to ascertain the safety-related common systems that are shared between the units. Table 1 shows the unit and train relationship of the overall electrical power to safety related systems including the safety related common systems shared between the units.

The safety related common systems were then assessed to determine the applicable TS. Table 2 shows the TS applicable to the safety related common systems (see the associated Notes in Table 1). All of the applicable common system TS have a completion time greater than eight hours. The safety related common loads fed from the 120V AC vital boards are also train consistent and are encompassed by the same system associated TS shown in Table 2. There are no cross-unit safety related 120V AC vital loads, other than these common systems loads. Therefore, the proposed eight-hour completion time is conservative compared to the other affected TS Required Actions.

¹ This takes into account the time needed to perform any repairs if problems are encountered during the maintenance.

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In the event the opposite unit's vital bus is inoperable for reasons other than planned maintenance (e.g., an unrelated failure of a vital bus in the opposite unit), proposed new TS 3.8.9, Condition D, would still require a two-hour completion time for restoration of the inoperable vital bus to operable status.

3.2.3 Safety Assessment of the Proposed Technical Specification Changes

The Notes to the proposed TS 3.8.9 Condition C allow the plant configuration to be aligned to minimize features being inoperable, when an opposite unit vital bus is made inoperable, and limits the applicability of Condition C to the time period when the opposite unit is in either Mode 5, Mode 6, or defueled. The Notes to the proposed TS 3.8.9 Condition C further state that the increase in the completion time from two to eight hours is only applicable during planned maintenance of the opposite unit's AC vital bus when the opposite unit is in either Mode 5, Mode 6, or defueled. Planned maintenance is a carefully managed and controlled evolution that minimizes the impact and risk on the operating unit, and is part of the work control and scheduling evolution. TVA uses a blended approach to risk assessment for work control and scheduling. The blended approach concept uses the best information available to assess and manage risk, including:

- Quantitative insights from the probabilistic safety assessment (PSA) and the equipment-out-of-service (EOOS) computer on-line risk model.
- Expert knowledge of plant operations by licensed Senior Reactor Operators.
- Qualitative methods of assessing the adequacy of defense-in-depth and potential loss of function.

Risk thresholds are established and include quantitative and qualitative classifications. Risk management actions address configurations that result in elevated risk profiles. These actions are aimed at providing increased risk awareness of appropriate personnel, providing more rigorous planning and control of the activity, and taking measures to control the duration and the magnitude of the increased risk. Further guidance is provided in the following TVA procedures:

- NPG-SPP-07.1, "On Line Work Management," provides the process for assessing and managing on-line risk.
- NPG-SPP-07.3, "Work Activity Risk Management Process," provides a process that plant personnel can use to review a planned and scheduled task so that it can be safely completed, without complications from unforeseen circumstances and inadequate contingency planning.
- NPG-SPP-07.3.4, "Protected Equipment," and WBN plant periodic instruction (PI) 1/2-PI-OPS-1-PE, "Protected Equipment," provide guidance for the protected equipment process, methodology, and posting.
- MMDP-1, "Maintenance Management System," ensures that maintenance is performed in a manner that enhances the reliability and availability of SSCs that is commensurate with safety pursuant to 10 CFR 50.65.

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Therefore, the proposed TS 3.8.9 is acceptable based on the following:

- The opposite unit's AC vital buses are not as critical to the operating unit (fewer operating unit loads) as the operating unit's AC vital buses.
- Performing maintenance on these components increases the reliability of the Class 1E AC Electrical Power Distribution System.
- The evolution is performed during planned maintenance when the opposite unit is in either Mode 5, Mode 6, or defueled.
- The Required Actions associated with the features declared inoperable specify the appropriate actions to be taken during the performance of the planned maintenance.

With an opposite unit vital bus in one channel inoperable and the opposite unit in either Mode 5, Mode 6, or defueled, the remaining operable AC vital buses are capable of supporting the minimum safety functions necessary to shut down the plant and maintain it in the safe shutdown condition for analyzed events. Furthermore, as noted in Section 3.2.2, the eight-hour time completion time is more conservative than the completion times for the affected TS for the safety-related common systems.

The proposed TS changes increase plant equipment reliability and safety by reducing the number of entries into numerous TS Applicable Conditions and Required Actions and providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected equipment.

3.3 CONCLUSION

The proposed amendment revises the WBN Units 1 and 2 TS 3.8.9 to add a new Condition C with an eight-hour completion time for performing maintenance on the opposite unit's vital buses when the opposite unit is Mode 5, Mode 6, or defueled. The proposed changes allow greater operational flexibility for two-unit operation at WBN. Without this proposed change, a dual unit outage could be required to perform 120V AC vital bus maintenances. This proposed change does not affect safe operation of the operating unit because the proposed eight-hour completion time is conservative with respect to the other affected TS completion times for an inoperable vital bus.

4.0 REGULATORY EVALUATION

4.1 APPLICABLE REGULATORY REQUIREMENTS/CRITERIA

4.1.1 Regulations

10 CFR 50.36 sets forth the regulatory requirements for the content of the TSs. This regulation requires, in part, that the TS contain Surveillance Requirements (SRs). 10 CFR 50.36(c)(3), states that SRs to be included in the TS are those relating to test, calibration, or inspection, which assure that the necessary quality of systems and components is maintained, that facility operation will be within safety limits, and that the TS limiting condition for operation (LCO) will be met.

4.1.2 Regulatory Guidance

Regulatory Guide 1.93, Revision 0, "Availability of Electrical Power Sources," provides guidance with respect to operating procedures and restrictions acceptable to the NRC that should be implemented if the available electric power sources are less than the LCO

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for a facility with respect to GDC 17. As noted in Section 8.1.5.3 of WBN dual-unit UFSAR, TVA complies with Regulatory Guide 1.93, Revision 0.

4.1.3 General Design Criteria

WBN was designed to meet the intent of the "Proposed General Design Criteria for Nuclear Power Plant Construction Permits" published in July 1967. The WBN construction permit was issued in January 1973. The WBN dual-unit UFSAR address the NRC General Design Criteria (GDC) published as Appendix A to 10 CFR 50 in July 1971. Conformance with the GDC is described in Section 3.1.2 of the WBN dual-unit UFSAR.

The relevant GDC are described below.

Criterion 1 - Quality Standards and Records

Structures, systems, and components important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. Where generally recognized codes and standards are used, they shall be identified and evaluated to determine their applicability, adequacy, and sufficiency and shall be supplemented or modified as necessary to assure a quality product in keeping with the required safety function. A Quality Assurance Program shall be established and implemented in order to provide adequate assurance that these structures, systems, and components will satisfactorily perform their safety function. Appropriate records of the design, fabrication, erection, and testing of structures, systems, and components important to safety shall be maintained by or under the control of the nuclear power unit licensee throughout the life of the unit.

Conformance with GDC 1 is described in Section 3.1.2.1 of the WBN dual-unit UFSAR.

Criterion 5 - Sharing of Structures, Systems, and Components

Structures, systems, and components important to safety shall not be shared among nuclear power units unless it is shown that such sharing will not impair significantly 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.

Conformance with GDC 5 is described in Section 3.1.2.1 of the WBN dual-unit UFSAR.

Criterion 17 - Electric Power Systems

An onsite electric power system and an offsite electric power system shall be provided to permit functioning of structures, systems, and components important to safety. The safety function for each system (assuming the other system is not functioning) shall be to provide sufficient capacity and capability to assure that (1) specified acceptable fuel design limits and design 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 accidents.

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The onsite power sources, including the batteries, and the onsite electric distribution system, shall have sufficient independence, redundancy, and testability to perform their safety functions assuming a single failure.

Electric power from the transmission network to the onsite electric distribution system shall be supplied by two physically independent circuits (not necessarily on separate rights of way) 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. A switchyard common to both circuits is acceptable. Each of these circuits shall be designed to be available in sufficient time following a loss of all onsite alternating current power supplies and the other offsite electric power circuit, to assure that specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded. One of these circuits shall be designed to be available within a few seconds following a LOCA to assure that core cooling, containment integrity, and other vital safety functions are maintained.

Provisions shall be included to minimize the probability of losing electric power from any of the remaining sources as a result of, or coincident with, the loss of power generated by the nuclear power unit, the loss of power from the transmission network, or the loss of power from the onsite electric power supplies.

Conformance with GDC 17 is described in Section 3.1.2.2 of the WBN dual-unit UFSAR.

Criterion 18 - Inspection and Testing of Electric Power Systems

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. The systems shall be designed with a capability to test periodically (1) the operability and functional performance of the components of the systems, such as onsite power sources, relays, switches, and buses, and (2) the operability of the systems as a whole and, under conditions as close to design as practical, the full operation sequence that brings the systems into operation, including operation of applicable portions of the protection system, and the transfer of power among the nuclear power unit, the offsite power system, and the onsite power system.

Conformance with GDC 18 is described in Section 3.1.2.2 of the WBN dual-unit UFSAR.

4.2 PRECEDENT

While there is not an exact precedent for the proposed change, the eight-hour completion time for the new TS 3.8.9 Condition C is consistent with other operating nuclear plants' TS. For example, the Sequoyah Nuclear Plant (SQN) TS 3.8.9 (Reference 1) Condition B has an eight-hour completion time with one or more AC vital instrument power distribution subsystems inoperable. It should be noted that the eight-hour completion time was part of the original TS for SQN Unit 1 (TS 3.8.2.2 of Reference 2) and Unit 2 (TS 3.8.2.1 of Reference 3). Examples of operating nuclear plants with an eight-hour completion time for inoperable AC vital buses are listed in References 4 through 7. The Notes associated with the proposed TS 3.8.9 Condition C are also similar to those in SQN TS 3.8.9, Condition D.

4.3 SIGNIFICANT HAZARDS CONSIDERATION

The Tennessee Valley Authority (TVA) proposes to revise the Watts Bar Nuclear Plant (WBN) Unit 1 and Unit 2 Technical Specifications (TS) 3.8.9 as follows.

- Add new Condition C that applies when an AC vital bus in one channel in the opposite unit's AC vital bus is inoperable. Note 1 states that this new condition applies during planned maintenance. Note 2 states that this new condition applies when the opposite unit is in Mode 5, Mode 6, or defueled. The Required Action is to restore the opposite unit's AC vital bus to operable status with a Completion Time of eight hours.
- Renumber Conditions C, D, and E as D, E, and F, respectively.

TVA has evaluated whether or not a significant hazards consideration is involved with the proposed amendment(s) by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

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

Response: No.

The proposed change modifies the Required Actions for the opposite unit's 120-volt (V) alternating current (AC) vital bus system. This change will not affect the probability of an accident, because the distribution system is not an initiator of any accident sequence analyzed in the UFSAR. Rather, the opposite unit's distribution system support equipment is used to mitigate accidents. The consequences of an analyzed accident will not be significantly increased because the minimum requirements for distribution systems will be maintained to ensure the availability of the required power to mitigate accidents assumed in the UFSAR. Operation in accordance with the proposed TS will ensure that sufficient onsite electrical distribution systems are operable as required to support the unit's required features. Therefore, the mitigating functions supported by the onsite electrical distribution systems will continue to provide the protection assumed by the accident analysis. The integrity of fission product barriers, plant configuration, and operating procedures as described in the UFSAR will not be affected by the proposed changes. Thus, the consequences of previously analyzed accidents will not increase by implementing these changes.

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.

The proposed change modifies the Required Actions for the opposite unit's 120V AC vital bus system. This change will not physically alter the plant (no new or different type of equipment will be installed). The proposed change will maintain the minimum

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requirements for onsite electrical distribution systems to ensure the availability of the equipment required to mitigate accidents assumed in the UFSAR.

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 proposed change modifies the Required Actions for the opposite unit's 120V AC vital bus system. The margin of safety is not affected by this change because the minimum requirements for onsite electrical distribution systems will be maintained to ensure the availability of the required power to shutdown the reactor and maintain it in a safe shutdown condition after an AOO or a postulated DBA.

Therefore, the proposed amendment 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.

4.4 CONCLUSIONS

In conclusion, based on the considerations discussed above, (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.

5.0 ENVIRONMENTAL CONSIDERATION

A review has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluents that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

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6.0 REFERENCES

1. NRC Letter to TVA, "Sequoyah Nuclear Plant, Units 1 and 2 - Issuance of Amendments for the Conversion to the Improved Technical Specifications with Beyond Scope Issues (TAC Nos. MF3128 and MF3129)," dated September 30, 2015 (ML15238B460, ML15258A511, and ML15258A516)
2. NRC Letter to TVA, "Sequoyah Nuclear Plant, Unit 1 -Issuance of License No. DPR-77," dated February 29, 1980 (ML013240049 and 8003170012)
3. NUREG-0789, "Technical Specifications Sequoyah Nuclear Plant Unit No. 2," dated June 1981 (8106190023)
4. Arkansas Nuclear Unit 1 Technical Specification 3.8.9 (ML053130314)
5. Davis-Besse Nuclear Power Station Unit 1 Technical Specification 3.8.9 (ML053110490)
6. Joseph M. Farley Nuclear Plant Unit 1 Technical Specification 3.8.9 (ML052780033)
7. River Bend Station Unit 1 Technical Specification 3.8.9 (ML053110037)

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Table 1
WBN Safety Related Major Loads

Train 1A-A	Train 1B-B	Train 2A-A	Train 2B-B
<u>Unit 1 Loads:</u>	<u>Unit 1 Loads:</u>	<u>Unit 2 Loads:</u>	<u>Unit 2 Loads:</u>
Safety Injection (SI) Pump 1A-A	SI Pump 1B-B	SI Pump 2A-A	SI Pump 2B-B
Auxiliary Feedwater (AFW) Pump 1A-A	AFW Pump 1B-B	AFW Pump 2A-A	AFW Pump 2B-B
Residual Heat Removal (RHR) Pump 1A-A	RHR Pump 1B-B	RHR Pump 2A-A	RHR Pump 2B-B
Charging Pump 1A-A	Charging Pump 1B-B	Charging Pump 2A-A	Charging Pump 2B-B
Pressurizer (Pzr) Heater (Htr) Groups 1A-A (U1 A Engineered Safety Features (ESF) loads fed from associated 125V DC and 120V AC vital boards)	Pzr Htr Groups 1B-B (U1 B ESF loads fed from associated 125V DC and 120V AC vital boards)	Pzr Htr Groups 2A-A (U2 A ESF loads fed from associated 125V DC and 120V AC vital boards)	Pzr Htr Groups 2B-B (U2 B ESF loads fed from associated 125V DC and 120V AC vital boards)
<u>Shared Loads:</u>	<u>Shared Loads:</u>	<u>Shared Loads:</u>	<u>Shared Loads:</u>
ERCW Pumps A-A, D-A (Note 1)	ERCW Pump F-B, G-B (Note 1)	ERCW Pump B-A, C-A (Note 1)	ERCW Pump E-B, H-B (Note 1)
CCS Pump 1A-A (Note 2)	CCS Pump 1B-B (Note 2)	CCS Pump 2A-A (Note 2)	CCS Pump 2B-B (Note 2)
CCS Pump C-S Train A (Note 2)			CCS Pump C-S Train B (Note 2)
Spent Fuel Pit Pump C-S (Note 3)	Spent Fuel Pit Pump B (Note 3)	Spent Fuel Pit Pump A (Note 3)	Spent Fuel Pit Pump C-S Alt (Note 3)
Shutdown Board Room (SDBR) Air Handling Units (AHUs) A-A (Note 3)	SDBR AHUs C-B (Note 3)	SDBR AHUs B-A (Note 3)	SDBR AHUs D-B (Note 3)
Main Control Room (MCR) Chiller (Chlr) Package (Pkg) A-A (Note 4)	MCR Chlr Pkg B-B (Note 4)	Electric Board Room (EBR) Chlr Pkg A-A (Note 3)	EBR Chlr Pkg B-B (Note 3)
	SDBR Chlr Pkg B-B (Note 3)	SDBR Chlr Pkg A-A (Note 3)	
Control Building (CB) Emergency Air Cleanup Fan A-A (Note 7)	CB Emergency Air Cleanup Fan B-B (Note 7)	Emergency Gas Treatment System (EGTS) Room (Rm) Cooler A-A (Note 5)	EGTS Rm Cooler B-B (Note 5)
CB Emergency Pressure Fan A-A (Note 7)	Control Building (CB) Emergency Pressure Fan A-A (Note 7)	Auxiliary Building Gas Treatment (ABGTS) 1A-A (Note 6)	ABGTS 2B-B (Note 6)
125V Vital Batt Chgr I	125V Vital Batt Chgr II	125V Vital Batt Chgr III	125V Vital Batt Chgr IV
120V Vital Invt 1-I, 2-I (Note 8)	120V Vital Invt 1-II, 2-II (Note 8)	120V Vital Invt 1-III, 2-III	120V Vital Invt 1-IV, 2-IV

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Notes:

1. This load applies to TS 3.7.8 in Table 2
2. This load applies to TS 3.7.7 in Table 2
3. There is no TS associated with this load
4. This load applies to TS 3.7.11 in Table 2
5. This load applies to TS 3.6.9 in Table 2
6. This load applies to TS 3.7.12 in Table 2
7. This load applies to TS 3.7.10 in Table 2
8. The loads associated with the vital inverters apply to TS 3.3.7, 3.3.8, and 3.7.4, in Table 2

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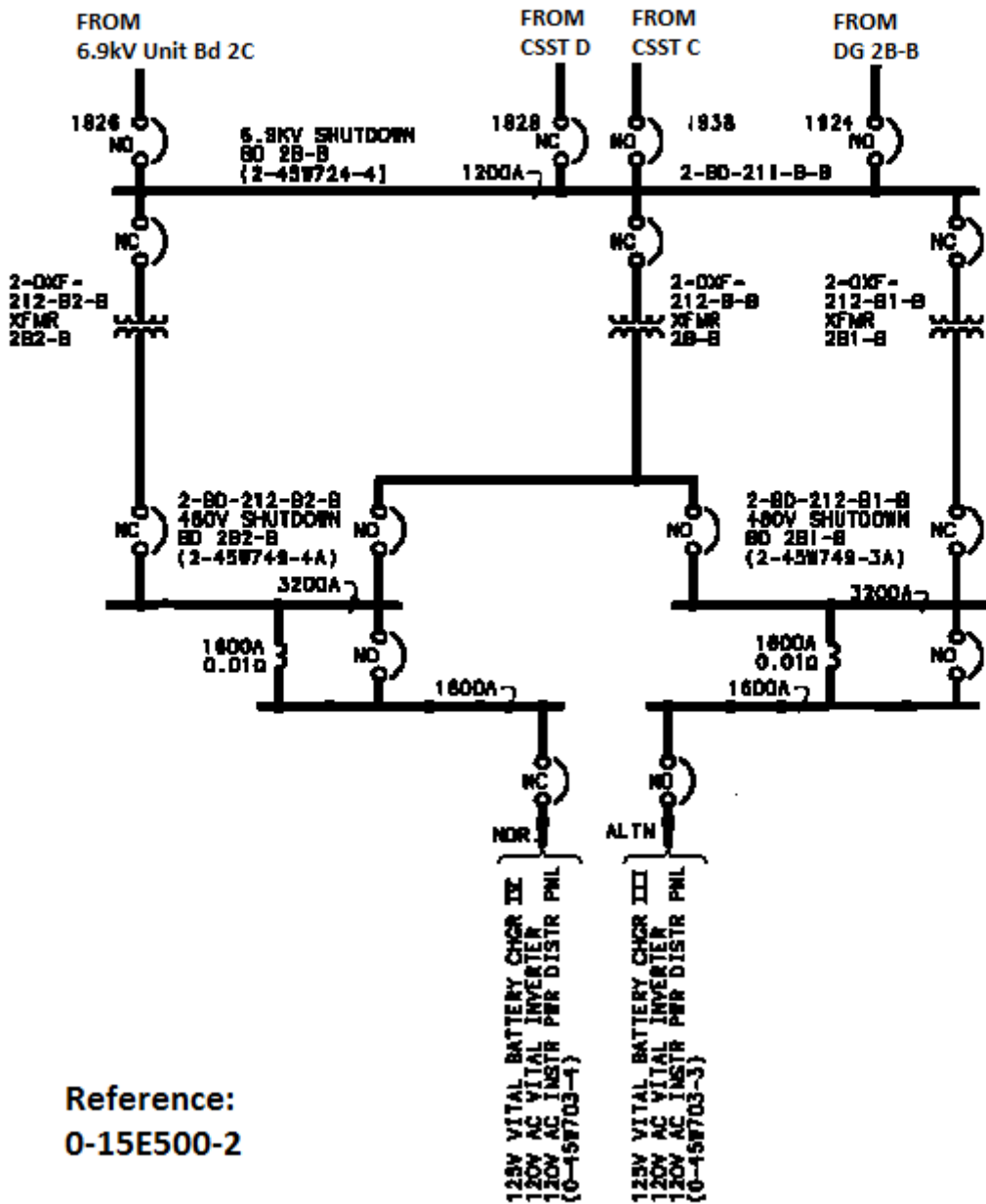
Table 2
WBN Unit 1 and Unit 2 Common System Applicable Technical Specifications

TS	System Applicability	Completion Time Impact
3.3.7	“Control Room Emergency Ventilation System (CREVS) Actuation Instrumentation”	7 Days
3.3.8	“Auxiliary Building Gas Treatment System (ABGTS) Actuation Instrumentation”	7 Days
3.6.9	“Emergency Gas Treatment System (EGTS)”	7 Days
3.7.4	“Atmospheric Dump Valves (ADV)s”	72 Hours
3.7.7	“Component Cooling System (CCS)”	72 Hours
3.7.8	“Essential Raw Cooling Water (ERCW) System”	72 Hours
3.7.10	“Control Room Emergency Ventilation System (CREVS)”	7 Days
3.7.11	“Control Room Emergency Air Temperature Control System (CREATCS)”	30 Days
3.7.12	“Auxiliary Building Gas Treatment System (ABGTS)”	7 Days

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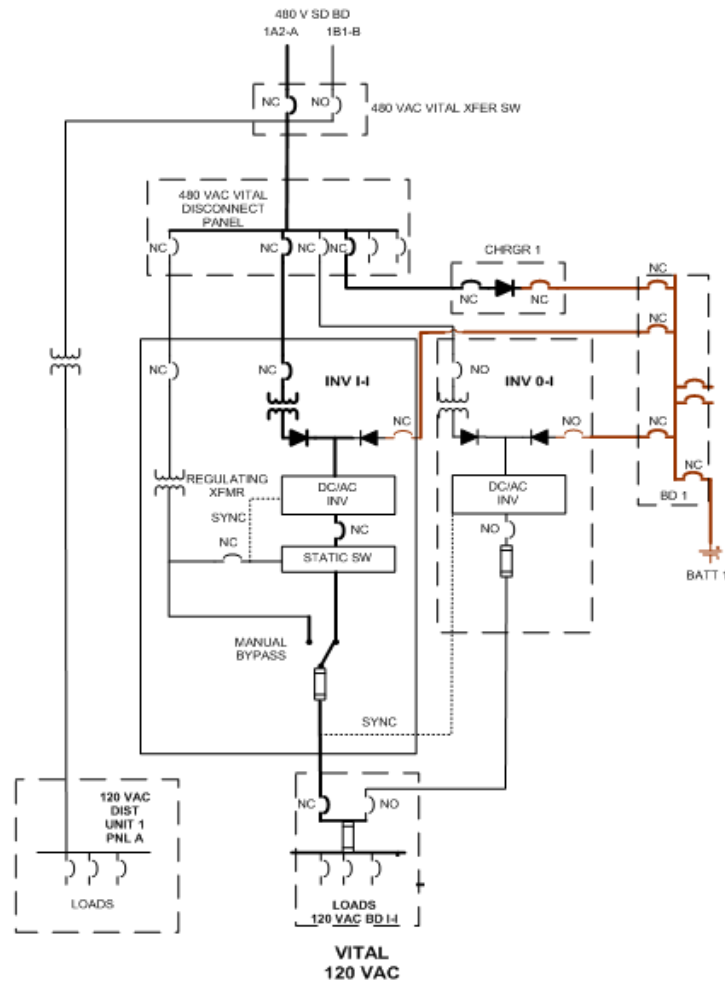
Figure 1 - Typical 120V AC Vital Power Source Alignment

Typical 120V AC Vital Power Source Alignment



ENCLOSURE

Figure 2 - Vital Instrument Power Boards



45W700-1

Vital Instrument Power Boards

- ▶ Four boards per Unit
 - ▶ U-1: Bd 1-I, 1-II, 1-III, 1-IV
 - ▶ U-2: Bd 2-I, 2-II, 2-III, 2-IV
- ▶ Boards located on El. 757 of Aux Bldg with two Bds per Vital Battery Bd room.
(Bds 1-I and 2-I in Room 1)
- ▶ Power supplies to Boards

Board	Normal	Alternate
1-I	Inverter 1-I	Spare Inv. 0-I
1-II	Inverter 1-II	Spare Inv. 0-II
1-III	Inverter 1-III	Spare Inv. 0-III
1-IV	Inverter 1-IV	Spare Inv. 0-IV

ENCLOSURE

Figure 3 - 120V Vital Distribution Board

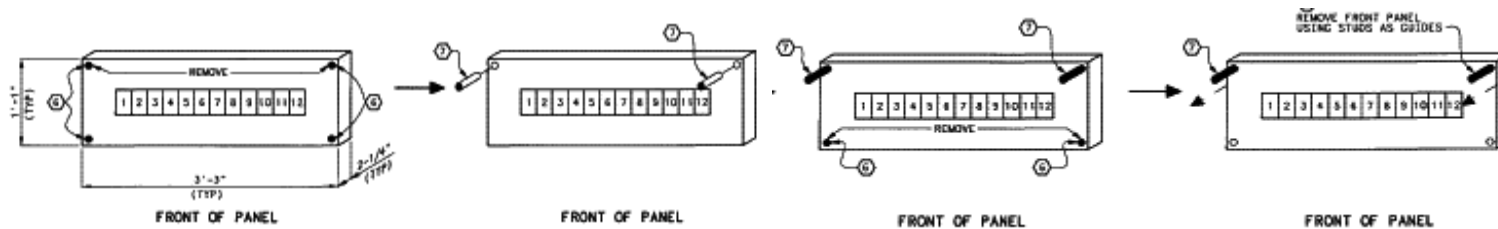


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Figure 4 - 120V Vital Distribution Board Maintenance

Replace 120V AC Breakers

1. Replace local panel top bolts and washers with temporary studs. Remove bottom bolts and washers and slide local panel out along studs. Remove panel as necessary for access to breakers.
2. Adjust or replace tie-wrap to temporarily support electrical bus bar, as needed.
3. Remove existing breaker and install replacement breaker, as required.
4. Torque replacement breaker/ instrument wire connector



ENCLOSURE

ATTACHMENT 1

Proposed TS Changes (Mark-Ups) for WBN Unit 1

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems - Operating

LCO 3.8.9 Train A and Train B AC, four channels of vital DC, and four channels of AC vital bus electrical power distribution subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION		REQUIRED ACTION	COMPLETION TIME
A.	One or more AC electrical power distribution subsystems inoperable.	A.1 Restore AC electrical power distribution subsystem to OPERABLE status.	8 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
B.	One or more Unit 1 AC vital buses in one channel inoperable.	B.1 Restore AC vital bus(es) to OPERABLE status.	2 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
<p>-----NOTES-----</p> <p>1. Only applicable during planned maintenance of a Unit 2 AC vital bus.</p> <p>2. Only applicable when Unit 2 is in MODE 5, MODE 6 or defueled.</p> <p>-----</p>		C.1 Restore the Unit 2 AC vital bus to OPERABLE status.	8 hours
C.	One Unit 2 AC vital bus in one channel inoperable.		

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One or more Unit 2 AC vital buses in one channel inoperable for reasons other than Condition C.	D.1 Restore the Unit 2 AC vital bus(es) to OPERABLE status.	2 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
DE. One or more vital DC electrical power distribution buses inoperable.	DE.1 Restore DC electrical power distribution bus to OPERABLE status.	2 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
DF. Required Action and associated Completion Time not met.	DF.1 Be in MODE 3. <u>AND</u> D.2 Be in MODE 5.	6 hours 36 hours
EG. Two trains with one or more inoperable distribution subsystems that result in a loss of safety function.	EG.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.8.9.1 Verify correct breaker alignments and voltage to required AC, vital DC, and AC vital bus electrical power distribution subsystems.	7 days

ENCLOSURE

ATTACHMENT 2

Proposed TS Changes (Mark-Ups) for WBN Unit 2

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems - Operating

LCO 3.8.9 Train A and Train B AC, four channels of vital DC, and four channels of AC vital bus electrical power distribution subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more AC electrical power distribution subsystems inoperable.	A.1 Restore AC electrical power distribution subsystem to OPERABLE status.	8 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
B. One or more Unit 2 AC vital buses in one channel inoperable.	B.1 Restore AC vital bus(es) to OPERABLE status.	2 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
<p>-----NOTES-----</p> <p>1. Only applicable during planned maintenance of a Unit 1 AC vital bus.</p> <p>2. Only applicable when Unit 1 is in MODE 5, MODE 6 or defueled.</p> <p>-----</p> <p>C. One Unit 1 AC vital bus in one channel inoperable.</p>	C.1 Restore the Unit 1 AC vital bus to OPERABLE status.	8 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One or more Unit 1 AC vital buses in one channel inoperable for reasons other than Condition C.	D.1 Restore the Unit 1 AC vital bus(es) to OPERABLE status.	2 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
C.E. One or more vital DC electrical power distribution buses inoperable.	C.E.1 Restore DC electrical power distribution bus to OPERABLE status.	2 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
D.F. Required Action and associated Completion Time not met.	D.F.1 Be in MODE 3. <u>AND</u> D.E.2 Be in MODE 5.	6 hours 36 hours
E.G. Two trains with one or more inoperable distribution subsystems that result in a loss of safety function.	E.G.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.8.9.1 Verify correct breaker alignments and voltage to required AC, vital DC, and AC vital bus electrical power distribution subsystems.	7 days

ENCLOSURE

ATTACHMENT 3

Proposed TS Bases Changes (Mark-Ups) for WBN Unit 1

ACTIONS

A.1 (continued)

subsequently restored OPERABLE, the LCO may already have been not met for up to 2 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the AC distribution system. At this time, a DC circuit could again become inoperable, and AC distribution restored OPERABLE. This could continue indefinitely.

The Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition A was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

B.1

With one or more Unit 1 AC vital buses in one channel inoperable (Vital channels 1-I, 1-II, 1-III, and 1-IV), the remaining OPERABLE AC vital buses are capable of supporting the minimum safety functions necessary to shut down the plant and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum required ESF functions not being supported. Therefore, the required AC vital bus must be restored to OPERABLE status within 2 hours by powering the bus from the associated unit or spare inverter via inverted DC, unit or spare inverter using internal AC source, or regulated transformer bypass source. See Conditions C.1 and D.1 for actions required when a Unit 2 vital bus is inoperable.

Condition B represents one or more AC vital buses in one channel without power; potentially both the DC source and the associated AC source are nonfunctioning. In this situation, the plant is significantly more vulnerable to a complete loss of all noninterruptible power. It is, therefore, imperative that the operator's attention focus on stabilizing the plant, minimizing the potential for loss of power to the remaining vital buses and restoring power to the affected vital bus.

This 2 hour limit is more conservative than Completion Times allowed for the vast majority of components that are without adequate vital AC power. Taking exception to LCO 3.0.2 for components without adequate vital AC power, that would have the Required Action Completion Times shorter than 2 hours if declared inoperable, is acceptable because of:

- a. The potential for decreased safety by requiring a change in plant conditions (i.e., requiring a shutdown) and not allowing stable operations to continue;
- b. The potential for decreased safety by requiring entry into numerous Applicable Conditions and Required Actions for components without adequate vital AC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train; and

ACTIONS

B.1 (continued)

- c. The potential for an event in conjunction with a single failure of a redundant component.

The 2 hour Completion Time takes into account the importance to safety of restoring the AC vital bus to OPERABLE status, the redundant capability afforded by the other OPERABLE vital buses, and the low probability of a DBA occurring during this period.

The second Completion Time for Required Action B.1 establishes a limit on the maximum allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition B is entered while, for instance, an AC bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the vital bus distribution system. At this time, an AC train could again become inoperable, and vital bus distribution restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition B was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

C.1

With a Unit 2 AC vital bus in one channel inoperable (Vital channels 2-I, 2-II, 2-III, and 2-IV), the remaining OPERABLE AC vital buses are capable of supporting the minimum safety functions necessary to shut down the plant and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum required ESF functions not being supported. Therefore, the inoperable Unit 2 AC vital bus must be restored to OPERABLE status within 8 hours. The 8-hour time limit is acceptable because the opposite unit's AC vital buses are not as critical to the operating unit (fewer operating unit loads) as the operating unit's AC vital buses.

This 8 hour limit is more conservative than Completion Times allowed for the vast majority of components that are without adequate vital AC power. Taking exception to LCO 3.0.2 for components without adequate vital AC power, that would have the Required Action Completion Times shorter than 8 hours if declared inoperable, is acceptable because:

- a. The potential for decreased safety by requiring a change in unit conditions (i.e., requiring a shutdown) and not allowing stable operations to continue;

ACTIONS

C.1 (continued)

- b. The potential for decreased safety by requiring entry into numerous Applicable Conditions and Required Actions for components without adequate vital AC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train; and
- c. The potential for an event in conjunction with a single failure of a redundant component.

Condition C is modified by two notes that limit the conditions and parameters that allow entry into Condition C. The first note states that Condition C is only applicable during planned maintenance of a Unit 2 AC vital bus. This note allows the plant configuration to be aligned to minimize features being inoperable when an opposite unit vital bus is made inoperable. The second note limits the applicability of Condition C to the time period when the opposite unit is either MODE 5, MODE 6, or defueled. This note limits the time period allowing Condition C to be entered, minimizing when the allowance can be utilized. The allowance for Condition C is acceptable based on the following:

- a. The opposite unit's AC vital buses are not as critical to the operating unit (fewer operating unit loads) as the operating unit's AC vital buses.
- b. Performing maintenance on these components will increase the reliability of the Class 1E AC Electrical Power Distribution System.
- c. The Required Actions associated with the features declared inoperable provide compensatory measures during the performance of the planned maintenance.
- d. The limited opportunities that allow the planned maintenance to occur.

During the planned maintenance of the Unit 2 vital buses, if a condition is discovered on these boards requiring corrective maintenance, this maintenance may be performed under Condition C.

D.1

With one or more Unit 2 AC vital buses in one channel inoperable (Vital channels 2-I, 2-II, 2-III, and 2-IV) for reasons other than Condition C and a loss of function has not occurred, the remaining OPERABLE AC vital buses are capable of supporting the minimum safety functions necessary to shut down the plant and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum required ESF functions not being supported. Therefore, the inoperable Unit 2 AC vital bus(es) must be restored to OPERABLE status within 2 hours by powering the bus from the associated unit or spare inverter via inverted DC, unit or spare inverter using internal AC source, or regulated transformer bypass source.

ACTIONS

D.1 (continued)

Condition D.1 is only applicable when a Unit 2 vital bus is inoperable for reasons other than preventive maintenance when Unit 2 is in MODE 5, MODE 6 or defueled.

GE.1

With one or more vital DC bus inoperable, the remaining DC electrical power distribution subsystems are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining DC electrical power distribution subsystem could result in the minimum required ESF functions not being supported. Therefore, the required DC buses must be restored to OPERABLE status within 2 hours by powering the bus from the associated battery or charger.

Condition ~~GE~~ represents one or more trains without adequate DC power; potentially both with the battery significantly degraded and the associated charger nonfunctioning. In this situation, the plant is significantly more vulnerable to a complete loss of all DC power. It is, therefore, imperative that the operator's attention focus on stabilizing the plant, minimizing the potential for loss of power to the remaining train(s) and restoring power to the affected train(s).

This 2 hour limit is more conservative than Completion Times allowed for the vast majority of components that would be without power. Taking exception to LCO 3.0.2 for components without adequate DC power, which would have Required Action Completion Times shorter than 2 hours, is acceptable because of:

- a. The potential for decreased safety by requiring a change in plant conditions (i.e., requiring a shutdown) while allowing stable operations to continue;
- b. The potential for decreased safety by requiring entry into numerous applicable Conditions and Required Actions for components without DC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train; and
- c. The potential for an event in conjunction with a single failure of a redundant component.

The 2 hour Completion Time for DC buses is consistent with Regulatory Guide 1.93 (Ref. 2).

ACTIONS

GE.1 (continued)

The second Completion Time for Required Action GE.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition GE is entered while, for instance, an AC bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the DC distribution system. At this time, an AC train could again become inoperable, and DC distribution restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition EG was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

DF.1 and DF.2

If the inoperable distribution subsystem cannot be restored to OPERABLE status within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

EG.1

With two trains with one or more inoperable distribution subsystems that result in a loss of safety function, adequate core cooling, containment OPERABILITY, and other vital functions for DBA mitigation would be compromised, and immediate plant shutdown in accordance with LCO 3.0.3 is required.

SURVEILLANCE
REQUIREMENTS

SR 3.8.9.1

This Surveillance verifies that the required AC, vital DC, and AC vital bus electrical power distribution systems are functioning properly, with the correct circuit breaker alignment. The correct breaker alignment ensures the appropriate separation and independence of the electrical trains is maintained, and the appropriate voltage is available to each required bus. The verification of proper voltage availability on the buses ensures that the required voltage is readily available for motive as well as control functions for critical system loads connected to these buses. The 7 day Frequency takes into account the redundant capability of the AC, vital DC, and AC vital bus electrical power distribution subsystems, and other indications available in the control room that alert the operator to subsystem malfunctions.

REFERENCES

1. Watts Bar FSAR, Section 6 "Engineering Safety Features," Section 8 "Electric Power," and Section 15 "Accident Analysis."
 2. Regulatory Guide 1.93, "Availability of Electric Power Sources," U.S. Nuclear Regulatory Commission, December 1974.
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ENCLOSURE

ATTACHMENT 4

Proposed TS Bases Changes (Mark-Ups) for WBN Unit 2

ACTIONS
(continued)

B.1

With one or more **Unit 2** AC vital buses in one channel inoperable (**Vital channels 2-I, 2-II, 2-III, and 2-IV**), the remaining OPERABLE AC vital buses are capable of supporting the minimum safety functions necessary to shut down the plant and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum required ESF functions not being supported. Therefore, the required AC vital bus must be restored to OPERABLE status within 2 hours by powering the bus from the associated unit or spare inverter via inverted DC, unit or spare inverter using internal AC source, or regulated transformer bypass source. **See Conditions C.1 and D.1 for actions required when a Unit 1 vital bus is inoperable**

Condition B represents one or more AC vital buses in one channel without power; potentially both the DC source and the associated AC source are nonfunctioning. In this situation, the plant is significantly more vulnerable to a complete loss of all non-interruptible power. It is, therefore, imperative that the operator's attention focus on stabilizing the plant, minimizing the potential for loss of power to the remaining vital buses and restoring power to the affected vital bus.

This 2 hour limit is more conservative than Completion Times allowed for the vast majority of components that are without adequate vital AC power. Taking exception to LCO 3.0.2 for components without adequate vital AC power, that would have the Required Action Completion Times shorter than 2 hours if declared inoperable, is acceptable because of:

- a. The potential for decreased safety by requiring a change in plant conditions (i.e., requiring a shutdown) and not allowing stable operations to continue;
- b. The potential for decreased safety by requiring entry into numerous Applicable Conditions and Required Actions for components without adequate vital AC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train; and
- c. The potential for an event in conjunction with a single failure of a redundant component.

The 2 hour Completion Time takes into account the importance to safety of restoring the AC vital bus to OPERABLE status, the redundant capability afforded by the other OPERABLE vital buses, and the low probability of a DBA occurring during this period.

(continued)

ACTIONS
(continued)

B.1 (continued)

The second Completion Time for Required Action B.1 establishes a limit on the maximum allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition B is entered while, for instance, an AC bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the vital bus distribution system. At this time, an AC train could again become inoperable, and vital bus distribution restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition B was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

C.1

With one Unit 1 AC vital bus in one channel inoperable (Vital channels 1-I, 1-II, 1-III, and 1-IV), the remaining OPERABLE AC vital buses are capable of supporting the minimum safety functions necessary to shut down the plant and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum required ESF functions not being supported. Therefore, the inoperable Unit 1 AC vital bus must be restored to OPERABLE status within 8 hours. The 8-hour time limit is acceptable because the opposite unit's AC vital buses are not as critical to the operating unit (fewer operating unit loads) as the operating unit's AC vital buses.

This 8 hour limit is more conservative than Completion Times allowed for the vast majority of components that are without adequate vital AC power. Taking exception to LCO 3.0.2 for components without adequate vital AC power, that would have the Required Action Completion Times shorter than 8 hours if declared inoperable, is acceptable because:

- a. The potential for decreased safety by requiring a change in unit conditions (i.e., requiring a shutdown) and not allowing stable operations to continue;

The potential for decreased safety by requiring entry into numerous Applicable Conditions and Required Actions for components without adequate vital AC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train; and

(continued)

ACTIONS
(continued)

C.1 (continued)

- b. The potential for an event in conjunction with a single failure of a redundant component.

Condition C is modified by two notes that limit the conditions and parameters that allow entry into Condition C. The first note states that Condition C is only applicable during planned maintenance of a Unit 1 AC vital bus. This will allow the plant configuration to be aligned to minimize features being inoperable when an opposite unit vital bus is made inoperable. The second note limits the applicability of Condition C to the time period when the opposite unit is either MODE 5, MODE 6, or defueled. This note limits the time period allowing Condition C to be entered, minimizing when the allowance can be utilized. The allowance for Condition C is acceptable based on the following:

- a. The opposite unit's AC vital buses are not as critical to the operating unit (fewer operating unit loads) as the operating unit's AC vital buses.
- b. Performing maintenance on these components will increase the reliability of the Class 1E AC Electrical Power Distribution System.
- c. The Required Actions associated with the features declared inoperable provide compensatory measures during the performance of the planned maintenance.
- d. The limited opportunities that allow the planned maintenance to occur.

During the planned maintenance of the Unit 1 vital buses, if a condition is discovered on these boards requiring corrective maintenance, this maintenance may be performed under Condition C.

D.1

With one or more Unit 1 AC vital buses in one channel inoperable (Vital channels 1-I, 1-II, 1-III, and 1-IV) for reasons other than Condition C and a loss of function has not occurred, the remaining OPERABLE AC vital buses are capable of supporting the minimum safety functions necessary to shut down the plant and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum required ESF functions not being supported. Therefore, the inoperable Unit 1 AC vital bus(es) must be restored to OPERABLE status within 2 hours by powering the bus from the associated unit or spare inverter via inverted DC, unit or spare inverter using internal AC source, or regulated transformer bypass source.

Condition D.1 is only applicable when a Unit 1 vital bus is inoperable for reasons other than preventive maintenance when Unit 1 is in MODE 5, MODE 6 or defueled.

(continued)

ACTIONS
(continued)

GE.1

With one or more vital DC buses inoperable, the remaining DC electrical power distribution subsystems are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining DC electrical power distribution subsystem could result in the minimum required ESF functions not being supported. Therefore, the required DC buses must be restored to OPERABLE status within 2 hours by powering the bus from the associated battery or charger.

Condition ~~EG~~ represents one or more trains without adequate DC power; potentially both with the battery significantly degraded and the associated charger nonfunctioning. In this situation, the plant is significantly more vulnerable to a complete loss of all DC power. It is, therefore, imperative that the operator's attention focus on stabilizing the plant, minimizing the potential for loss of power to the remaining train(s) and restoring power to the affected train(s).

This 2 hour limit is more conservative than Completion Times allowed for the vast majority of components that would be without power. Taking exception to LCO 3.0.2 for components without adequate DC power, which would have Required Action Completion Times shorter than 2 hours, is acceptable because of:

- a. The potential for decreased safety by requiring a change in plant conditions (i.e., requiring a shutdown) while allowing stable operations to continue;
- b. The potential for decreased safety by requiring entry into numerous applicable Conditions and Required Actions for components without DC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train; and
- c. The potential for an event in conjunction with a single failure of a redundant component.

The 2 hour Completion Time for DC buses is consistent with Regulatory Guide 1.93 (Ref. 2).

The second Completion Time for Required Action ~~EG~~.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition ~~EG~~ is entered while, for instance, an AC bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the

(continued)

ACTIONS
(continued)

GE.1 (continued)

DC distribution system. At this time, an AC train could again become inoperable, and DC distribution restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition EG was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

DF.1 and DF.2

If the inoperable distribution subsystem cannot be restored to OPERABLE status within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

EG.1

With two trains with one or more inoperable distribution subsystems that result in a loss of safety function, adequate core cooling, containment OPERABILITY, and other vital functions for DBA mitigation would be compromised, and immediate plant shutdown in accordance with LCO 3.0.3 is required.

SURVEILLANCE
REQUIREMENTS

SR 3.8.9.1

This Surveillance verifies that the required AC, vital DC, and AC vital bus electrical power distribution systems are functioning properly, with the correct circuit breaker alignment. The correct breaker alignment ensures the appropriate separation and independence of the electrical trains is maintained, and the appropriate voltage is available to each required bus. The verification of proper voltage availability on the buses ensures that the required voltage is readily available for motive as well as control functions for critical system loads connected to these buses. The 7 day Frequency takes into account the redundant capability of the AC, vital DC, and AC vital bus electrical power distribution subsystems, and other indications available in the control room that alert the operator to subsystem malfunctions.

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| REFERENCES | <ol style="list-style-type: none">1. Watts Bar FSAR, Section 6 "Engineering Safety Features," Section 8 "Electric Power," and Section 15 "Accident Analysis."2. Regulatory Guide 1.93, "Availability of Electric Power Sources," U.S. Nuclear Regulatory Commission, December 1974. |
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(continued)

ENCLOSURE

ATTACHMENT 5

Proposed TS Changes (Final Typed) for WBN Unit 1

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems - Operating

LCO 3.8.9 Train A and Train B AC, four channels of vital DC, and four channels of AC vital bus electrical power distribution subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION		REQUIRED ACTION	COMPLETION TIME
A.	One or more AC electrical power distribution subsystems inoperable.	A.1 Restore AC electrical power distribution subsystem to OPERABLE status.	8 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
B.	One or more Unit 1 AC vital buses in one channel inoperable.	B.1 Restore AC vital bus(es) to OPERABLE status.	2 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
<p>-----NOTES-----</p> <p>1. Only applicable during planned maintenance of a Unit 2 AC vital bus.</p> <p>2. Only applicable when Unit 2 is in MODE 5, MODE 6 or defueled.</p> <p>-----</p>		C.1 Restore the Unit 2 AC vital bus to OPERABLE status.	8 hours
C.	One Unit 2 AC vital bus in one channel inoperable.		

(continued)

ACTIONS (continued)

CONDITION		REQUIRED ACTION	COMPLETION TIME
D.	One or more Unit 2 AC vital buses in one channel inoperable for reasons other than Condition C.	D.1 Restore the Unit 2 AC vital bus(es) to OPERABLE status.	2 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
E.	One or more vital DC electrical power distribution buses inoperable.	E.1 Restore DC electrical power distribution bus to OPERABLE status.	2 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
F.	Required Action and associated Completion Time not met.	F.1 Be in MODE 3. <u>AND</u> D.2 Be in MODE 5.	6 hours 36 hours
G.	Two trains with one or more inoperable distribution subsystems that result in a loss of safety function.	G.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.9.1	Verify correct breaker alignments and voltage to required AC, vital DC, and AC vital bus electrical power distribution subsystems.	7 days

ENCLOSURE

ATTACHMENT 6

Proposed TS Changes (Final Typed) for WBN Unit 2

3.8 ELECTRICAL POWER SYSTEMS

3.8.9 Distribution Systems - Operating

LCO 3.8.9 Train A and Train B AC, four channels of vital DC, and four channels of AC vital bus electrical power distribution subsystems shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more AC electrical power distribution subsystems inoperable.	A.1 Restore AC electrical power distribution subsystem to OPERABLE status.	8 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
B. One or more Unit 2 AC vital buses in one channel inoperable.	B.1 Restore AC vital bus(es) to OPERABLE status.	2 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
<p>-----NOTES-----</p> <p>1. Only applicable during planned maintenance of a Unit 1 AC vital bus.</p> <p>2. Only applicable when Unit 1 is in MODE 5, MODE 6 or defueled.</p> <p>-----</p> <p>C. One Unit 1 AC vital bus in one channel inoperable.</p>	C.1 Restore the Unit 1 AC vital bus to OPERABLE status.	8 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One or more Unit 1 AC vital buses in one channel inoperable for reasons other than Condition C.	D.1 Restore the Unit 1 AC vital bus(es) to OPERABLE status.	2 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
E. One or more vital DC electrical power distribution buses inoperable.	E.1 Restore DC electrical power distribution bus to OPERABLE status.	2 hours <u>AND</u> 16 hours from discovery of failure to meet LCO
F. Required Action and associated Completion Time not met.	F.1 Be in MODE 3. <u>AND</u> E.2 Be in MODE 5.	6 hours 36 hours
G. Two trains with one or more inoperable distribution subsystems that result in a loss of safety function.	G.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.8.9.1 Verify correct breaker alignments and voltage to required AC, vital DC, and AC vital bus electrical power distribution subsystems.	7 days

ENCLOSURE

ATTACHMENT 7

Proposed TS Bases Changes (Final Typed) for WBN Unit 1

ACTIONS

A.1 (continued)

subsequently restored OPERABLE, the LCO may already have been not met for up to 2 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the AC distribution system. At this time, a DC circuit could again become inoperable, and AC distribution restored OPERABLE. This could continue indefinitely.

The Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition A was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

B.1

With one or more Unit 1 AC vital buses in one channel inoperable (Vital channels 1-I, 1-II, 1-III, and 1-IV), the remaining OPERABLE AC vital buses are capable of supporting the minimum safety functions necessary to shut down the plant and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum required ESF functions not being supported. Therefore, the required AC vital bus must be restored to OPERABLE status within 2 hours by powering the bus from the associated unit or spare inverter via inverted DC, unit or spare inverter using internal AC source, or regulated transformer bypass source. See Conditions C.1 and D.1 for actions required when a Unit 2 vital bus is inoperable.

Condition B represents one or more AC vital buses in one channel without power; potentially both the DC source and the associated AC source are nonfunctioning. In this situation, the plant is significantly more vulnerable to a complete loss of all noninterruptible power. It is, therefore, imperative that the operator's attention focus on stabilizing the plant, minimizing the potential for loss of power to the remaining vital buses and restoring power to the affected vital bus.

This 2 hour limit is more conservative than Completion Times allowed for the vast majority of components that are without adequate vital AC power. Taking exception to LCO 3.0.2 for components without adequate vital AC power, that would have the Required Action Completion Times shorter than 2 hours if declared inoperable, is acceptable because of:

- a. The potential for decreased safety by requiring a change in plant conditions (i.e., requiring a shutdown) and not allowing stable operations to continue;
- b. The potential for decreased safety by requiring entry into numerous Applicable Conditions and Required Actions for components without adequate vital AC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train; and

ACTIONS

B.1 (continued)

- c. The potential for an event in conjunction with a single failure of a redundant component.

The 2 hour Completion Time takes into account the importance to safety of restoring the AC vital bus to OPERABLE status, the redundant capability afforded by the other OPERABLE vital buses, and the low probability of a DBA occurring during this period.

The second Completion Time for Required Action B.1 establishes a limit on the maximum allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition B is entered while, for instance, an AC bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the vital bus distribution system. At this time, an AC train could again become inoperable, and vital bus distribution restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition B was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

C.1

With a Unit 2 AC vital bus in one channel inoperable (Vital channels 2-I, 2-II, 2-III, and 2-IV), the remaining OPERABLE AC vital buses are capable of supporting the minimum safety functions necessary to shut down the plant and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum required ESF functions not being supported. Therefore, the inoperable Unit 2 AC vital bus must be restored to OPERABLE status within 8 hours. The 8-hour time limit is acceptable because the opposite unit's AC vital buses are not as critical to the operating unit (fewer operating unit loads) as the operating unit's AC vital buses.

This 8 hour limit is more conservative than Completion Times allowed for the vast majority of components that are without adequate vital AC power. Taking exception to LCO 3.0.2 for components without adequate vital AC power, that would have the Required Action Completion Times shorter than 8 hours if declared inoperable, is acceptable because:

- a. The potential for decreased safety by requiring a change in unit conditions (i.e., requiring a shutdown) and not allowing stable operations to continue;

ACTIONS

C.1 (continued)

- b. The potential for decreased safety by requiring entry into numerous Applicable Conditions and Required Actions for components without adequate vital AC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train; and
- c. The potential for an event in conjunction with a single failure of a redundant component.

Condition C is modified by two notes that limit the conditions and parameters that allow entry into Condition C. The first note states that Condition C is only applicable during planned maintenance of a Unit 2 AC vital bus. This note allows the plant configuration to be aligned to minimize features being inoperable when an opposite unit vital bus is made inoperable. The second note limits the applicability of Condition C to the time period when the opposite unit is either MODE 5, MODE 6, or defueled. This note limits the time period allowing Condition C to be entered, minimizing when the allowance can be utilized. The allowance for Condition C is acceptable based on the following:

- a. The opposite unit's AC vital buses are not as critical to the operating unit (fewer operating unit loads) as the operating unit's AC vital buses.
- b. Performing maintenance on these components will increase the reliability of the Class 1E AC Electrical Power Distribution System.
- c. The Required Actions associated with the features declared inoperable provide compensatory measures during the performance of the planned maintenance.
- d. The limited opportunities that allow the planned maintenance to occur.

During the planned maintenance of the Unit 2 vital buses, if a condition is discovered on these boards requiring corrective maintenance, this maintenance may be performed under Condition C.

D.1

With one or more Unit 2 AC vital buses in one channel inoperable (Vital channels 2-I, 2-II, 2-III, and 2-IV) for reasons other than Condition C and a loss of function has not occurred, the remaining OPERABLE AC vital buses are capable of supporting the minimum safety functions necessary to shut down the plant and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum required ESF functions not being supported. Therefore, the inoperable Unit 2 AC vital bus(es) must be restored to OPERABLE status within 2 hours by powering the bus from the associated unit or spare inverter via inverted DC, unit or spare inverter using internal AC source, or regulated transformer bypass source.

ACTIONS

D.1 (continued)

Condition D.1 is only applicable when a Unit 2 vital bus is inoperable for reasons other than preventive maintenance when Unit 2 is in MODE 5, MODE 6 or defueled.

E.1

With one or more vital DC bus inoperable, the remaining DC electrical power distribution subsystems are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining DC electrical power distribution subsystem could result in the minimum required ESF functions not being supported. Therefore, the required DC buses must be restored to OPERABLE status within 2 hours by powering the bus from the associated battery or charger.

Condition E represents one or more trains without adequate DC power; potentially both with the battery significantly degraded and the associated charger nonfunctioning. In this situation, the plant is significantly more vulnerable to a complete loss of all DC power. It is, therefore, imperative that the operator's attention focus on stabilizing the plant, minimizing the potential for loss of power to the remaining train(s) and restoring power to the affected train(s).

This 2 hour limit is more conservative than Completion Times allowed for the vast majority of components that would be without power. Taking exception to LCO 3.0.2 for components without adequate DC power, which would have Required Action Completion Times shorter than 2 hours, is acceptable because of:

- a. The potential for decreased safety by requiring a change in plant conditions (i.e., requiring a shutdown) while allowing stable operations to continue;
- b. The potential for decreased safety by requiring entry into numerous applicable Conditions and Required Actions for components without DC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train; and
- c. The potential for an event in conjunction with a single failure of a redundant component.

The 2 hour Completion Time for DC buses is consistent with Regulatory Guide 1.93 (Ref. 2).

ACTIONS

E.1 (continued)

The second Completion Time for Required Action E.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition E is entered while, for instance, an AC bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the DC distribution system. At this time, an AC train could again become inoperable, and DC distribution restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition E was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

F.1 and F.2

If the inoperable distribution subsystem cannot be restored to OPERABLE status within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

G.1

With two trains with one or more inoperable distribution subsystems that result in a loss of safety function, adequate core cooling, containment OPERABILITY, and other vital functions for DBA mitigation would be compromised, and immediate plant shutdown in accordance with LCO 3.0.3 is required.

SURVEILLANCE
REQUIREMENTS

SR 3.8.9.1

This Surveillance verifies that the required AC, vital DC, and AC vital bus electrical power distribution systems are functioning properly, with the correct circuit breaker alignment. The correct breaker alignment ensures the appropriate separation and independence of the electrical trains is maintained, and the appropriate voltage is available to each required bus. The verification of proper voltage availability on the buses ensures that the required voltage is readily available for motive as well as control functions for critical system loads connected to these buses. The 7 day Frequency takes into account the redundant capability of the AC, vital DC, and AC vital bus electrical power distribution subsystems, and other indications available in the control room that alert the operator to subsystem malfunctions.

REFERENCES

1. Watts Bar FSAR, Section 6 "Engineering Safety Features," Section 8 "Electric Power," and Section 15 "Accident Analysis."
 2. Regulatory Guide 1.93, "Availability of Electric Power Sources," U.S. Nuclear Regulatory Commission, December 1974.
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ENCLOSURE

ATTACHMENT 8

Proposed TS Bases Changes (Final Typed) for WBN Unit 2

ACTIONS
(continued)

B.1

With one or more Unit 2 AC vital buses in one channel inoperable (Vital channels 2-I, 2-II, 2-III, and 2-IV), the remaining OPERABLE AC vital buses are capable of supporting the minimum safety functions necessary to shut down the plant and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum required ESF functions not being supported. Therefore, the required AC vital bus must be restored to OPERABLE status within 2 hours by powering the bus from the associated unit or spare inverter via inverted DC, unit or spare inverter using internal AC source, or regulated transformer bypass source. See Conditions C.1 and D.1 for actions required when a Unit 1 vital bus is inoperable

Condition B represents one or more AC vital buses in one channel without power; potentially both the DC source and the associated AC source are nonfunctioning. In this situation, the plant is significantly more vulnerable to a complete loss of all non-interruptible power. It is, therefore, imperative that the operator's attention focus on stabilizing the plant, minimizing the potential for loss of power to the remaining vital buses and restoring power to the affected vital bus.

This 2 hour limit is more conservative than Completion Times allowed for the vast majority of components that are without adequate vital AC power. Taking exception to LCO 3.0.2 for components without adequate vital AC power, that would have the Required Action Completion Times shorter than 2 hours if declared inoperable, is acceptable because of:

- a. The potential for decreased safety by requiring a change in plant conditions (i.e., requiring a shutdown) and not allowing stable operations to continue;
- b. The potential for decreased safety by requiring entry into numerous Applicable Conditions and Required Actions for components without adequate vital AC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train; and
- c. The potential for an event in conjunction with a single failure of a redundant component.

The 2 hour Completion Time takes into account the importance to safety of restoring the AC vital bus to OPERABLE status, the redundant capability afforded by the other OPERABLE vital buses, and the low probability of a DBA occurring during this period.

(continued)

ACTIONS
(continued)

B.1 (continued)

The second Completion Time for Required Action B.1 establishes a limit on the maximum allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition B is entered while, for instance, an AC bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the vital bus distribution system. At this time, an AC train could again become inoperable, and vital bus distribution restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition B was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

C.1

With one Unit 1 AC vital bus in one channel inoperable (Vital channels 1-I, 1-II, 1-III, and 1-IV), the remaining OPERABLE AC vital buses are capable of supporting the minimum safety functions necessary to shut down the plant and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum required ESF functions not being supported. Therefore, the inoperable Unit 1 AC vital bus must be restored to OPERABLE status within 8 hours. The 8-hour time limit is acceptable because the opposite unit's AC vital buses are not as critical to the operating unit (fewer operating unit loads) as the operating unit's AC vital buses.

This 8 hour limit is more conservative than Completion Times allowed for the vast majority of components that are without adequate vital AC power. Taking exception to LCO 3.0.2 for components without adequate vital AC power, that would have the Required Action Completion Times shorter than 8 hours if declared inoperable, is acceptable because:

- a. The potential for decreased safety by requiring a change in unit conditions (i.e., requiring a shutdown) and not allowing stable operations to continue;

The potential for decreased safety by requiring entry into numerous Applicable Conditions and Required Actions for components without adequate vital AC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train; and

(continued)

ACTIONS
(continued)

C.1 (continued)

- b. The potential for an event in conjunction with a single failure of a redundant component.

Condition C is modified by two notes that limit the conditions and parameters that allow entry into Condition C. The first note states that Condition C is only applicable during planned maintenance of a Unit 1 AC vital bus. This will allow the plant configuration to be aligned to minimize features being inoperable when an opposite unit vital bus is made inoperable. The second note limits the applicability of Condition C to the time period when the opposite unit is either MODE 5, MODE 6, or defueled. This note limits the time period allowing Condition C to be entered, minimizing when the allowance can be utilized. The allowance for Condition C is acceptable based on the following:

- a. The opposite unit's AC vital buses are not as critical to the operating unit (fewer operating unit loads) as the operating unit's AC vital buses.
- b. Performing maintenance on these components will increase the reliability of the Class 1E AC Electrical Power Distribution System.
- c. The Required Actions associated with the features declared inoperable provide compensatory measures during the performance of the planned maintenance.
- d. The limited opportunities that allow the planned maintenance to occur.

During the planned maintenance of the Unit 1 vital buses, if a condition is discovered on these boards requiring corrective maintenance, this maintenance may be performed under Condition C.

D.1

With one or more Unit 1 AC vital buses in one channel inoperable (Vital channels 1-I, 1-II, 1-III, and 1-IV) for reasons other than Condition C and a loss of function has not occurred, the remaining OPERABLE AC vital buses are capable of supporting the minimum safety functions necessary to shut down the plant and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum required ESF functions not being supported. Therefore, the inoperable Unit 1 AC vital bus(es) must be restored to OPERABLE status within 2 hours by powering the bus from the associated unit or spare inverter via inverted DC, unit or spare inverter using internal AC source, or regulated transformer bypass source.

Condition D.1 is only applicable when a Unit 1 vital bus is inoperable for reasons other than preventive maintenance when Unit 1 is in MODE 5, MODE 6 or defueled.

(continued)

ACTIONS
(continued)

E.1

With one or more vital DC buses inoperable, the remaining DC electrical power distribution subsystems are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining DC electrical power distribution subsystem could result in the minimum required ESF functions not being supported. Therefore, the required DC buses must be restored to OPERABLE status within 2 hours by powering the bus from the associated battery or charger.

Condition E represents one or more trains without adequate DC power; potentially both with the battery significantly degraded and the associated charger nonfunctioning. In this situation, the plant is significantly more vulnerable to a complete loss of all DC power. It is, therefore, imperative that the operator's attention focus on stabilizing the plant, minimizing the potential for loss of power to the remaining train(s) and restoring power to the affected train(s).

This 2 hour limit is more conservative than Completion Times allowed for the vast majority of components that would be without power. Taking exception to LCO 3.0.2 for components without adequate DC power, which would have Required Action Completion Times shorter than 2 hours, is acceptable because of:

- a. The potential for decreased safety by requiring a change in plant conditions (i.e., requiring a shutdown) while allowing stable operations to continue;
- b. The potential for decreased safety by requiring entry into numerous applicable Conditions and Required Actions for components without DC power and not providing sufficient time for the operators to perform the necessary evaluations and actions for restoring power to the affected train; and
- c. The potential for an event in conjunction with a single failure of a redundant component.

The 2 hour Completion Time for DC buses is consistent with Regulatory Guide 1.93 (Ref. 2).

The second Completion Time for Required Action E.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition E is entered while, for instance, an AC bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the

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ACTIONS
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E.1 (continued)

DC distribution system. At this time, an AC train could again become inoperable, and DC distribution restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This will result in establishing the "time zero" at the time the LCO was initially not met, instead of the time Condition E was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

F.1 and F.2

If the inoperable distribution subsystem cannot be restored to OPERABLE status within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

G.1

With two trains with one or more inoperable distribution subsystems that result in a loss of safety function, adequate core cooling, containment OPERABILITY, and other vital functions for DBA mitigation would be compromised, and immediate plant shutdown in accordance with LCO 3.0.3 is required.

SURVEILLANCE
REQUIREMENTS

SR 3.8.9.1

This Surveillance verifies that the required AC, vital DC, and AC vital bus electrical power distribution systems are functioning properly, with the correct circuit breaker alignment. The correct breaker alignment ensures the appropriate separation and independence of the electrical trains is maintained, and the appropriate voltage is available to each required bus. The verification of proper voltage availability on the buses ensures that the required voltage is readily available for motive as well as control functions for critical system loads connected to these buses. The 7 day Frequency takes into account the redundant capability of the AC, vital DC, and AC vital bus electrical power distribution subsystems, and other indications available in the control room that alert the operator to subsystem malfunctions.

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| REFERENCES | <ol style="list-style-type: none">1. Watts Bar FSAR, Section 6 "Engineering Safety Features," Section 8 "Electric Power," and Section 15 "Accident Analysis."2. Regulatory Guide 1.93, "Availability of Electric Power Sources," U.S. Nuclear Regulatory Commission, December 1974. |
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