



Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402-2801

November 30, 2009

10 CFR 50.4
10 CFR 50.90

WBN-TS-09-24

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

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

Subject: Technical Specification Change Request to Revise Completion Time for Inoperable Diesel Generator(s)

In accordance with the provisions of 10 CFR 50.90, "Application for amendment of license, construction permit, or early site permit," the Tennessee Valley Authority (TVA) requests that Appendix A of Facility Operating License No. NPF-90, Watts Bar Nuclear Plant (WBN), Unit 1 Technical Specifications (TSs), be amended to modify conditions and associated actions to TS 3.8.1, "AC Sources Operating." The proposed amendment is being requested in anticipation of the completion and startup of WBN Unit 2. It will revise the Completion Time for restoring one or more inoperable diesel generators (DGs) in one train to an operable status and increase the Completion Time for confirming that the other DGs are not impacted by a common cause failure. TVA intends to submit a subsequent license amendment request to extend the completion time for an inoperable DG prior to dual unit operation.

Enclosed is TVA's evaluation of the proposed change. Included as part of the enclosure are the changes to the TS Bases for the affected actions.

TVA has determined that there are no significant hazards considerations associated with the proposed change and that the license amendment 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), a copy of the proposed amendment is being forwarded to the designated Tennessee state official.

TVA requests approval of this license amendment by November 30, 2010. Implementation of the amendment will be completed after the issuance of the facility operating license for WBN Unit 2 and prior to Unit 2 entry into Mode 4, "Hot Shutdown."

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There are no regulatory commitments associated with this letter or its enclosure.
Please direct any questions concerning this matter to Kevin Casey at (423) 751-8523.

I declare under the penalty of perjury that the foregoing is true and correct.
Executed on the 30th day of November, 2009.

Respectfully,



R. M. Krich
Vice President
Nuclear Licensing

Enclosure
cc (Enclosure):

NRC Regional Administrator – Region II
NRC Senior Resident Inspector – Watts Bar Nuclear Plant
TN Department of Environment & Conservation – Division of Radiological Health

ENCLOSURE

EVALUATION OF THE PROPOSED CHANGE

Technical Specification Change Request to Revise Completion Time for Inoperable Diesel Generator(s)

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- 2.0 DETAILED DESCRIPTION
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1.0 SUMMARY DESCRIPTION

The Tennessee Valley Authority (TVA) requests that Appendix A of Facility Operating License No. NPF-90, Watts Bar Nuclear Plant (WBN), Unit 1 Technical Specifications (TSs), be amended to modify conditions and associated actions to TS 3.8.1, "AC Sources Operating." The proposed amendment is being requested in anticipation of the completion and startup of WBN Unit 2. It will revise the Completion Time for restoring one or more inoperable diesel generators (DGs) in one train to an operable status and increase the Completion Time for confirming that the other DGs are not impacted by a common cause failure. TVA is requesting this license amendment, because the basis for the Completion Time of WBN Unit 1 TS 3.8.1 Required Action B.4 will no longer be valid when WBN Unit 2 receives its operating license and enters Mode 4. The risk-based justification for the 14-day Completion Time was based on operation of a single unit. The four DGs at WBN will support operation of both Unit 1 and Unit 2. Additionally, TVA proposes the removal of a note allowing use of the C-S DG because the C-S DG has not been maintained.

TVA requests approval of this license amendment by November 30, 2010. Implementation of the amendment will be completed after the issuance of the facility operating license for WBN Unit 2 and prior to Unit 2 entry into Mode 4, "Hot Shutdown."

2.0 DETAILED DESCRIPTION

WBN has four Class 1E, DG sets to provide onsite emergency alternating current (ac) power to essential safety systems in the event of a loss of offsite power (LOOP), degraded voltage on the 6.9 kV shutdown boards, and/or a safety injection (SI) signal. The DG power system is divided into two redundant load groups. Each load group has two power trains (train 1A and 2A; train 1B and 2B) and supplies power to all safety-related plant loads. There are four 6.9 kV shutdown boards that are arranged into four electrical power trains (two per unit) with two boards associated with each load group and each unit. Load group A is located in Unit 1, and load group B is in Unit 2. Two DGs in the same train are needed. Separate DGs are provided for each shutdown board to provide power when offsite power is not available.

Each DG set is complete with its own air starting system, fuel supply system, and automatic control circuitry. The DGs are designed, installed, and tested to requirements that ensure their availability. The DGs are also designed to operate in parallel with the normal electrical power source for test and exercise purposes.

Each diesel-generator set is furnished by Power Systems-A Morrison-Knudsen Division and consists of two 16-cylinder engines (EMD 16-645E4) directly connected to a 6.9 kV Electric Products generator. The continuous rating of each set is 4400 kW at 0.8 power factor, 6.9 kV, 3-phase, and 60 Hz. Each diesel-generator set also has an additional rating of 4840 kW for two hours out of 24. The normal operating speed of the set is 900 rpm. The diesel-generator set uses a tandem arrangement; that is, each set consists of two diesel engines with a generator between them connected together to form a common shaft. The generator sets are physically separated and electrically isolated from each other.

The DGs are also designed for a life of 40 years with normal maintenance. DG voltage and frequency limits and the starting and loading reliability factors meet Regulatory Guide 1.9, Revision 3, and IEEE Standard 387-1984, "Criteria for Diesel Generator Units Applied as Standby Power Supplies for Nuclear Power Stations." Additional information regarding the design of the WBN electrical system is contained in Chapter 8, "Electric Power," of the Updated Final Safety Analysis Report.

WBN Unit 1 TSs are proposed to be amended to modify conditions and associated actions to TS 3.8.1. This proposed amendment is being requested in anticipation of the completion and startup of WBN Unit 2, and will revise the COMPLETION TIME for the WBN DGs from 14 days to 72 hours. Specifically, the change eliminates TS 3.8.1 Condition B and the associated required actions and completion times and modifies the conditions described in existing Condition C from:

"C. Two required DGs in Train
A inoperable.

OR

Two required DGs in Train
B inoperable."

to:

"B. One or more DG(s) in
Train A inoperable.

OR

One or more DG(s) in
Train B inoperable."

As a result of the elimination of TS 3.8.1, Condition B, for the condition of one required DG inoperable, the Required Action and associated Completion Time to restore the DG to operable status is effectively changed from 14 days to 72 hours. Furthermore, the maximum Completion Time for restoration of one required DG is effectively changed from "17 days from discovery of failure to meet LCO" to "6 days from discovery of failure to meet LCO." Subsequent conditions and required actions are relabeled due to the elimination of TS 3.8.1, Condition B.

As a result of the changes to existing Condition C, administrative and editorial changes will also be made to Required Actions C.2, C.3.1, C.3.2, and C.4 to maintain consistency with the revised condition statement. The current Required Actions C.2, C.3.1, C.3.2, and C.4 for TS 3.8.1 are shown below.

"C.2 Declare required feature(s)
supported by the inoperable
DGs inoperable when its
required redundant feature(s) is
inoperable.

C.3.1 Determine OPERABLE DGs are not inoperable due to common cause failure.

OR

C.3.2 Perform SR 3.8.1.2 for OPERABLE DGs.

C.4 Restore at least one required DG to OPERABLE status.”

The proposed revised Required Actions B.2, B.3.1, B.3.2, and B.4 for TS 3.8.1 are shown below.

“B.2 Declare required feature(s) supported by the inoperable DG(s) inoperable when its required redundant feature(s) is inoperable.

B.3.1 Determine OPERABLE DG(s) is not inoperable due to common cause failure.

OR

B.3.2 Perform SR 3.8.1.2 for OPERABLE DG(s).

B.4 Restore required DG(s) to OPERABLE status.”

The Completion Times for existing TS 3.8.1 Required Actions C.3.1 and C.3.2 (new Required Actions B.3.1 and B.3.2) are proposed to be increased from 12 hours to 24 hours.

In addition, the note to Limiting Condition for Operation (LCO) 3.8.1 which states “The C-S DG may be substituted for any of the required DGs,” is deleted.

The proposed changes to TS 3.8.1 and corresponding proposed changes to the associated TS Bases are provided in Attachments 1 and 2, respectively. The revised TS 3.8.1 and associated TS Bases are provided in Attachments 3 and 4.

3.0 TECHNICAL EVALUATION

On July 1, 2002 (Reference 6.2), the NRC issued Amendment No. 39 to Facility Operating License No. NPF-90 that changed TS LCO 3.8.1, “AC Sources Operating,” Completion Time to restore an inoperable DG to operable status from 72 hours to 14 days. In the Safety Evaluation related to Amendment No. 39, the NRC documented

their review of the proposed change. As part of the basis for their acceptance of the proposed change, the NRC cited the TVA submittal on April 1, 2002 (Reference 6.3), regarding the capabilities of the DGs, and indicated that:

“The cross-train interconnection capability of DGs ensures that two DGs are available for contingency purposes to power one train of safe shutdown loads for a design basis event during the extended maintenance outage.”

TVA is requesting this license amendment, because the basis for the Completion Time of WBN Unit 1 TS 3.8.1 Required Action B.4 will no longer be valid when WBN Unit 2 receives its operating license and enters Mode 4. The risk-based justification for the 14-day Completion Time was based on operation of a single unit. The four DGs at WBN will support operation of both Unit 1 and Unit 2. As a result, the Required Action Completion Time for the condition of one DG in either Train A or Train B inoperable is proposed to be revised from 14 days to 72 hours to be consistent with the Required Action Completion Time that existed for this condition prior to the issuance of Amendment No. 39 (Reference 6.2). This proposed 72 hour completion time is consistent with the completion time provided for restoring one DG to operable status provided in TS 3.8.1, “AC Sources – Operating,” of NUREG-1431, “Standard Technical Specifications Westinghouse Plants” (Reference 6.4). The change from 14 days to 72 hours for restoration of one or more inoperable DG(s) in a single train represents a more restrictive specification for plant operation.

The administrative and editorial changes made as a result of the deletion of Condition B have no impact on public health and safety.

In License Amendment No. 39 (Reference 6.2) to the WBN Unit 1 TS, the Completion Times for TS 3.8.1 Required Actions B.3.1, B.3.2, C.3.1, and C.3.2 were established at 12 hours. The 12-hour Completion Time to determine that the remaining operable DGs were not subject to a common cause failure or to perform the applicable surveillance to establish operability supported the probabilistic risk analysis for the expansion of the Completion Time from 72 hours to 14 days for an inoperable DG. This license amendment request eliminates the dependency on the risk-based justification. As a result, TVA proposes to increase the Completion Time for Required Actions C.3.1 and C.3.2 (new Required Actions B.3.1 and B.3.2) from 12 hours to 24 hours. This change is consistent with NUREG-1431 (Reference 6.4) and Generic Letter 84-15, “Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability” (Reference 6.5). In the event of an inoperable DG, Appendix A of Generic Letter 84-15 established a 24-hour Completion Time for performing the applicable surveillance to establish the operability of the other DG.

According to the TS Bases B 3.8.1, the provisions of the note that allow the C-S DG to be substituted for any required DG are only applicable if the C-S DG is electrically connected in place of another DG and has satisfied all applicable surveillance requirements. The removal of the note to LCO 3.8.1 associated with use of the C-S DG is to reflect that the C-S DG at WBN has not been maintained and, at this time, cannot satisfy these requirements. This change represents a reduction in operational flexibility, but does not impact the overall functional requirements regarding operation of the DGs.

4.0 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

The onsite standby ac power systems at WBN are designed to comply with the following applicable regulations and requirements:

- 10 CFR 50, Appendix A, General Design Criterion (GDC) 17, "Electric power systems," specifies that an onsite electric power system shall be provided to permit functioning of structures, systems, and components important to safety.
- 10 CFR 50, Appendix A, GDC 18, "Inspection and testing of electric power systems," specifies that electric power systems important to safety shall be designed to permit appropriate periodic inspection and testing of important areas and features.
- Regulatory Guide 1.6, Revision 0, "Independence Between Redundant Standby (Onsite) Power Sources and Between Their Distribution Systems," describes an acceptable degree of independence between redundant standby (onsite) power sources and between their distribution systems.
- Regulatory Guide 1.9, Revision 3, "Selection, Design, Qualification, and Testing of Emergency Diesel Generator Units Used as Class 1E Onsite Electrical Power Systems at Nuclear Power Plants," describes the selection, design, qualification, and testing of DGs.
- Institute of Electrical and Electronics Engineers (IEEE) Standard 308-1971, "Criteria for Class 1E Power Systems for Nuclear Power Generating Stations," provides criteria for the determination of Class 1E power system design features and the requirements for their testing, surveillance, and documentation.

With the implementation of the proposed change, WBN continues to meet the applicable regulations and requirements.

4.2 Precedent

This license amendment request is similar in concept to License Amendments 298 and 256 received for Browns Ferry Nuclear Plant (BFN) Units 2 and 3 on January 26, 2007 (Reference 6.6). The BFN License Amendments reduced the Completion Time for restoration of an inoperable DG to an operable status from 14 days to 7 days, due to the restart of BFN Unit 1.

4.3 Significant Hazards Consideration

TVA has evaluated whether or not a significant hazards consideration is involved with the proposed amendment 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 diesel generators (DGs) are designed as backup alternating current (ac) power sources in the event of loss of offsite power. The proposed changes to Completion Times associated with determining inoperable DGs are not subject to common cause failure and restoration of inoperable DGs and the deletion of the note referencing the C-S DG do not change the conditions, operating configurations, or minimum amount of operating equipment assumed in the safety analysis accident mitigation. No changes are proposed in the manner in which the DGs provide plant protection.

Therefore, the proposed changes do 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 changes associated with determining inoperable DGs are not subject to common cause failure and restoration of inoperable DGs and the deletion of the note referencing the C-S DG do not involve a change in the design, configuration, or method of operation of the plant. The proposed changes will not alter the manner in which equipment operation is initiated, nor will the functional demands on credited equipment be changed. The capability of the DGs to perform their required safety function will not be affected. The proposed changes do not affect the interaction of the DGs with any system whose failure or malfunction can initiate an accident. As such, no new failure modes are being introduced.

Therefore, the proposed changes do 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 DGs are designed as backup ac power sources in the event of loss of offsite power. The proposed changes associated with determining inoperable DGs are not subject to common cause failure and restoration of inoperable DGs and the deletion of the note referencing the C-S DG do not change the conditions, operating configurations, or minimum amount of operating equipment assumed in the safety analysis accident mitigation. The proposed changes do not alter the plant design, including instrument setpoints, nor do they alter the assumptions contained in the

safety analyses. No changes are proposed in the manner in which the DGs provide plant protection or which create new modes of plant operation.

Therefore, the proposed changes do 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.

6.0 REFERENCES

1. Facility Operating License No. NPF-90, Watts Bar Nuclear Plant, Unit 1
2. Letter from NRC to TVA, "Watts Bar Nuclear Plant, Unit 1 – Issuance of Amendment Regarding Increase in Allowed Outage Times for Emergency Diesel Generators (TAC NO. MB2720)," dated July 1, 2002
3. Letter from TVA to NRC, "Watts Bar Nuclear Plant (WBN) – Technical Specification Change TS-01-04, Diesel Generator (DG) Risk Informed Allowed Outage Time (AOT) Extension – Additional Information," dated April 1, 2002
4. NUREG-1431, "Standard Technical Specifications Westinghouse Plants," Volume 1, Rev. 3.0

5. Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," dated July 2, 1984
6. NRC Letter to TVA, "Browns Ferry Nuclear Plant, Units 2 and 3 – Issuance of Amendments Regarding Change of Emergency Diesel Generator Required Action 3.8.1.B.4 Completion Time from 14 Days to 7 Days (TAC Nos. MD3404 and MD3405) (TS-457)," dated January 26, 2007.

ATTACHMENT 1

Technical Specification Page Markups

3.8-1
3.8-2
3.8-2a
3.8-3
3.8-4
3.8-5

3.8 ELECTRICAL POWER SYSTEMS

3.8.1 AC Sources - Operating

LCO 3.8.1 The following AC electrical sources shall be OPERABLE:

- a. Two qualified circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System; and
- b. Four diesel generators (DGs) capable of supplying the onsite Class 1E AC Electrical Power Distribution System.

NOTE

~~The C-S DG may be substituted for any of the required DGs.~~

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

ACTIONS

NOTE

LCO 3.0.4.b is not applicable to DGs.

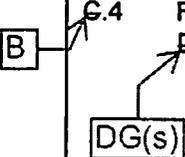
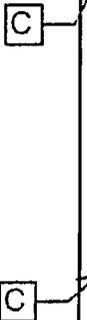
CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One offsite circuit inoperable.	A.1 Perform SR 3.8.1.1 for OPERABLE offsite circuit.	1 hour
	<u>AND</u>	<u>AND</u>
	A.2 Declare required feature(s) with no offsite power available inoperable when its redundant required feature(s) is inoperable.	Once per 8 hours thereafter
	<u>AND</u>	24 hours from discovery of no offsite power to one train concurrent with inoperability of redundant required feature(s)
	<u>AND</u>	(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.3 Restore offsite circuit to OPERABLE status.	72 hours <u>AND</u> 6 days from discovery of failure to meet LCO
B. One required DG inoperable.	<p>B-1 Perform SR 3.8.1.1 for the offsite circuits.</p> <p><u>AND</u></p> <p>B-2 Declare required feature(s) supported by the inoperable DG inoperable when its required redundant feature(s) is inoperable.</p> <p><u>AND</u></p> <p>B-3.1 Determine OPERABLE DGs are not inoperable due to common cause failure.</p> <p><u>OR</u></p> <p>B-3.2 Perform SR 3.8.1.2 for OPERABLE DGs.</p> <p><u>AND</u></p>	<p>4 hour</p> <p><u>AND</u></p> <p>Once per 8 hours thereafter</p> <p>4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s)</p> <p>12 hours</p> <p>12 hours</p> <p>(continued)</p>

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>B- (continued)</p> <p>One or more DG(s)</p>	<p>B.4 Restore required DG to OPERABLE status.</p>	<p>14 days</p> <p>AND</p> <p>17 days from discovery of failure to meet LGO</p>
<p>Two required DGs in Train A inoperable.</p> <p>OR</p> <p>Two required DGs in Train B inoperable.</p> <p>One or more DG(s)</p>	<p>G.1 Perform SR 3.8.1.1 for the offsite circuits.</p> <p>AND</p>	<p>1 hour</p> <p>AND</p> <p>Once per 8 hours thereafter</p>
<p>One or more DG(s)</p>	<p>G.2 Declare required feature(s) supported by the inoperable DGs inoperable when its required redundant feature(s) is inoperable.</p> <p>AND</p>	<p>4 hours from discovery of Condition G concurrent with inoperability of redundant required feature(s)</p>
<p>One or more DG(s)</p>	<p>G.3.1 Determine OPERABLE DGs are not inoperable due to common cause failure.</p> <p>OR</p>	<p>42 hours</p> <p>24</p>
<p>One or more DG(s)</p>	<p>G.3.2 Perform SR 3.8.1.2 for OPERABLE DGs.</p> <p>AND</p>	<p>42 hours</p> <p>24</p> <p>(continued)</p>

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>(continued)</p> 	<p>G.4 Restore at-least-one required DG to OPERABLE status.</p> 	<p>72 hours</p> <p><u>AND</u></p> <p>6 days from discovery of failure to meet LCO</p>
<p>Two offsite circuits inoperable.</p> 	<p>D.1 Declare required feature(s) inoperable when its redundant required feature(s) is inoperable.</p> <p><u>AND</u></p> <p>D.2 Restore one offsite circuit to OPERABLE status.</p> 	<p>12 hours from discovery of Condition D</p>  <p>concurrent with inoperability of redundant required features</p> <p>24 hours</p>

(continued)

ACTIONS (continued)

	CONDITION	REQUIRED ACTION	COMPLETION TIME
D	One offsite circuit inoperable.	<p>-----NOTE-----</p> <p>-</p> <p>Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating," when Condition E is entered with no AC power source to any train.</p> <p>-----</p>	12 hours
	<p><u>AND</u></p> <p>One or more required DG(s) in Train A inoperable.</p> <p><u>OR</u></p> <p>One or more required DG(s) in Train B inoperable.</p>		
E	<p><u>AND</u></p> <p>One or more required DG(s) in Train A inoperable.</p> <p><u>AND</u></p> <p>One or more required DG(s) in Train B inoperable.</p>	E.1 Restore offsite circuit to OPERABLE status.	12 hours
		E.2 Restore required DG(s) to OPERABLE status.	12 hours
F	<p><u>AND</u></p> <p>One or more required DG(s) in Train A inoperable.</p> <p><u>AND</u></p> <p>One or more required DG(s) in Train B inoperable.</p>	F.1 Restore required DGs in Train A to OPERABLE status.	2 hours
		F.2 Restore required DGs in Train B to OPERABLE status	2 hours
F	<p>Required Action and Associated Completion Time of Condition A, B, C, D, E, or F not met.</p>	G.1 Be in MODE 3.	6 hours
		G.2 Be in MODE 5.	36 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>G → H. Two offsite circuits inoperable. G → H.1</p> <p><u>AND</u></p> <p>One or more required DG(s) in Train A inoperable.</p> <p><u>OR</u></p> <p>One or more required DG(s) in Train B inoperable.</p>	<p>H.1 Enter LCO 3.0.3.</p>	<p>Immediately</p>
<p>H → H. One offsite circuit inoperable. H → H.1</p> <p><u>AND</u></p> <p>One or more required DG(s) in Train A inoperable.</p> <p><u>AND</u></p> <p>One or more required DG(s) in Train B inoperable.</p>	<p>H.1 Enter LCO 3.0.3.</p>	<p>Immediately</p>

ATTACHMENT 2

Technical Specification Bases Page Markups

**B 3.8-2
B 3.8-4
B 3.8-8
B 3.8-9
B 3.8-10
B 3.8-11
B 3.8-12
B 3.8-13
B 3.8-14
B 3.8-15
B 3.8-35**

BASES

BACKGROUND
(continued)

A single offsite circuit is capable of providing the ESF loads. Both of these circuits are required to meet the Limiting Condition for Operation.

The onsite standby power source for each 6.9 kV shutdown board is a dedicated DG. WBN uses 4 DG sets for Unit 1 operation. These same DGs will be shared for Unit 2 operation. ~~WBN may utilize a C-S DG that can be manually aligned (electrically and mechanically) to any 6.9 kV shutdown board to replace an existing DG.~~ A DG starts automatically on a safety injection (SI) signal (i.e., low pressurizer pressure or high containment pressure signals) or on an 6.9 kV shutdown board degraded voltage or loss-of-voltage signal (refer to LCO 3.3.5, "Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation"). After the DG has started, it will automatically tie to its respective 6.9 kV shutdown board after offsite power is tripped as a consequence of 6.9 kV shutdown board loss-of-voltage or degraded voltage, independent of or coincident with an SI signal. The DGs will also start and operate in the standby mode without tying to the 6.9 kV shutdown board on an SI signal alone. Following the trip of offsite power, a loss-of-voltage signal strips all nonpermanent loads from the 6.9 kV shutdown board. When the DG is tied to the 6.9 kV shutdown board, loads are then sequentially connected to its respective 6.9 kV shutdown board by the automatic sequencer. The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading the DG by automatic load application.

In the event of a loss of preferred power, the 6.9 kV shutdown boards are automatically connected to the DGs in sufficient time to provide for safe reactor shutdown and to mitigate the consequences of a Design Basis Accident (DBA) such as a LOCA.

Certain required plant loads are returned to service in a predetermined sequence in order to prevent overloading the DG in the process. Within the required interval (FSAR Table 8.3-3) after the initiating signal is received, all automatic and permanently connected loads needed to recover the plant or maintain it in a safe condition are returned to service.

Ratings for Train 1A, 1B, 2A and 2B DGs satisfy the requirements of Regulatory Guide 1.9 (Ref. 3). The continuous service rating of each DG is 4400 kW with 10% overload permissible for up to 2 hours in any 24 hour period. The ESF loads that are powered from the 6.9 kV shutdown boards are listed in Reference 2.

(continued)

BASES

LCO
(continued)

Each DG must be capable of starting, accelerating to rated speed and voltage, and connecting to its respective 6.9 kV shutdown board on detection of loss-of-voltage. This will be accomplished within 10 seconds. Each DG must also be capable of accepting required loads within the assumed loading sequence intervals, and continue to operate until offsite power can be restored to the 6.9 kV shutdown boards. These capabilities are required to be met from a variety of initial conditions such as DG in standby with the engine hot and DG in standby with the engine at ambient conditions. Additional DG capabilities must be demonstrated to meet required Surveillances, e.g., capability of the DG to revert to standby status on an accident signal while operating in parallel test mode.

Proper sequencing of loads, including tripping of nonessential loads, is a required function for DG OPERABILITY.

~~A Note has been added to indicate that the C-S DG may be substituted for any of the required DGs. However, the C-S DG cannot be declared OPERABLE until it is connected electrically in place of another DG, and it has satisfied applicable Surveillance Requirements.~~

The AC sources in one train must be separate and independent (to the extent possible) of the AC sources in the other train. For the DGs, separation and independence are complete.

For the offsite AC sources, separation and independence are to the extent practical. A circuit may be connected to more than one ESF bus, with fast transfer capability to the other circuit OPERABLE, and not violate separation criteria. A circuit that is not connected to an ESF bus is required to have OPERABLE fast transfer interlock mechanisms to at least two ESF buses to support OPERABILITY of that circuit.

BASES

ACTIONS
(continued)

B.1 and C.1

To ensure a highly reliable power source remains with one or more DGs inoperable in Train A OR with one or more DGs inoperable in Train B, it is necessary to verify the availability of the offsite circuits on a more frequent basis. Since the Required Action only specifies "perform," a failure of SR 3.8.1.1 acceptance criteria does not result in a Required Action being not met. However, if a circuit fails to pass SR 3.8.1.1, it is inoperable. Upon offsite circuit inoperability, additional Conditions and Required Actions must then be entered.

B.2 and C.2

Required Actions B.2 and C.2 are intended to provide assurance that a loss of offsite power, during the period that a DG is inoperable, does not result in a complete loss of safety function of critical systems. These features are designed with redundant safety related trains. This includes motor driven auxiliary feedwater pumps. Single train systems, such as the turbine driven auxiliary feedwater pump, are not included. Redundant required feature failures consist of inoperable features associated with a train, redundant to the train that has inoperable DG(s).

The Completion Time for Required Actions B.2 and C.2 are intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action, the Completion Time only begins on discovery that both:

- a. An inoperable DG exists; and
- b. A required feature on the other train (Train A or Train B) is inoperable.

If at any time during the existence of this Condition (one or more DGs inoperable) a required feature subsequently becomes inoperable, this Completion Time would begin to be tracked.

Discovering one or more required DGs in Train A or one or more DGs in Train B inoperable coincident with one or more inoperable required support or supported features, or both, that are associated with the OPERABLE DGs, results in starting the Completion Time for the Required Action. Four hours from the discovery of these events existing concurrently is Acceptable because it minimizes risk while allowing time for restoration before subjecting the plant to transients associated with shutdown.

(continued)

BASES

ACTIONS

B.2 and C.2 (continued)

In this Condition, the remaining OPERABLE DGs and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System. Thus, on a component basis, single failure protection for the required feature's function may have been lost; however, function has not been lost. The 4 hour Completion Time takes into account the OPERABILITY of the redundant counterpart to the inoperable required feature. Additionally, the 4 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

B.3.1; B.3.2, C.3.1 and C.3.2

Required Actions B.3.1 and C.3.1 provide an allowance to avoid unnecessary testing of OPERABLE DG(s). If it can be determined that the cause of the inoperable DG does not exist on the OPERABLE DG, SR 3.8.1.2 does not have to be performed. For the performance of a Surveillance, Required Action B.3.1 is considered satisfied since the cause of the DG being inoperable is apparent. If the cause of inoperability exists on other DG(s), the other DG(s) would be declared inoperable upon discovery and Condition ~~E~~ of LCO 3.8.1 would be entered if the other inoperable DGs are not on the same train, otherwise, if the other inoperable DGs are on the same train, the unit is in Condition C. Once the failure is repaired, the common cause failure no longer exists, and Required Actions B.3.1 and B.3.2 are satisfied. If the cause of the initial inoperable DG cannot be confirmed not to exist on the remaining DG(s), performance of SR 3.8.1.2 suffices to provide assurance of continued OPERABILITY of that DG.

In the event the inoperable DG is restored to OPERABLE status prior to completing either B.3.1, B.3.2, C.3.1 or C.3.2, the corrective action program will continue to evaluate the common cause possibility. This continued evaluation, however, is no longer under the 12 hour constraint imposed while in Condition B or C.

According to Generic Letter 84-15 (Ref. 11), 24 hours is reasonable to confirm that the OPERABLE DG(s) is not affected by the same problem as the inoperable DG(s).

(continued)

BASES

ACTIONS
(continued)

B-4

In Condition B, the remaining OPERABLE DGs and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System. The 14 day Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

The second Completion Time for Required Action B.4 establishes a limit on the maximum time allowed for any combination of required AC power sources to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition B is entered while, for instance, an offsite circuit is inoperable and that circuit is subsequently restored OPERABLE, the LCO may already have been not met for up to 14 days. This could lead to a total of 17 days, since initial failure to meet the LCO, to restore the DGs. At this time, an offsite circuit could again become inoperable, the DGs restored OPERABLE, and an additional 72 hours (for a total of 20 days) allowed prior to complete restoration of the LCO. The 17 day Completion Time provides a limit on time allowed in a specified condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and B are entered concurrently. The "AND" connector between the 14 day and 17 day Completion Times means that both Completion Times apply simultaneously, and the more restrictive Completion Time must be met.

Compliance with the contingency actions listed in Bases Table 3.8.1-2 is required whenever Condition B is entered for a planned or unplanned outage which will extend beyond 72 hours. If Condition B is entered initially for an activity intended to last less than 72 hours or for an unplanned outage, the contingency actions should be invoked as soon as it is established that the outage period will be longer than 72 hours. The contingency actions applicable to Surveillance Requirement (SR) 3.8.1.14 must be invoked prior to initiation of the test.

As in Required Action B.2, the Completion Time allows for an exception to the normal "time zero" for beginning the allowed time "clock." This will result in establishing the "time zero" at the time that the LCO was initially not met, instead of at the time Condition B was entered.

According to TVA's probabilistic safety analysis described in Reference 11, 12 hours is reasonable to confirm the OPERABLE DGs are not affected by the same problem as the inoperable DG.

(continued)

BASES

ACTIONS
(continued)

B

C.4

According to Regulatory Guide 1.93, (Ref. 6), operation may continue in Condition C for a period that should not exceed 72 hours.

B

B

In Condition C, the remaining OPERABLE DGs and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System. The 72 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period. ~~Restoration of at least one DG within 72 hours results in reverting back under Condition B and continuing to track the "time zero" completion time for one DG inoperable.~~

B

B

The second Completion Time for Required Action C.4 establishes a limit on the maximum time allowed for any combination of required AC power sources to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition C is entered while, for instance, an offsite circuit is inoperable and that circuit is subsequently restored OPERABLE, the LCO may already have been not met for up to 72 hours. This could lead to a total of 144 hours, since initial failure to meet the LCO, to restore the DGs. At this time, an offsite circuit could again become inoperable, the DGs restored OPERABLE, and an additional 72 hours (for a total of 9 days) allowed prior to complete restoration of the LCO. The 6 day Completion Time provides a limit on time allowed in a specified condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and B are entered concurrently. The "AND" connector between the 72 hour and 6 day Completion Times means that both Completion Times apply simultaneously, and the more restrictive Completion Time must be met.

B

As in Required Action C.2, the Completion Time allows for an exception to the normal "time zero" for beginning the allowed time "clock." This will result in establishing the "time zero" at the time that the LCO was initially not met, instead of at the time Condition C was entered.

B

(continued)

BASES



ACTIONS
(continued)

D.1 and D.2



Required Action D.1, which applies when two offsite circuits are inoperable, is intended to provide assurance that an event with a coincident single failure will not result in a complete loss of redundant required safety functions. The Completion Time for this failure of redundant required features is reduced to 12 hours from that allowed for one train without offsite power (Required Action A.2). The rationale for the reduction to 12 hours is that Regulatory Guide 1.93 (Ref. 6) allows a Completion Time of 24 hours for two required offsite circuits inoperable, based upon the assumption that two complete safety trains are OPERABLE. When a concurrent redundant required feature failure exists, this assumption is not the case, and a shorter Completion Time of 12 hours is appropriate. These features are powered from redundant AC safety trains. This includes motor driven auxiliary feedwater pumps. Single train features, such as the turbine driven auxiliary pump, are not included in the list.



The Completion Time for Required Action D.1 is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action the Completion Time only begins on discovery that both:

- a. All required offsite circuits are inoperable; and
- b. A required feature is inoperable.



If at any time during the existence of Condition D (two offsite circuits inoperable) a required feature becomes inoperable, this Completion Time begins to be tracked.



According to Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition D for a period that should not exceed 24 hours. This level of degradation means that the offsite electrical power system does not have the capability to effect a safe shutdown and to mitigate the effects of an accident; however, the onsite AC sources have not been degraded. This level of degradation generally corresponds to a total loss of the immediately accessible offsite power sources.

Because of the normally high availability of the offsite sources, this level of degradation may appear to be more severe than other combinations of two AC sources inoperable (e.g., combinations that involve an offsite circuit and one DG inoperable, or one or more DGs in each train inoperable). However, two factors tend to decrease the severity of this level of degradation:

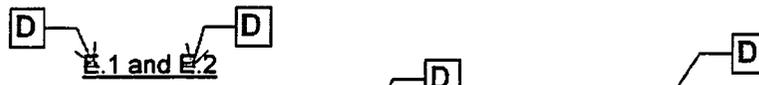
(continued)

BASES	
ACTIONS	<p><u>D.1 and D.2</u> (continued)</p>

- a. The configuration of the redundant AC electrical power system that remains available is not susceptible to a single bus or switching failure; and
- b. The time required to detect and restore an unavailable offsite power source is generally much less than that required to detect and restore an unavailable onsite AC source.

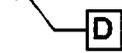
With both of the required offsite circuits inoperable, sufficient onsite AC sources are available to maintain the plant in a safe shutdown condition in the event of a DBA or transient. In fact, a simultaneous loss of offsite AC sources, a LOCA, and a worst case single failure were postulated as a part of the design basis in the safety analysis. Thus, the 24 hour Completion Time provides a period of time to effect restoration of one of the offsite circuits commensurate with the importance of maintaining an AC electrical power system capable of meeting its design criteria.

According to Reference 6, with the available offsite AC sources, two less than required by the LCO, operation may continue for 24 hours. If two offsite sources are restored within 24 hours, unrestricted operation may continue. If only one offsite source is restored within 24 hours, power operation continues in accordance with Condition A.



Pursuant to LCO 3.0.6, the Distribution System ACTIONS would not be entered even if all AC sources to it were inoperable, resulting in de-energization. Therefore, the Required Actions of Condition E are modified by a Note to indicate that when Condition E is entered with no AC source to any train, the Conditions and Required Actions for LCO 3.8.9, "Distribution Systems - Operating," must be immediately entered. This allows Condition E to provide requirements for the loss of one offsite circuit and one or more DGs in a train, without regard to whether a train is de-energized. LCO 3.8.9 provides the appropriate restrictions for a de-energized train.

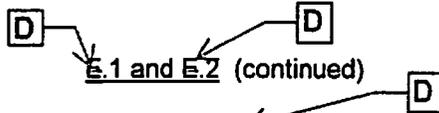
According to Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition E for a period that should not exceed 12 hours.



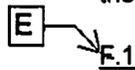
(continued)

BASES

ACTIONS

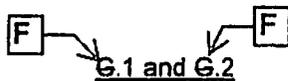


In Condition E, individual redundancy is lost in both the offsite electrical power system and the onsite AC electrical power system. Since power system redundancy is provided by two diverse sources of power, however, the reliability of the power systems in this Condition may appear higher than that in Condition D (loss of both required offsite circuits). This difference in reliability is offset by the susceptibility of this power system configuration to a single bus or switching failure. The 12 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.



With one or more required DGs in Train A inoperable simultaneous with one or more required DGs in Train B inoperable, there are no remaining standby AC sources. Thus, with an assumed loss of offsite electrical power, insufficient standby AC sources are available to power the minimum required ESF functions. Since the offsite electrical power system is the only source of AC power for this level of degradation, the risk associated with continued operation for a very short time could be less than that associated with an immediate controlled shutdown (the immediate shutdown could cause grid instability, which could result in a total loss of AC power). Since any inadvertent generator trip could also result in a total loss of offsite AC power, however, the time allowed for continued operation is severely restricted. The intent here is to avoid the risk associated with an immediate controlled shutdown and to minimize the risk associated with this level of degradation.

According to Reference 6, with one or more required DGs in Train A inoperable simultaneous with one or more required DGs in Train B inoperable, operation may continue for a period that should not exceed 2 hours.

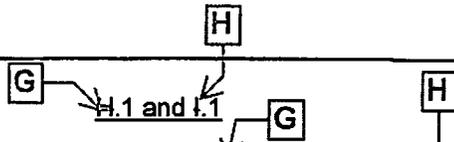


If the inoperable AC electric power sources cannot be restored to OPERABLE status within the required Completion Time, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. 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.

(continued)

BASES

ACTIONS
(continued)



Condition H and Condition I corresponds to a level of degradation in which all redundancy in the AC electrical power supplies cannot be guaranteed. At this severely degraded level, any further losses in the AC electrical power system will cause a loss of function. Therefore, no additional time is justified for continued operation. The plant is required by LCO 3.0.3 to commence a controlled shutdown.

SURVEILLANCE
REQUIREMENTS

The AC sources are designed to permit inspection and testing of all important areas and features, especially those that have a standby function, in accordance with 10 CFR 50, Appendix A, GDC 18 (Ref. 8). Periodic component tests are supplemented by extensive functional tests during refueling outages (under simulated accident conditions). The SRs for demonstrating the OPERABILITY of the DGs are in accordance with the recommendations of Regulatory Guide 1.9 (Ref. 3) and Regulatory Guide 1.137 (Ref. 9), as addressed in the FSAR.

Where the SRs discussed herein specify voltage and frequency tolerances, the following is applicable. 6800 volts is the minimum steady state output voltage and the 10 second transient value. 6800 volts is 98.6% of the nominal bus voltage of 6900 V corrected for instrument error and is the upper limit of the minimum voltage required for the DG supply breaker to close on the 6.9 kV shutdown board. The specified maximum steady state output voltage of 7260 V is 110% of the nameplate rating of the 6600 V motors. The specified 3 second transient value of 6555 V is 95% of the nominal bus voltage of 6900 V. The specified maximum transient value of 8880 V is the maximum equipment withstand value provided by the DG manufacturer. The specified minimum and maximum frequencies of the DG are 58.8 Hz and 61.2 Hz, respectively. These values are equal to $\pm 2\%$ of the 60 Hz nominal frequency and are derived from the recommendations given in Regulatory Guide 1.9 (Ref. 3).

SR 3.8.1.1

This SR ensures proper circuit continuity for the offsite AC electrical power supply to the onsite distribution network and availability of offsite AC electrical power. The breaker alignment verifies that each breaker is in its correct position to ensure that distribution buses and loads are connected to their preferred power source, and that appropriate independence of offsite circuits is maintained. The 7 day Frequency is adequate since breaker position is not likely to change without the operator being aware of it and because its status is displayed in the control room.

(continued)

BASES

REFERENCES
(continued)

- 9. Regulatory Guide 1.137, Rev. 1, "Fuel Oil Systems for Standby Diesel Generators," October 1979.
- 10. Watts Bar Drawing 1-47W605-242, "Electrical Tech Spec Compliance Tables.
- 11. ~~TVA's letter to NRC dated August 7, 2001, Technical Specification Change TS-01-04, Diesel Generator (DG) Risk Informed Allowed Outage Time (AOT) Extension~~

11. Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," dated July 2, 1984.

ATTACHMENT 3

Retyped Technical Specification Pages

3.8-1
3.8-2
3.8-2a
3.8-3
3.8-4
3.8-5

3.8 ELECTRICAL POWER SYSTEMS

3.8.1 AC Sources - Operating

LCO 3.8.1 The following AC electrical sources shall be OPERABLE:

- a. Two qualified circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System; and
- b. Four diesel generators (DGs) capable of supplying the onsite Class 1E AC Electrical Power Distribution System.

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

ACTIONS

NOTE

LCO 3.0.4.b is not applicable to DGs.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One offsite circuit inoperable.	A.1 Perform SR 3.8.1.1 for OPERABLE offsite circuit.	1 hour
	<u>AND</u>	<u>AND</u>
	A.2 Declare required feature(s) with no offsite power available inoperable when its redundant required feature(s) is inoperable.	Once per 8 hours thereafter
	<u>AND</u>	24 hours from discovery of no offsite power to one train concurrent with inoperability of redundant required feature(s)
		(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.3 Restore offsite circuit to OPERABLE status.	72 hours <u>AND</u> 6 days from discovery of failure to meet LCO

(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>B. One or more DG(s) in Train A inoperable.</p> <p><u>OR</u></p> <p>One or more DG(s) in Train B inoperable.</p>	<p>B.1 Perform SR 3.8.1.1 for the offsite circuits.</p>	<p>1 hour</p>
	<p><u>AND</u></p>	<p>Once per 8 hours thereafter</p>
	<p>B.2 Declare required feature(s) supported by the inoperable DG(s) inoperable when its required redundant feature(s) is inoperable.</p>	<p>4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s)</p>
	<p><u>AND</u></p>	
	<p>B.3.1 Determine OPERABLE DG(s) are not inoperable due to common cause failure.</p>	<p>24 hours</p>
	<p><u>OR</u></p>	
	<p>B.3.2 Perform SR 3.8.1.2 for OPERABLE DG(s).</p>	<p>24 hours</p>
	<p><u>AND</u></p>	<p>(continued)</p>

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.4 Restore required DG(s) to OPERABLE status.	72 hours <u>AND</u> 6 days from discovery of failure to meet LCO
C. Two offsite circuits inoperable.	C.1 Declare required feature(s) inoperable when its redundant required feature(s) is inoperable.	12 hours from discovery of Condition C concurrent with inoperability of redundant required features
	<u>AND</u> C.2 Restore one offsite circuit to OPERABLE status.	24 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>D. One offsite circuit inoperable.</p> <p><u>AND</u></p> <p>One or more required DG(s) in Train A inoperable.</p> <p><u>OR</u></p> <p>One or more required DG(s) in Train B inoperable.</p>	<p>-----NOTE-----</p> <p>Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating," when Condition D is entered with no AC power source to any train.</p> <p>-----</p> <p>D.1 Restore offsite circuit to OPERABLE status.</p> <p><u>OR</u></p> <p>D.2 Restore required DG(s) to OPERABLE status.</p>	<p>12 hours</p> <p>12 hours</p>
<p>E. One or more required DG(s) in Train A inoperable.</p> <p><u>AND</u></p> <p>One or more required DG(s) in Train B inoperable.</p>	<p>E.1 Restore required DGs in Train A to OPERABLE status.</p> <p><u>OR</u></p> <p>E.2 Restore required DGs in Train B to OPERABLE status</p>	<p>2 hours</p> <p>2 hours</p>
<p>F. Required Action and Associated Completion Time of Condition A, B, C, D, or E not met.</p>	<p>F.1 Be in MODE 3.</p> <p><u>AND</u></p> <p>F.2 Be in MODE 5.</p>	<p>6 hours</p> <p>36 hours</p>

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>G. Two offsite circuits inoperable.</p> <p><u>AND</u></p> <p>One or more required DG(s) in Train A inoperable.</p> <p><u>OR</u></p> <p>One or more required DG(s) in Train B inoperable.</p>	<p>G.1 Enter LCO 3.0.3.</p>	<p>Immediately</p>
<p>H. One offsite circuit inoperable.</p> <p><u>AND</u></p> <p>One or more required DG(s) in Train A inoperable.</p> <p><u>AND</u></p> <p>One or more required DG(s) in Train B inoperable.</p>	<p>H.1 Enter LCO 3.0.3.</p>	<p>Immediately</p>

ATTACHMENT 4

Retyped Technical Specification Bases Pages

**B 3.8-2
B 3.8-4
B 3.8-8
B 3.8-9
B 3.8-10
B 3.8-11
B 3.8-12
B 3.8-13
B 3.8-14
B 3.8-15
B 3.8-35**

BASES

BACKGROUND
(continued)

A single offsite circuit is capable of providing the ESF loads. Both of these circuits are required to meet the Limiting Condition for Operation.

The onsite standby power source for each 6.9 kV shutdown board is a dedicated DG. WBN uses 4 DG sets for Unit 1 operation. These same DGs will be shared for Unit 2 operation. A DG starts automatically on a safety injection (SI) signal (i.e., low pressurizer pressure or high containment pressure signals) or on an 6.9 kV shutdown board degraded voltage or loss-of-voltage signal (refer to LCO 3.3.5, "Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation"). After the DG has started, it will automatically tie to its respective 6.9 kV shutdown board after offsite power is tripped as a consequence of 6.9 kV shutdown board loss-of-voltage or degraded voltage, independent of or coincident with an SI signal. The DGs will also start and operate in the standby mode without tying to the 6.9 kV shutdown board on an SI signal alone. Following the trip of offsite power, a loss-of-voltage signal strips all nonpermanent loads from the 6.9 kV shutdown board. When the DG is tied to the 6.9 kV shutdown board, loads are then sequentially connected to its respective 6.9 kV shutdown board by the automatic sequencer. The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading the DG by automatic load application.

In the event of a loss of preferred power, the 6.9 kV shutdown boards are automatically connected to the DGs in sufficient time to provide for safe reactor shutdown and to mitigate the consequences of a Design Basis Accident (DBA) such as a LOCA.

Certain required plant loads are returned to service in a predetermined sequence in order to prevent overloading the DG in the process. Within the required interval (FSAR Table 8.3-3) after the initiating signal is received, all automatic and permanently connected loads needed to recover the plant or maintain it in a safe condition are returned to service.

Ratings for Train 1A, 1B, 2A and 2B DGs satisfy the requirements of Regulatory Guide 1.9 (Ref. 3). The continuous service rating of each DG is 4400 kW with 10% overload permissible for up to 2 hours in any 24 hour period. The ESF loads that are powered from the 6.9 kV shutdown boards are listed in Reference 2.

(continued)

BASES

LCO
(continued)

Each DG must be capable of starting, accelerating to rated speed and voltage, and connecting to its respective 6.9 kV shutdown board on detection of loss-of-voltage. This will be accomplished within 10 seconds. Each DG must also be capable of accepting required loads within the assumed loading sequence intervals, and continue to operate until offsite power can be restored to the 6.9 kV shutdown boards. These capabilities are required to be met from a variety of initial conditions such as DG in standby with the engine hot and DG in standby with the engine at ambient conditions. Additional DG capabilities must be demonstrated to meet required Surveillances, e.g., capability of the DG to revert to standby status on an accident signal while operating in parallel test mode.

Proper sequencing of loads, including tripping of nonessential loads, is a required function for DG OPERABILITY.

The AC sources in one train must be separate and independent (to the extent possible) of the AC sources in the other train. For the DGs, separation and independence are complete.

For the offsite AC sources, separation and independence are to the extent practical. A circuit may be connected to more than one ESF bus, with fast transfer capability to the other circuit OPERABLE, and not violate separation criteria. A circuit that is not connected to an ESF bus is required to have OPERABLE fast transfer interlock mechanisms to at least two ESF buses to support OPERABILITY of that circuit.

BASES

ACTIONS
(continued)

B.1

To ensure a highly reliable power source remains with one or more DGs inoperable in Train A OR with one or more DGs inoperable in Train B, it is necessary to verify the availability of the offsite circuits on a more frequent basis. Since the Required Action only specifies "perform," a failure of SR 3.8.1.1 acceptance criteria does not result in a Required Action being not met. However, if a circuit fails to pass SR 3.8.1.1, it is inoperable. Upon offsite circuit inoperability, additional Conditions and Required Actions must then be entered.

B.2

Required Action B.2 is intended to provide assurance that a loss of offsite power, during the period that a DG is inoperable, does not result in a complete loss of safety function of critical systems. These features are designed with redundant safety related trains. This includes motor driven auxiliary feedwater pumps. Single train systems, such as the turbine driven auxiliary feedwater pump, are not included. Redundant required feature failures consist of inoperable features associated with a train, redundant to the train that has inoperable DG(s).

The Completion Time for Required Action B.2 is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action, the Completion Time only begins on discovery that both:

- a. An inoperable DG exists; and
- b. A required feature on the other train (Train A or Train B) is inoperable.

If at any time during the existence of this Condition (one or more DGs inoperable) a required feature subsequently becomes inoperable, this Completion Time would begin to be tracked.

Discovering one or more required DGs in Train A or one or more DGs in Train B inoperable coincident with one or more inoperable required support or supported features, or both, that are associated with the OPERABLE DGs, results in starting the Completion Time for the Required Action. Four hours from the discovery of these events existing concurrently is Acceptable because it minimizes risk while allowing time for restoration before subjecting the plant to transients associated with shutdown.

(continued)

BASES

ACTIONS

B.2 (continued)

In this Condition, the remaining OPERABLE DGs and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System. Thus, on a component basis, single failure protection for the required feature's function may have been lost; however, function has not been lost. The 4 hour Completion Time takes into account the OPERABILITY of the redundant counterpart to the inoperable required feature. Additionally, the 4 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

B.3.1 or B.3.2

Required Action B.3.1 provides an allowance to avoid unnecessary testing of OPERABLE DG(s). If it can be determined that the cause of the inoperable DG(s) does not exist on the OPERABLE DG(s), SR 3.8.1.2 does not have to be performed. For the performance of a Surveillance, Required Action B.3.1 is considered satisfied since the cause of the DG(s) being inoperable is apparent. If the cause of inoperability exists on other DG(s), the other DG(s) would be declared inoperable upon discovery and Condition E of LCO 3.8.1 would be entered if the other inoperable DGs are not on the same train. Once the failure is repaired, the common cause failure no longer exists, and Required Actions B.3.1 and B.3.2 are satisfied. If the cause of the initial inoperable DG(s) cannot be confirmed not to exist on the remaining DG(s), performance of SR 3.8.1.2 suffices to provide assurance of continued OPERABILITY of that DG(s).

In the event the inoperable DG(s) is restored to OPERABLE status prior to completing either B.3.1 or B.3.2, the corrective action program will continue to evaluate the common cause possibility. This continued evaluation, however, is no longer under the 24 hour constraint imposed while in Condition B.

According to Generic Letter 84-15 (Ref. 11), 24 hours is reasonable to confirm that the OPERABLE DG(s) is not affected by the same problem as the inoperable DG(s).

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BASES

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BASES

ACTIONS
(continued)

B.4

According to Regulatory Guide 1.93, (Ref. 6), operation may continue in Condition B for a period that should not exceed 72 hours.

In Condition B, the remaining OPERABLE DGs and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System. The 72 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

The second Completion Time for Required Action B.4 establishes a limit on the maximum time allowed for any combination of required AC power sources to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition B is entered while, for instance, an offsite circuit is inoperable and that circuit is subsequently restored OPERABLE, the LCO may already have been not met for up to 72 hours. This could lead to a total of 144 hours, since initial failure to meet the LCO, to restore the DGs. At this time, an offsite circuit could again become inoperable, the DGs restored OPERABLE, and an additional 72 hours (for a total of 9 days) allowed prior to complete restoration of the LCO. The 6 day Completion Time provides a limit on time allowed in a specified condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and B are entered concurrently. The "AND" connector between the 72 hour and 6 day Completion Times means that both Completion Times apply simultaneously, and the more restrictive Completion Time must be met.

As in Required Action B.2, the Completion Time allows for an exception to the normal "time zero" for beginning the allowed time "clock." This will result in establishing the "time zero" at the time that the LCO was initially not met, instead of at the time Condition B was entered.

(continued)

BASES

ACTIONS
(continued)

C.1 and C.2

Required Action C.1, which applies when two offsite circuits are inoperable, is intended to provide assurance that an event with a coincident single failure will not result in a complete loss of redundant required safety functions. The Completion Time for this failure of redundant required features is reduced to 12 hours from that allowed for one train without offsite power (Required Action A.2). The rationale for the reduction to 12 hours is that Regulatory Guide 1.93 (Ref. 6) allows a Completion Time of 24 hours for two required offsite circuits inoperable, based upon the assumption that two complete safety trains are OPERABLE. When a concurrent redundant required feature failure exists, this assumption is not the case, and a shorter Completion Time of 12 hours is appropriate. These features are powered from redundant AC safety trains. This includes motor driven auxiliary feedwater pumps. Single train features, such as the turbine driven auxiliary pump, are not included in the list.

The Completion Time for Required Action C.1 is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action the Completion Time only begins on discovery that both:

- a. All required offsite circuits are inoperable; and
- b. A required feature is inoperable.

If at any time during the existence of Condition C (two offsite circuits inoperable) a required feature becomes inoperable, this Completion Time begins to be tracked.

According to Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition C for a period that should not exceed 24 hours. This level of degradation means that the offsite electrical power system does not have the capability to effect a safe shutdown and to mitigate the effects of an accident; however, the onsite AC sources have not been degraded. This level of degradation generally corresponds to a total loss of the immediately accessible offsite power sources.

Because of the normally high availability of the offsite sources, this level of degradation may appear to be more severe than other combinations of two AC sources inoperable (e.g., combinations that involve an offsite circuit and one DG inoperable, or one or more DGs in each train inoperable). However, two factors tend to decrease the severity of this level of degradation:

(continued)

BASES

ACTIONS

C.1 and C.2 (continued)

- a. The configuration of the redundant AC electrical power system that remains available is not susceptible to a single bus or switching failure; and
- b. The time required to detect and restore an unavailable offsite power source is generally much less than that required to detect and restore an unavailable onsite AC source.

With both of the required offsite circuits inoperable, sufficient onsite AC sources are available to maintain the plant in a safe shutdown condition in the event of a DBA or transient. In fact, a simultaneous loss of offsite AC sources, a LOCA, and a worst case single failure were postulated as a part of the design basis in the safety analysis. Thus, the 24 hour Completion Time provides a period of time to effect restoration of one of the offsite circuits commensurate with the importance of maintaining an AC electrical power system capable of meeting its design criteria.

According to Reference 6, with the available offsite AC sources, two less than required by the LCO, operation may continue for 24 hours. If two offsite sources are restored within 24 hours, unrestricted operation may continue. If only one offsite source is restored within 24 hours, power operation continues in accordance with Condition A.

D.1 and D.2

Pursuant to LCO 3.0.6, the Distribution System ACTIONS would not be entered even if all AC sources to it were inoperable, resulting in de-energization. Therefore, the Required Actions of Condition D are modified by a Note to indicate that when Condition D is entered with no AC source to any train, the Conditions and Required Actions for LCO 3.8.9, "Distribution Systems - Operating," must be immediately entered. This allows Condition D to provide requirements for the loss of one offsite circuit and one or more DGs in a train, without regard to whether a train is de-energized. LCO 3.8.9 provides the appropriate restrictions for a de-energized train.

According to Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition D for a period that should not exceed 12 hours.

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BASES

ACTIONS

D.1 and D.2 (continued)

In Condition D, individual redundancy is lost in both the offsite electrical power system and the onsite AC electrical power system. Since power system redundancy is provided by two diverse sources of power, however, the reliability of the power systems in this Condition may appear higher than that in Condition C (loss of both required offsite circuits). This difference in reliability is offset by the susceptibility of this power system configuration to a single bus or switching failure. The 12 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

E.1

With one or more required DGs in Train A inoperable simultaneous with one or more required DGs in Train B inoperable, there are no remaining standby AC sources. Thus, with an assumed loss of offsite electrical power, insufficient standby AC sources are available to power the minimum required ESF functions. Since the offsite electrical power system is the only source of AC power for this level of degradation, the risk associated with continued operation for a very short time could be less than that associated with an immediate controlled shutdown (the immediate shutdown could cause grid instability, which could result in a total loss of AC power). Since any inadvertent generator trip could also result in a total loss of offsite AC power, however, the time allowed for continued operation is severely restricted. The intent here is to avoid the risk associated with an immediate controlled shutdown and to minimize the risk associated with this level of degradation.

According to Reference 6, with one or more required DGs in Train A inoperable simultaneous with one or more required DGs in Train B inoperable, operation may continue for a period that should not exceed 2 hours.

F.1 and F.2

If the inoperable AC electric power sources 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.

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BASES

ACTIONS
(continued)

G.1 and H.1

Condition G and Condition H corresponds to a level of degradation in which all redundancy in the AC electrical power supplies cannot be guaranteed. At this severely degraded level, any further losses in the AC electrical power system will cause a loss of function. Therefore, no additional time is justified for continued operation. The plant is required by LCO 3.0.3 to commence a controlled shutdown.

**SURVEILLANCE
REQUIREMENTS**

The AC sources are designed to permit inspection and testing of all important areas and features, especially those that have a standby function, in accordance with 10 CFR 50, Appendix A, GDC 18 (Ref. 8). Periodic component tests are supplemented by extensive functional tests during refueling outages (under simulated accident conditions). The SRs for demonstrating the OPERABILITY of the DGs are in accordance with the recommendations of Regulatory Guide 1.9 (Ref. 3) and Regulatory Guide 1.137 (Ref. 9), as addressed in the FSAR.

Where the SRs discussed herein specify voltage and frequency tolerances, the following is applicable. 6800 volts is the minimum steady state output voltage and the 10 second transient value. 6800 volts is 98.6% of the nominal bus voltage of 6900 V corrected for instrument error and is the upper limit of the minimum voltage required for the DG supply breaker to close on the 6.9 kV shutdown board. The specified maximum steady state output voltage of 7260 V is 110% of the nameplate rating of the 6600 V motors. The specified 3 second transient value of 6555 V is 95% of the nominal bus voltage of 6900 V. The specified maximum transient value of 8880 V is the maximum equipment withstand value provided by the DG manufacturer. The specified minimum and maximum frequencies of the DG are 58.8 Hz and 61.2 Hz, respectively. These values are equal to $\pm 2\%$ of the 60 Hz nominal frequency and are derived from the recommendations given in Regulatory Guide 1.9 (Ref. 3).

SR 3.8.1.1

This SR ensures proper circuit continuity for the offsite AC electrical power supply to the onsite distribution network and availability of offsite AC electrical power. The breaker alignment verifies that each breaker is in its correct position to ensure that distribution buses and loads are connected to their preferred power source, and that appropriate independence of offsite circuits is maintained. The 7 day Frequency is adequate since breaker position is not likely to change without the operator being aware of it and because its status is displayed in the control room.

(continued)

BASES

REFERENCES
(continued)

9. Regulatory Guide 1.137, Rev. 1, "Fuel Oil Systems for Standby Diesel Generators," October 1979.
 10. Watts Bar Drawing 1-47W605-242, "Electrical Tech Spec Compliance Tables.
 11. Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," dated July 2, 1984.
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