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Ref: 10CFR50.90

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Log # TXX-04143
File # 00236

October 6, 2004

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)
DOCKET NOS. 50-445 AND 50-446
LICENSE AMENDMENT REQUEST (LAR) 02-07
REVISION TO TECHNICAL SPECIFICATION (TS) 3.8.1
SURVEILLANCE REQUIREMENT MODE RESTRICTION NOTES

REF: Technical Specifications Task Force (TSTF) Standard Technical Specification (TS) Change Traveler TSTF-283, Revision 3, "Modify Section 3.8 Mode Restriction Notes"

Gentlemen:

Pursuant to 10CFR50.90, TXU Generation Company LP (TXU Power) hereby requests an amendment to the CPSES Unit 1 Operating License (NPF-87) and CPSES Unit 2 Operating License (NPF-89) by incorporating the attached changes into the CPSES Unit 1 and 2 Technical Specifications. The requested changes apply to both units.



A001

The proposed changes will revise TS 3.8.1, "AC Sources - Operating," to allow surveillance testing of the onsite standby diesel generators (DGs) during power operation. Specifically, TXU Power proposes removing the surveillance test MODE restrictions from the following Surveillance Requirements (SRs): SR 3.8.1.10 (full load rejection test), SR 3.8.1.12 (auto-start on safety injection (SI) signal test), SR 3.8.1.13 (protective-trip bypass test), and SR 3.8.1.14 (endurance and margin test).

TXU Power also requests to incorporate changes to surveillance test MODE restrictions based on approved Industry/Technical Specification Task Force (TSTF) Standard TS Change Traveler, TSTF-283, Revision 3, which are applicable to SRs for the diesel generators. These changes will incorporate the standard TS wording for the affected Notes and the associated conditions for the revised surveillance test MODE restrictions (NUREG-1431, Revision 2) while retaining those restricted MODES that are presently applicable, consistent with the current TS Section 3.8.1. Specifically, these changes will revise the MODE restriction Notes in SR 3.8.1.8 (transfer of AC sources test), SR 3.8.1.9 (post accident load rejection test), SR 3.8.1.11 (simulated loss of offsite power test), SR 3.8.1.16 (restoration of loads to offsite power test), SR 3.8.1.17 (verification of test mode override test), SR 3.8.1.18 (engineered safety feature and auto-transfer load sequencing test), and SR 3.8.1.19 (loss of offsite power plus SI signal response test) to allow performance (or partial performance) of these surveillances during restricted MODES in order to re-establish OPERABILITY following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns during plant operation.

In addition, TXU Power further proposes to add a new Note to TS Section 3.8.1 Limiting Condition for Operation (LCO) that permits one DG to be connected in parallel with offsite power in order to conduct the required surveillance testing. The Note is needed based on recognition that when a DG is paralleled to an offsite power source, the standby emergency power system is not independent of disturbances on offsite power systems that can adversely affect emergency power availability. The proposed Note will clarify that one DG at a time may be operated in parallel with an offsite power source in order to perform testing required to demonstrate OPERABILITY.

The proposed changes will also delete the now expired one time Completion Time preventive maintenance outage extension allowance for Startup Transformer XST2 from TS LCO 3.8.1 Required Action A.3.

TXU Power is submitting this LAR in conjunction with an industry consortium of six plants as a result of a mutual agreement known as Strategic Teaming and Resource Sharing (STARS). The STARS group consists of the six plants operated by TXU Generation Company LP, Union Electric Company, Wolf Creek Nuclear Operating Corporation, Pacific Gas and Electric Company, STP Nuclear Operating Company, and Arizona Public Service Company. The other members of the group (except STP Nuclear Operating Company) have previously submitted license amendment requests containing changes similar to this one. Pacific Gas and Electric Company's Diablo Canyon plant is the lead plant for this proposed license amendment. Due to license basis and design differences between the STARS plants, some differences exist between in the individual plant LARs, particularly for the information provided in Attachment 1.

Attachment 1 provides a detailed description of the proposed changes, a safety analysis of the proposed changes, TXU Generation Company LP determination that the proposed changes do not involve a significant hazard consideration, a regulatory analysis of the proposed changes and an environmental evaluation. Attachment 2 provides the affected Technical Specification pages marked-up to reflect the proposed changes. Attachment 3 provides proposed changes to the Technical Specification Bases for information only. These changes will be processed per CPSES site procedures. Attachment 4 provides retyped Technical Specification pages which incorporate the requested changes. Attachment 5 provides retyped Technical Specification Bases pages which incorporate the proposed changes.

TXU Generation Company LP requests approval of the proposed License Amendment by June 30, 2005 to be implemented within 120 days of the issuance of the license amendment. The proposed changes are not required to address an immediate safety concern. However, the requested changes, particular those pertaining to diesel generator surveillance testing, will improve operational flexibility by allowing the above tests to be performed during at-power operation with no significant decrease in operational safety. This allowance will provide increased flexibility in outage scheduling and allow reductions in outage critical path time since these surveillance tests would no longer be required to be performed during Modes 3, 4, 5, 6, and with the core off-loaded (for example, the SR 3.8.1.14 endurance and margin test).

In accordance with 10CFR50.91(b), TXU Generation Company LP is providing the State of Texas with a copy of this proposed amendment.

This communication contains one new commitment to be completed in support of this License Amendment Request.

| Commitment Number | Description |
|---|---|
| 27323 | A confirmatory analysis is being performed to confirm the preliminary evaluation conclusions regarding diesel generator (DG) capability in the event of LOOP occurring while a DG is running and paralleled to offsite power for testing. |

The commitment number is used by TXU Power for internal tracking of CPSES commitments.

Should you have any questions, please contact Mr. Mike Riggs at (254) 897-5218.

I state under penalty of perjury that the foregoing is true and correct.

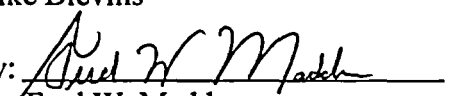
Executed on October 6, 2004.

Sincerely,

TXU Generation Company LP

By: TXU Generation Management Company LLC
Its General Partner

Mike Blevins

By: 
Fred W. Madden
Director, Regulatory Affairs

MJR

Attachments
1. Description and Assessment
2. Markup of Technical Specifications pages
3. Markup of Technical Specifications Bases pages (for information)
4. Retyped Technical Specification Pages
5. Retyped Technical Specification Bases Pages (for information)

c - Dr. B. S. Mallett, Region IV
W. D. Johnson, Region IV
M. C. Thadani, NRR
Resident Inspectors, CPSES

Ms. Alice Rogers
Bureau of Radiation Control
Texas Department of Public Health
1100 West 49th Street
Austin, Texas 78756-31

**ATTACHMENT 1 to TXX-04143**

**DESCRIPTION AND ASSESSMENT**

# LICENSEE'S EVALUATION

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2.0 PROPOSED CHANGES

3.0 BACKGROUND

- 3.1 DESCRIPTION OF CLASS 1E ALTERNATING CURRENT (AC) POWER SYSTEM
- 3.2 DESCRIPTION OF LOSS OF POWER DETECTION AND DG LOADING SCHEMES
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- 4.1 MODE RESTRICTION ELIMINATION
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- 5.1 NO SIGNIFICANT HAZARDS CONSIDERATION
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7.0 REFERENCES

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## 1.0 DESCRIPTION

By this letter, TXU Generation Company LP (TXU Power) requests an amendment to the CPSES Unit 1 Operating License (NPF-87) and CPSES Unit 2 Operating License (NPF-89) by incorporating the following changes into the CPSES Unit 1 and 2 Technical Specifications. The changes proposed in this license amendment request, LAR 02-07, would revise Notes and administrative controls applicable to Technical Specifications (TS) 3.8.1, "AC Sources - Operating," for Comanche Peak Steam Electric Station (CPSES) Units 1 and 2.

TS 3.8.1 includes LCO and Surveillance Requirements (SRs) that require the performance of testing to confirm OPERABILITY of the AC electrical sources, including the standby diesel generators (DGs). Testing, monitoring, and inspection pursuant to these SRs are required to be performed on a periodic basis. In certain cases, however, performance of such activities may also be required to verify or re-establish OPERABILITY following repairs or other unanticipated corrective maintenance.

The testing required by some of these SRs can be performed during any plant MODE. However, some SRs contain provisions, in the form of a Note included in the individual SR, restricting performance of the surveillance to certain plant MODES. The proposed changes would remove such MODE restrictions for the applicable surveillance, or conditionally allow surveillance testing to be performed (or partially performed) during currently restricted MODES to demonstrate OPERABIITY.

Specifically, the surveillance test MODE restrictions that are currently specified for the following SRs would be removed: SR 3.8.1.10 (full load rejection test), SR 3.8.1.12 (auto-start on safety injection (SI) signal test), SR 3.8.1.13 (protective-trip bypass test), and SR 3.8.1.14 (endurance and margin test). The proposed changes would allow these surveillances to be performed periodically and/or following planned or unplanned maintenance, during plant operation while remaining at-power.

Also, the surveillance test Mode-restriction Notes for the following SRs that are applicable to the DGs would be revised based on NRC-approved Industry/Technical Specification Task Force (TSTF) Standard TS Change Traveler, TSTF-283, Revision 3. The proposed changes would incorporate the standard TS Note wording and the accompanying conditions for the exceptions to the surveillance test MODE restrictions consistent with TSTF-283, but retain the same restricted MODES that are currently specified in TS Section 3.8.1. Effectively, there would be no significant changes to the manner in which the current MODE restrictions are applied.

The proposed changes would adopt the Standard TS wording for the Mode-restriction Notes in SR 3.8.1.8 (transfer of offsite AC sources test), SR 3.8.1.9 (post

accident load rejection test), SR 3.8.1.11 (simulated loss of offsite power test), SR 3.8.1.16 (restoration of loads to offsite power test), SR 3.8.1.17 (verification of test mode override test), SR 3.8.1.18 (engineered safety feature and auto-transfer load sequencing test), and SR 3.8.1.19 (loss of offsite power plus SI signal response test) to allow performance (or partial performance) of these surveillances during restricted MODES in order to re-establish OPERABILITY following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns during plant operation while remaining at-power.

In addition, this LAR proposes to add a Note to TS Section 3.8.1 that would clarify that a DG may be paralleled with offsite power for the short periods of time necessary to perform required testing. The proposed Note is consistent with the NRC position provided in Information Notice 84-69, which "prohibits the use of EDGs for purposes other than supplying standby power, when needed, and permits interconnection of the onsite and offsite sources only for short periods of time for the purpose of EDG load retesting. During such testing, only one of the redundant EDGs is to be paralleled at any one time, leaving the other EDG(s) available in standby service." Thus, the proposed Note would clarify that the DG under test need not be considered inoperable as a consequence of being paralleled with offsite power during performance of the required testing to demonstrate OPERABILITY. Paralleled DG operation for purposes other than for required testing would continue to be prohibited as currently provided in FSAR 8.3.1.1.8, "System Testing During Power Operation," and FSAR 8.3.1.1.11, "Onsite Emergency Power Sources (Diesel Generators)."

The TS Bases would similarly be revised to explain the added note and to clarify that interconnection of the standby onsite DG and the offsite source (i.e., DG operation in parallel with offsite power) is allowed for the periods of time necessary to perform required DG testing, and to include the administrative controls required to be in effect during DG testing while connected in parallel to the offsite power supply.

Consistent with the previous STARS responses to NRC questions regarding administrative controls to be in effect during DG testing while connected in parallel to the offsite power supply, the revised TS Bases will include the following provisions. These changes are provided for information only in attachments 3 and 5 to assist the staff in it review of the proposed changes. Revision to the TS Bases will be implemented pursuant to the TS Bases Control Program, TS 5.5.14, upon issuance of the license.

> "Administrative controls for performing surveillance testing with the DG connected to an offsite circuit, ensure or require that:
>
> a. Weather conditions are conducive for performing this SR.

b. The offsite power supply and switchyard conditions are conducive for performing this SR, which includes ensuring that switchyard access is restricted and no potentially impactive maintenance within the switchyard is performed.

c. No equipment or systems assumed to be available for supporting the performance of the SR are removed from service.

d. Associated risks shall be managed in accordance with the TS 5.5.18 Configuration Risk Management Program."

This change also includes an administrative change to delete TS LCO 3.8.1 Required Action A.3 one time Completion Time extension for Startup Transformer XST2 preventive maintenance because this allowance has now expired.

## 2.0 PROPOSED CHANGES

Mode Restriction Elimination

The following changes are proposed in order to eliminate the MODE 1 and 2 surveillance testing restrictions for SRs 3.8.1.10, 3.8.1.12, 3.8.1.13, and 3.8.1.14 as described above. The changes would be effected by deleting the applicable Note for each surveillance, as follows:

- SR 3.8.1.10 (full load rejection test) currently contains the following Note:

  "Verify requirement during MODES 3, 4, 5, 6 or with core off-loaded."

  For the proposed change to this SR, this Note would be completely removed.

- SR 3.8.1.12 (auto-start on safety injection (SI) signal test) currently contains the following Note 2:

  "Verify requirement during MODES 3, 4, 5, 6 or with core off-loaded."

  For the proposed change to this SR, Note 2 would be completely removed.

- SR 3.8.1.13 (protective-trip bypass test) currently contains the following Note 1:

  "Verify requirement during MODES 3, 4, 5, 6 or with core off-loaded."

  For the proposed change to this SR, Note 1 would be completely removed.

- SR 3.8.1.14 (endurance and margin test) currently contains the following Note 2:

  "Verify requirement during MODES 3, 4, 5, 6 or with core off-loaded."

  For the proposed change to this SR, Note 2 would be completely removed.

These proposed changes will allow performance of the testing required by these SRs to be performed during all Modes of operation such that the testing will no longer be required to be performed only during plant outages. This will help to reduce the complexity of coordinating work and testing activities during refueling outages and could potentially reduce outage critical path time. The change will also maximize flexibility in responding to an event during shutdown when other engineered safety features (ESF) equipment may be out of service. In addition, this change will potentially avoid a plant shutdown if maintenance (planned or unplanned) performed during power operation results in the need to perform the surveillance to demonstrate OPERABILITY.

TSTF-283 Revision 3 Changes

The following proposed changes modify the current TS Section 3.8.1 Notes that presently require surveillance testing to be performed in "Modes 3, 4, 5, 6 or with the core off-loaded" to be consistent with the standard TS wording provided in TSTF-283, Revision 3. The proposed changes will allow flexibility for DG testing when required to reestablish OPERABILITY following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns during plant operations, in accordance with TSTF-283, Revision 3.

- SR 3.8.1.8 (transfer of offsite AC sources test) currently contains the following Note:

  "Verify requirement during MODES 3, 4, 5, 6 or with core off-loaded."

  For the proposed change to this SR, this Note would be replaced with the following Note:

  "This Surveillance shall not normally be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced."

- SR 3.8.1.9 (post accident load rejection test) currently contains the following Note :

  "Verify requirement during MODES 3, 4, 5, 6 or with core off-loaded."

For the proposed change to this SR, this Note would be replaced with the following Note:

"This Surveillance shall not normally be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced."

- SR 3.8.1.11 (simulated loss of offsite power test) currently contains Note 2 which states:

  "Verify requirement during MODES 3, 4, 5, 6 or with core off-loaded."

  For the proposed change to this SR, this Note would be replaced with the following Note 2:

  "This Surveillance shall not normally be performed in MODE 1 or 2. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced."

- SR 3.8.1.16 (restoration of loads to offsite power test) currently contains the following Note:

  "Verify requirement during MODES 3, 4, 5, 6 or with core off-loaded."

  For the proposed change to this SR, this Note would be replaced with the following Note:

  "This Surveillance shall not normally be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced."

- SR 3.8.1.17 (verification of test mode override test) currently contains the following Note:

  "Verify requirement during MODES 3, 4, 5, 6 or with core off-loaded."

  For the proposed change to this SR, this Note would be replaced with the following Note:

  "This Surveillance shall not normally be performed in MODE 1 or 2. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced."

- SR 3.8.1.18 (engineered safety feature and auto-transfer load sequencing test) currently contains the following Note:

  "Verify requirement during MODES 3, 4, 5, 6 or with core off-loaded."

  For the proposed change to this SR, this Note would be replaced with the following Note:

  "This Surveillance shall not normally be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. "

- SR 3.8.1.19 (loss of offsite power plus SI signal response test) currently contains Note 2 which states:

  "Verify requirement during MODES 3, 4, 5, 6 or with core off-loaded."

  For the proposed change to this SR, this Note would be replaced with the following Note 2:

  "This Surveillance shall not normally be performed in MODE 1 or 2. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced."

Incorporating TSTF-283, Revision 3, for the affected SRs will ensure flexibility to perform (or partially perform) these Surveillances online for the purpose of reestablishing OPERABILITY without having to shut down the associated Unit. This will eliminate potential transients involved with a plant shutdown.

DG Parallel Testing Allowance

The proposed change would add the following Note to TS LCO 3.8.1:

"One DG may be synchronized with the offsite power source under administrative controls for the purpose of surveillance testing."

The Note will apply to surveillance testing that periodically requires a DG to be connected in parallel with offsite power in order to perform the required testing. Consistent with IN 84-69, the Note and accompanying TS Bases discussion will clarify that interconnection of the onsite and offsite sources only for short periods of time for the purpose of DG testing is permitted, provided that during such testing, only one of the redundant DGs is to be paralleled at any one time, leaving the other

DG available in standby service. The associated TS Bases will also provide the administrative controls for performing surveillance testing with the DG connected to an offsite circuit. Thus, the proposed Note would clarify that the DG under test need not be considered inoperable strictly as a consequence of being paralleled with offsite power during performance of the required testing to demonstrate OPERABILITY.

Administrative Change

This proposed change would delete the one time 21 day Completion Time allowance for Startup Transformer XST2 preventive maintenance from TS LCO 3.8.1 Required Action A.3 because this allowance has now expired.

The marked-up and retyped TS pages reflecting the above changes are provided in Attachments 2 and 3, respectively. Marked-up and retyped TS Bases pages are provided in Attachments 4 and 5 respectively, for information only. The TS Bases changes will be implemented in accordance with TS 5.5.14, "Technical Specifications (TS) Bases Control Program," as part of the implementation of this amendment after NRC approval.

## 3.0 BACKGROUND

### 3.1 Description of Class 1E Alternating Current (AC) Power System

As required by 10 CFR 50, Appendix A, General Design Criteria (GDC) 17, the design of the Comanche Peak Steam Electric Station (CPSES) AC electrical power system provides independence and redundancy to ensure an available source of power to the Engineered Safety Feature (ESF) systems. The onsite electric power systems are provided with preferred and alternate offsite power sources through two physically independent circuits supplied by separate switchyards through startup transformers each sized to simultaneously carry plant essential loads for both units. This arrangement provides for highly reliable network interconnections which are made through five 345 kV and two 138 kV transmission lines to the integrated ERCOT (Electric Reliability Council of Texas) transmission network (grid).

The offsite power sources are configured such that the preferred source to the Unit 1 buses is provided from the 345 kV Switchyard via startup transformer XST2 , and the preferred source to the Unit 2 buses is provided from the 138 kV Switchyard via startup transformer XST1. In the event one startup transformer (e.g., XST2, the preferred source for Unit 1) becomes unavailable to its normally fed class 1E buses, power is made available within seconds from the other startup transformer (e.g., XST1, the alternate source for Unit 1) by an automatic transfer scheme. Because both the preferred and alternate sources for each unit's safety related buses are

provided from offsite power sources, this eliminates the need for an automatic transfer of safety-related loads in the event of a unit trip. Also, the two redundant and independent offsite power sources are both available on an immediate basis following a Design Bases Accident (DBA) to ensure the safe shutdown of either unit. Hence, the offsite power systems are fully capable of providing reliable sources of power to the Class 1E systems of each unit in compliance with NRC General Design Criterion (GDC) 17, NRC Regulatory Guide 1.32, and IEEE 308-1974. Moreover, the design of the offsite power systems for CPSES exceeds the minimum requirements cited by these regulations.

With respect to the onsite safety related AC power systems, each unit is provided with two independent and redundant 6.9 kV Class 1E buses, each capable of supplying the required safety-related ESF loads to safely shut down the unit following a DBA. Each emergency bus can be supplied from the offsite power sources (preferred power source and alternate), and the onsite standby emergency power sources (Train A or Train B diesel generators (DGs)). The redundant safety-related loads are divided between the Trains A bus and the Train B bus so that loss of either train does not impair fulfillment of the minimum shutdown safety requirements. There are no manual or automatic connections between Class 1E buses and loads of redundant trains. Electrical separation of redundant trains is maintained through all voltage levels, including DC and instrumentation.

Upon loss of the preferred offsite power source to any 6.9 kV Class 1E bus, the alternate power source is automatically connected to the bus and the diesel generator starts should the alternate source not return power to the Class 1E buses. Loss of both offsite power sources to any 6.9 kV Class 1E bus, although highly unlikely, results in the diesel generator providing power to the Class 1E bus. Each diesel generator is connected exclusively to its associated 6.9 kV Class 1E bus, which ensures independence of the onsite standby emergency power sources.

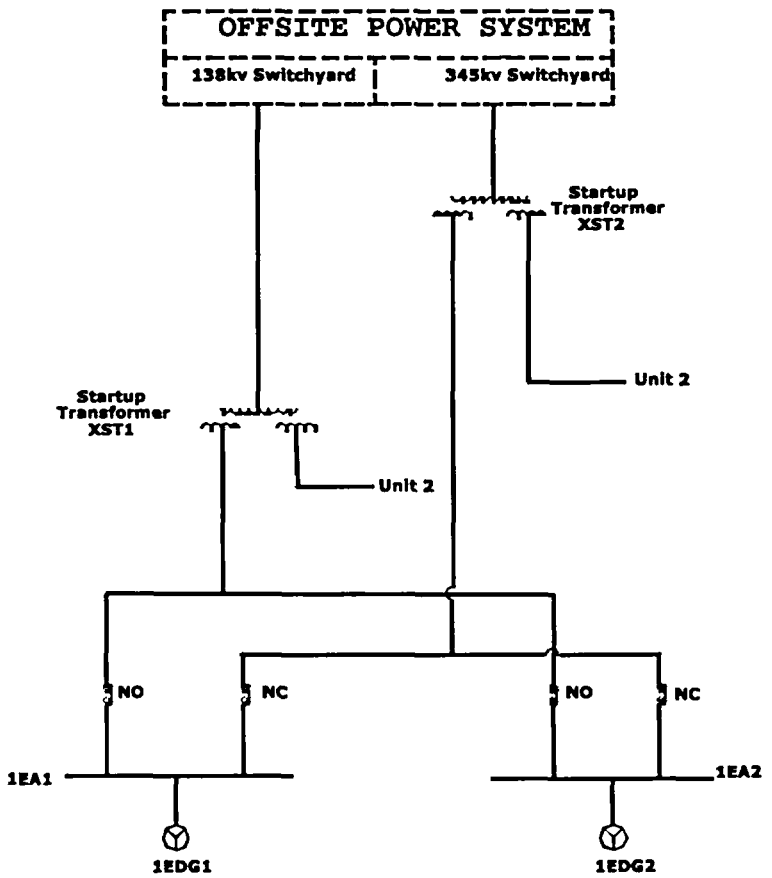


Figure 1

CPSES Electrical Distribution Overview

A simplified one-line diagram of the electrical power distribution system described above is provided as Figure 1. As can be seen from the figure, and as described above, each of the two 6.9 kV Class 1E buses is normally supplied by its preferred offsite power source via its respective startup transformer (U1: XST2 or U2: XST1) and is capable of being exclusively supplied by its associated diesel generator. There are no automatic connections between the redundant load groups.

Overcurrent (OC) relays are provided at the preferred and alternate sources to each safeguards bus. On the detection of a bus fault, the OC relays will trip the bus lockout relays. Lockout relay actuation will send trip signals to the preferred and alternate offsite source breakers and the DG output breaker. The source breakers will be prevented from closing until the lockout condition is manually reset.

Differential protection for the offsite circuit startup transformer is provided between the transformer high side bushings and bus side source breakers, i.e., cable bus and bus source breaker faults are detected and protected by the transformer differential relay. Actuation of the transformer differential relay instantly trips the switchyard breakers feeding the offsite circuit startup transformer and the bus side source breakers to isolate the fault.

3.2 Description of Loss of Power Detection and DG Loading Schemes

Loss of the preferred and loss of the alternate offsite power sources are detected by undervoltage sensors located on the offsite feeder circuits to the 6.9 kV Class 1E safety buses. The scheme consists of instantaneous undervoltage relays which initiate tripping of the offsite source breakers via time delay pickup relays.

Undervoltage protection schemes for degraded grid voltages are applied at the 6.9 kV and 480 V Class 1E safety related buses by undervoltage relays via time delay relays which will trip the 6.9 kV Class 1E safety bus source breakers.

Undervoltage protection relays for 6.9 kV Class 1E safety bus loss of voltage will trip, after a time delay, all the 6.9 kV motors, provide an alarm indicating loss of bus voltage, and permit the alternate source breaker to be closed to the 6.9 kV bus. After a time delay to allow for the alternate source breaker to close, these undervoltage relays also provide a start signal to the DGs.

Low voltage (after an appropriate time delay) on the 6.9 kV Class 1E bus starts the respective emergency diesel generator for that bus should the alternate source not return power to the Class 1E bus. If both the preferred and alternate power sources are not available, the emergency diesel generator will power the bus after it has reached rated voltage and frequency.

For each unit, two independent and redundant solid-state safeguards sequencer (SSSS) cabinets are provided for sequential loading of the safeguard buses, one for Train A and one for Train B. Each cabinet houses two sequencers, one for the safety injection mode sequencing (SIS) and one for loss of offsite power (blackout) only mode sequencing (BOS). In the event of loss and subsequent restoration of bus voltage or in the event of a Safety Injection Actuation Signal (SIAS), each sequencer cabinet will provide the logic for loading one 6.9 kV emergency bus in a pre-established time sequence.

Undervoltage (UV) protection is provided at the preferred and alternate sources to each of the safeguards buses. After a short time delay if the offsite source is not available, the offsite source will be isolated from the safety bus.

A second level of UV protection is provided for each safeguards bus to isolate the bus from a degraded offsite source condition. The actuation of this protection for the bus will trip the preferred offsite source feeder breaker in 60 seconds in the absence of an SIAS or in 8 seconds with an SIAS. If the alternate offsite source does not restore the bus voltage then the alternate source breaker will be tripped and the associated DG will receive an emergency start signal from safeguards bus UV relays.

Actuation of bus UV relays provides an emergency start signal to the associated DG. This signal resets the DG to emergency operating mode if the DG was already running. The bus UV relays also initiate bus load shedding and arms the blackout sequencer (BOS). The BOS starts sequencing the load on to the bus on restoration of the bus voltage.

Overall, a loss of offsite power (LOOP) will cause a reactor trip and the safety buses to experience loss of voltage. The safety buses UV condition will initiate load shedding of the buses, start the DG in emergency mode, and arm the BOS.

In the event of a DBA, such as a LOCA, an SIAS is generated and provides an emergency start signal to the DGs. This signal resets the DG to emergency operating mode if the DG was already running. The non-Class 1E loads are tripped and isolated by the SIAS. The SIAS also arms the safety injection sequencer (SIS), and the SIS starts sequencing the load on to the bus on restoration of the bus voltage. Non-LOCA DBAs may not generate an SIAS signal.

Plant response to Loss of Power, Accident Signals, and Subsequent Loading

LOOP

On loss of both preferred and alternate offsite sources (LOOP) the incoming breakers (Preferred and Alternate) to the onsite Class 1E buses are tripped or prevented from closing if open. The following sequence of operation is initiated:

- Undervoltage relaying sheds the required loads from the Class 1E buses.
- The DGs are started in the emergency mode on an UV signal.
- The diesel generator breaker will close after the diesel generator rated voltage and frequency have been established and there is no bus fault.
- Large loads required during a LOOP (blackout) are started in sequence by the blackout sequencer (BOS). Small loads (less than 20 hp) are generally started in accordance with their respective circuit logic.

SIAS

In the event of a SIAS alone, the following sequence of operation is initiated.

- The DGs receive SIAS start signals and run (emergency mode) without connecting to the IE bus or the DG breaker is tripped if it was closed.
- All non-Class 1E loads connected to Class 1E 6.9 kV or 480 V buses are tripped except those which are electrically isolated by two protection devices.
- The power source for the Class 1E buses remain supplied by offsite power.
- Large loads required during a DBA are started in sequence if not already running, by the SIS. Small loads (less than 20 hp) are generally started in accordance with their respective circuit logic. following completion of the sequencer timing.

SIAS and LOOP (See Section 4 for SIAS occurring after LOOP)

In the event of SIAS and LOOP, plant response is similar to the LOOP response above except:

- The DGs receive both UV and SIAS start signals
- The SSSS functions to recognize the simultaneous or sequential occurrence of Class 1E 6.9 kV safety bus undervoltage (UV) and SIAS, and arms the SIS. In this mode, when bus voltage is restored, the SIS proceeds through its operation as described for safety injection alone.
- When bus voltage is restored, the SIS proceeds through its operation as described for safety injection alone.

A description of the plant response to these events while the DG is operation in a test mode paralleled with offsite power is provided in detail in Section 4.

3.3 Standby Power Source Design Features

As previously described, the onsite standby power source for each 6.9 kV Class 1E safety (ESF) bus is a dedicated DG. Each DG set will automatically start in emergency mode whenever any of the following conditions occur:

a. Undervoltage on its respective ESF bus
b. SIAS

Manual initiation capability is also provided, both locally (at the DG local control panel in each diesel generator room) and from the Control Room. This may be a normal or emergency start.

The diesel generator protection systems initiate automatic and immediate protective actions to prevent or limit equipment damage and allow restoration of the equipment upon correction of the problem. Automatic tripping of the DG occurs for any of the following reasons when the DG is started in normal mode.

a. Lube oil low pressure
b. Engine overspeed
c. Crankcase high pressure
d. Generator differential
e. Generator reverse power
f. Jacket water high temperature
g. Generator outboard bearing high temperature
h. Generator loss of excitation
i. Lube oil high temperature
j. Generator negative sequence
k. Generator voltage restrained time overcurrent
l. Generator stator ground
m. Generator field ground
n. Engine high vibration
o. Turbo high vibration
p. Engine bearing high temperature
q. Left or right bank turbo low oil pressure
r. Generator overexitation
s. Generator neutral ground overcurrent

With the exception of generator differential and engine overspeed protection, the preceding trips are bypassed with the DG in emergency mode.

During normal (non-emergency) operation, the DG is protected from overload by a voltage restraint overcurrent (VROC) relay. This DG protection is bypassed during emergency operation of the DG. Actuation of VROC relay will send a trip open signal to DG breaker.

A diesel generator trouble alarm in the Control Room is provided to alert the operators of any of the abnormal conditions listed above. Appropriate action can then be taken by the operator as required.

3.4 Diesel Generator Testing

Periodic testing of the diesel generators is performed as specified in the Technical

Specifications to verify their continued capability and availability to perform their design function. TS 3.8.1, "AC Sources - Operating," includes SRs for both monitoring of the offsite sources and for testing of the DGs. Some of the DG SRs involve tests in which the DG is paralleled in the normal mode to the offsite source (i.e., connected to its associated bus while that bus is being supplied by its preferred offsite source). The length of time that the DG is paralleled to the offsite circuit can be on the order of minutes or, depending on what test is being performed, up to a minimum time of 24 continuous hours for the endurance and margin test per SR 3.8.1.14. SR 3.8.1.3, for example, tests DG starting and loading capabilities to demonstrate continued availability for operation. This test requires synchronizing the DG to its associated bus while the bus is being supplied from offsite power and is performed monthly.

Onsite and offsite power sources are not paralleled except for testing of the diesel generators. During the testing mode, only one DG is paralleled to the offsite source at any one time. Should there be an SIAS generated by a DBA resulting in an SIAS during these periods, separation of the two sources is established by automatic tripping of the diesel generator breaker in response to the SIAS signal. The diesel generator returns to standby status and continues to operate at rated voltage and frequency with no load.

When a DG is not under test, the standby power source is separated from the preferred power source. CPSES design does not provide for automatic paralleling of these sources by the sequencer or otherwise. Consequently, no single failure in the sequencer will either compromise separation of redundant portions of these two power sources, or render both preferred power sources and both redundant onsite power sources unavailable.

As noted in Section 2, TXU Power is proposing to eliminate Mode restrictions on certain SRs associated with the DG, and to revise other restrictions consistent with TSTF-283. Further analysis and justification for these changes is provided in Section 4. In the course of the reviews performed to support the preparation of this License Amendment Request (LAR), a set of unlikely coincident events and conditions was postulated during the design verification review. It could not be conclusively determined that the CP licensing basis and previous NRC review specifically identified and considered these unlikely scenarios which could impact both DGs while one DG is paralleled to an offsite source. As a result, interim compensatory actions have been conservatively initiated to declare the DG inoperable prior to and during parallel operation to the off-site sources. The identified condition was reported in CPSES License Event Report (LER) 02-001. These scenarios are explained and analyzed in section 4 concluding that they are not credible.

## 4.0 TECHNICAL ANALYSIS

### 4.1 MODE Restriction Elimination

As provided in the NUREG-1431, standard Technical Specifications (TS) Bases, the reason that the performance of these Surveillance Requirements (SRs) is restricted in MODES 1 and 2 is to prevent unnecessary perturbations to the electrical distribution systems which could challenge steady state operation and thus affect plant safety systems. The standard TS Bases compares the risk of this testing to the risk associated with a shutdown of the unit without the availability of a required DG. As a result, the performance of these SRs is restricted during MODE 1 or 2 unless test performance is required to demonstrate OPERABILITY, such as following unplanned maintenance. As a similar consideration, the standard TS Bases for SR 3.8.1.13 also includes that the reason for not performing this surveillance in Mode 1 or 2 is due to removing a required diesel from service.

The following technical analysis provides justification for the proposed changes based on the conclusion that there is minimal increase in risk involved with performing these SRs while the unit is at power, and that the increase in risk is insignificant and acceptable.

The operability requirements for the onsite and offsite AC sources during plant operation in MODES 1, 2, 3, and 4 are specified in TS 3.8.1, " AC Sources - Operating." TS 3.8.1 also includes Surveillance Requirements (SRs) for monitoring the offsite power sources and testing the standby emergency diesel generators (DGs). Currently, specific SRs include a Note stating "Verify requirement during MODES 3, 4, 5, 6, or with core off-loaded." These notes neither approve nor prohibit testing in MODES 1 and 2; however, for testing that is performed in MODES 1 and 2 (e.g. for post work testing) the testing may not be credited to satisfy the SR. Only the testing performed in MODES 3, 4, 5, 6 or with core off-loaded can be credited to satisfy the SR. Adoption of the TSTF 283 wording clearly allows performance of the SRs, or portions thereof, with certain restrictions addressed in the bases.

The existing Notes were approved by Amendment 64 during the TS conversion to the format and content of the Improved Standard Technical Specifications (ISTS). In lieu of the standard TS wording for the SR MODE restriction Notes, CPSES retained a modified version of the Notes provided in NUREG-1431, Revision 1. The standard TS Notes require that "This Surveillance shall not be performed in MODE 1 or 2," while the current CPSES TS Notes restrict the affected surveillance performance to "Verify requirement during MODES 3, 4, 5, 6 or with core off-loaded." The justification for the difference was based on the pre-conversion TS surveillance requirements which continue to provide an acceptable means of demonstrating OPERABILITY without perturbing the electrical system or challenging safety systems.

This LAR proposes changes to the current TS 3.8.1 SR performance MODE restrictions by completely removing the associated surveillance MODE restriction Note or by modifying the current Notes to incorporate the standard TS MODE restriction Notes consistent with the changes provided TSTF-283, Revision 3. The changes that remove these Notes meet the intent of the approved TSTF-283 MODE restriction Note changes which is to avoid a potential plant shutdown by allowing maintenance of the DGs to be performed during unit power operation. This would reduce the complexity of coordinating work and testing activities during refueling outages, which in turn could potentially reduce outage critical path time (i.e., reduce overall outage complexity by not performing these SRs in a refueling outage). The other changes that are based on TSTF-283 would allow performance (or partial performance) of these surveillances during restricted MODES in order to re-establish OPERABILITY following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns, during plant operation while remaining at-power.

SR 3.8.1.10 Full-Load Rejection Test

The method of conducting the SR 3.8.1.10 full-load rejection test has historically been to perform the test while the plant is shutdown during an outage when only one of the two DG Trains is required to be OPERABLE. The test is typically performed by paralleling the DG that is not being credited as the operable DG with the offsite power source while the offsite source is supplying the associated bus, loading the DG to the required load, then opening the DG output breaker. Opening of the DG output breaker separates the DG from its associated emergency bus and allows the offsite circuit to continue to supply the emergency bus.

As described in the standard TS Bases, the concern associated with performing the full-load rejection test in MODES 1 and 2 is that disconnecting the DG while it is supplying power to the emergency bus could cause undesirable electrical perturbations on the bus and thus to plant loads. This is a concern because while paralleled with the offsite source, the DG under test is susceptible to grid disturbances and is potentially more susceptible to tripping due to the non-emergency DG protection trips that are in effect during the test. These concerns are discussed below.

The proposed change would allow DG testing to be performed during unit power operation when both DGs are required to be operable in accordance with TS 3.8.1. This test will only be performed in Modes 1 or 2 if the other DG and both offsite circuits are operable. The time period that the DG is synchronized to the offsite power source is minimized.

Grid Disturbances

The potential for the occurrence of a compounding grid disturbance during the relatively short time that a DG is under test per this SR is remote. The occurrence of a grid disturbance is independent of testing performed pursuant to this SR, and since the DG is only paralleled with the offsite source for a limited period of time before isolating the DG by opening its output circuit breaker, the probability of a grid disturbance occurring while the DG is under test and paralleled to the offsite system is small. This conclusion is supported and reinforced by the fact that normal risk management practices are also in effect to ensure that SRs of this type are not scheduled during periods in which there is an increased potential for grid or bus disturbances (such as during severe weather, maintenance activities in the switchyard, or when the independent system operator has identified potentially adverse grid conditions). Administrative procedures for DG parallel operation require close monitoring of bus voltage and DG load and the parallel operation is required to be terminated if bus voltage and DG loading exceed the limits defined in the administrative procedures. It may be noted that the amount of time required for the DG to be paralleled to the offsite source for performance of this surveillance is much less than the time the DG is paralleled when performing the monthly test required per SR 3.8.1.3 (done in conjunction with SR 3.8.1.2 or SR 3.8.1.7) for which the current TS provides no performance MODE restrictions.

In the event that a grid voltage disturbance should occur while the DG is paralleled to offsite power, UV protective relaying and instrumentation exists to mitigate the effects of such disturbances. For a sustained low grid-voltage condition, the protection instrumentation required by TS 3.3.5, "Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation," is available to respond to such a condition for protection of the plant loads. During the degradation of grid voltage the operators will likely have sufficient time to terminate the test by disconnecting the diesel from the offsite source if the DG load or bus voltage exceed the limits established for the parallel operation.

Also, should there be a DBA resulting in an SIAS during these periods, separation of the onsite and offsite power sources is established by automatic tripping of the diesel generator breaker by a Safety Injection Actuation Signal (SIAS). In this event, the diesel generator returns to standby status and continues to operate at rated voltage frequency with no load.

Therefore, for a degrading grid conditions both DGs will remain available to mitigate the consequences of an accident. In some DBAs, the reactor trip/turbine trip occurs before the SIAS with the associated impact on the grid. Therefore, LOOP with a delayed SIAS was evaluated. See these additional analysis of DG parallel operation in Section 4.3.1.

Electrical Perturbations

As noted above, opening of the DG breaker during the performance of this surveillance separates the DG from the associated safety bus and allows the offsite circuit to continue supplying the bus. This evolution has little impact on plant loads. The power system loading during the testing is well within the rating of all transformers, switchgear, and breakers before and after the load rejection. Based on experience this test generally has had little impact on the plant electrical distribution system. Results from tests at CPSES show that voltage changes during a full-load rejection test are not significant. Data recorded from past performances of this test at CPSES show that bus voltage during the "transient" remains well above the minimum required voltage for bus loads and typically recovers within one second. Further, industry experience with this test has shown that the voltage "perturbation" seen on the bus during and just after the load rejection is not significant, i.e. voltage fluctuations remain well within the 5% allowed during step load applications. Therefore, performing load reject tests in accordance with SR 3.8.1.10 during plant operation would not be expected to cause any a significant voltage perturbation that could adversely affect the plant electrical system or plant loads.

SR 3.8.1.12 Safety Injection Actuation Signal Test

This test requires verification that the DG auto-starts from the standby condition on a SIAS, achieves proper voltage and frequency within the required time, and operates at least 5 minutes. Note that this test does not require the DG to be paralleled with offsite power, nor does it require verification of emergency load sequencing (SIS) which is addressed in other SRs. For these reasons, the concerns that the test could cause electrical perturbations as stated in the standard TS Bases do not apply to CPSES. It is current practice to combine the required slave relay test (on the specific relays that start the DG) with one of the DG starts for monthly testing per SR 3.8.1.2. Removal of the note will allow credit to be taken for this 18 month test, possibly avoiding an additional test setup or engine start during shutdown testing.

SR 3.8.1.13 Non-Emergency Protective Trip Bypass Test

This test requires verification that the non-emergency automatic protective trip functions for each DG are bypassed on a loss-of-voltage signal on the emergency bus and on an SI actuation signal.

This surveillance is presently performed during shutdown conditions. With the DG in Emergency Mode, the test is performed by simulating a non-emergency trip signal (here, crankcase high-pressure) and verifying that the running DG does not trip. Because all the non-emergency trips are processed through one common circuit that is blocked by the emergency start signal, this demonstrates that none of the signals will trip the DG.

The standard TS Bases for SR 3.8.1.13 notes that the surveillance is currently restricted from being performed during MODES 1 and 2 because its performance requires removing a required DG from service. This concern may be put into perspective, however, when the actual amount of time that a DG is rendered unavailable for the performance of this surveillance is considered. An average unavailability time of 5 hours per DG per operating cycle, attributed to this test, is considered to be quite small relative to the total time the DGs are available throughout the operating cycle. This is significantly less than the Completion Time (72 hours) currently specified in the TS for an inoperable DG. Also, it should be remembered that availability of the other DG is maintained during such testing since risk-management practices require the redundant, unaffected train (associated with the DG not under test) to be maintained in a protected status during such activities. Therefore, performing the non-emergency bypass test online is not a significant concern because the other operable DG is capable of mitigating a DBA. Based on the short time that a DG remains in this condition, this is considered an insignificant increase in unavailability and performance of the SR should not be restricted to shutdown conditions. It is also likely that the test would be performed during a DG work window when the DG was inoperable for other maintenance.

SR 3.8.1.14 - Endurance and Margin Test

Performance of the endurance and margin test per SR 3.8.1.14 requires synchronizing (paralleling) and loading the DG with the offsite source (via the associated 6.9 kV safety bus) and then running it continuously while loaded to its full-load capability for not less than 24 hours. The electrical alignment for this test is similar to the existing monthly run of the DG (SR 3.8.1.3) for which there is no MODE restriction. The proposed change would allow this surveillance test to be performed without restrictions during plant operation when both DGs are required to be OPERABLE, as opposed to the current MODE restrictions that require this testing to be performed during shutdown conditions. The tested DG remains OPERABLE throughout performance of this surveillance (subject to the clarification in Section 4.3.1) and does not render any additional safety system or component inoperable.

Current surveillance tests are performed in MODES 5 or 6, which require only one DG to be operable. Thus, current testing does not require the DG being tested to remain operable. This LAR is proposing that this testing also be allowed in Modes 1, 2, 3 or 4 when both DGs are required to be operable per Technical Specification 3.8.1.

The concerns associated with performing the 24-bour endurance test while in MODE 1 and 2 are similar to those previously described for the SR 3.8.1.10 full-load rejection test, i.e., that while a DG is paralleled to the offsite source, the DG is not independent of disturbances on the offsite power system, and the associated safety

bus and train of equipment is not independent of any potential interaction between the DG and the offsite system.

These concerns are addressed in the following evaluation which shows that the risk associated with paralleling a DG to offsite power for surveillance testing during plant operation is acceptably small.

Grid Disturbances

CPSES currently tests DGs paralleled to offsite power during required monthly surveillance test SR 3.8.1.3 while the unit is at power. SR 3.8.1.3 requires the DG to be full loaded for a minimum of 60 minutes, but the DG is typically paralleled for approximately 4 hours to allow for DG loading and unloading. The DG 24-hour endurance test SR 3.8.1.14 is identical in setup and alignment to SR 3.8.1.3 and differs only in the required duration and the 2-hour peak loading of 110% of continuous rated load.

While the time required that a DG is paralleled to offsite power for performance of the 24-hour endurance test is longer than the time a DG is paralleled for the performance of other SRs requiring parallel operation (such as the monthly SR 3.8.1.3), the required testing frequency of the 24-hour endurance test is only once per 18 month cycle. The endurance test will substitute for one of the required monthly tests, thus making the increased time about 20 hours per operating cycle and only a fraction of the cumulative time incurred during the monthly testing. Thus, the additional time required in this configuration is on the order of only a few hours increase and the total time remains small when compared to the thousands of hours per year that the DGs are required OPERABLE. The potential for occurrence of a compounding grid disturbance during the time that a DG is under test per this SR may therefore still be considered remote. Further, since there is only a remote probability that a grid disturbance will lead to DG unavailability, the likelihood of a DG being rendered unavailable as a result of a grid disturbance during testing is extremely remote.

As noted previously, in the event of a grid disturbance occurring while the DG is paralleled to offsite power, protective relaying and instrumentation (including the aforementioned LOP instrumentation) exist to respond to certain types of disturbances. Further, if a DG protective trip were to occur and , if the DG is not separated from the grid on degrading voltage in response to a disturbance in the offsite power system, operator action can be taken to manually reset the lockout relay of the DG under test (assuming that the condition which caused the trip was promptly cleared or isolated) so that the DG can be restarted and its loads properly sequenced, if required.

As common practice at CPSES, risk management considerations ensure that this

testing and other SRs would not be scheduled during periods where the potential for grid or bus disturbance exists (storms, grid emergencies, etc.). On-line maintenance/testing scheduling and coordination of work activities at CPSES is controlled as required by 10 CFR 50.65(a)(4). Risk management practices are implemented at CPSES by the administrative requirements of the Configuration Risk Management Program (CRMP). The CRMP is used to assess the risk impacts of performing maintenance and testing work, including this testing, to ensure that there is no significant increase in the risk of a severe accident while maintenance is performed. The CRMP also include the Safety Monitor™ for risk monitoring and contingency action planning. These methodologies, which are currently in existence at CPSES, provide acceptable assurance of continued safe reactor operation. The Configuration Risk Management Program (CRMP) is prescribed by TS 5.5.18 and will be applied throughout the duration of the testing.

Also in accordance with the CRMP, equipment identified as important to Loss of Offsite Power and Station Blackout considerations will be administratively controlled and protected to insure that the equipment remains operable and available for the duration of the testing. As previously mentioned, the CRMP also will ensure that SRs of this type are not scheduled during periods in which the potential for grid or bus disturbances exists (such as during severe weather or maintenance activities in the switchyard). And, as described in FSAR Sections 8.3.1.1.8 and 8.3.1.1.11, paralleled testing is limited to only one DG at a time with heightened awareness and emphasis placed on "protecting" the standby train. This ensures sufficient independence of the onsite sources from the other train and from offsite power while still enabling testing to demonstrate DG OPERABILITY for the affected train under test.

No potentially impactive switchyard activity will be allowed during this testing. All activity in the switchyards will be closely monitored and controlled. Heightened control of the swtichyards will be implemented. These actions will ensure that switchyard maintenance work will not be allowed that could challenge the operability of the offsite AC power sources.

To minimize risk during the planned testing, maintenance and testing of the other DG and the 6.9 kV AC safety buses will not be conducted.

The results and assumptions used in the Station Blackout (SBO) analysis regarding the availability and reliability of the DGs are unaffected by this proposed change.

In the case where internal faults potentially affect the DG being tested, protective devices (i.e. overcurrent relays, differential relays, reverse power) would protect the DG from overcurrent or reverse power. These features will ensure that the DG is protected by causing the DG output breaker to trip separating the DG from its associated bus and assuming that the DG could be quickly restored, making the DG

available for restart via operator action. The DGs were designed for parallel testing and as such, design features, such as protective devices, were included. The change does not affect parallel testing design features, the consequences of postulated failures during parallel testing, and postulated interactions with offsite power during parallel testing. If problems are encountered during testing, the DG will separate from the bus allowing the offsite circuit to continue to supply the bus.

Electrical Perturbations

After the DG is synchronized and loaded, the test performed per SR 3.8.1.14 is essentially a continuous run involving little or no dynamic effects. Bus voltage and power factor, including the effects of any changes in offsite power (such as the typical change in grid load that occurs in the course of a day) are monitored closely during the test because SR 3.8.1.14 requires the load to be maintained within a certain range. Electrical perturbations are thus minimized to the extent that they are monitored and can be controlled.

Additionally, information will be added to the TS Bases to state:

"Administrative controls for performing this SR in MODES 1 or 2, with the DG connected to an offsite circuit, ensure or require that:

a. Weather conditions are conducive for performing this SR.

b. The offsite power supply and switchyard conditions are conducive for performing this SR, which includes ensuring that switchyard access is restricted and no potentially impactive maintenance within the switchyard is performed.

c. No equipment or systems assumed to be available for supporting the performance of the SR are removed from service.

d. Associated risks shall be managed in accordance with the TS 5.5.18 Configuration Risk Management Program."

Only one DG per unit will be in parallel with the offsite source at a time in order to prevent any grid disturbances from potentially affecting more than one DG. During the test, the remaining DG will be available to respond normally to a start signal. The unit's remaining DG is capable of supplying power to mitigate all DBAs. This test configuration is consistent with the configuration used during the monthly DG tests.

Further justification is provided in that improved maintenance scheduling permitted by the more flexible SR will reduce the amount of time that the DGs will be

inoperable. The flexibility allows performing the 24-hour DG endurance run in other than shutdown conditions when heavy and complex maintenance activities occur resulting in unavailability of equipment. In addition, the capability to safely complete emergency shutdown procedures following a DBA coincident with a single failure is maintained throughout the performance of the surveillance.

No actions will be taken to affect the operability of the unit's remaining DG and its support systems throughout the surveillance test, and no actions will be taken to affect the capability of the onsite Class 1E AC electrical distribution system and its support systems to complete plant shutdown and maintain safe shutdown conditions following a DBA. Based on the above, although performance of the 24-hour DG endurance test during power operation deviates from the standard TS, the performance of this test during power operation is consistent with the robust design features of the plant and is therefore acceptable.

This proposed change is justified based on the above considerations by the fact that the remaining DG (i.e., the standby DG not under test) would remain operable and is independently capable of mitigating a Design Base Accident (DBA) or providing for safe shutdown of the associated unit with the remaining DG operable.

4.2 TSTF-283 Revision 3 Change

The proposed change modifies the Notes in SRs 3.8.1.8 (transfer of AC sources test), 3.8.1.9 (single load rejection test), 3.8.1.11 (loss of offsite power test), 3.8.1.16 (synchronizing test), 3.8.1.17 (test mode change-over test), 3.8.1.18 (engineered safety feature and auto-transfer load sequencing test), and 3.8.1.19 (combined safety injection actuation signal and loss of offsite power test) to allow performance of the surveillances or in some cases only portions of the surveillances in the prohibited modes in order to reestablish operability following corrective maintenance. The changes to these Notes are consistent with NRC approved change TSTF-283, Revision 3.

The TS Bases will be revised to allow testing to reestablish operability provided an assessment is performed to assure plant safety is maintained or enhanced. This update will be consistent with TSTF-283 to provide the following guidance relative to this assessment: "This assessment shall consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when the Surveillance, or portions of the Surveillance, is performed in these normally restricted modes. Risk insights or deterministic methods may be used for this assessment."

Some SRs are more complicated or intrusive than others, and would involve too great an impact or potential perturbation to the plant to be done in their entirety during plant operation. For these, the Note incorporated per TSTF-283 only permits a partial performance of the applicable SR. In each of these cases, the text proposed for the Note (and for the associated Bases changes) refers to the "partial Surveillance" or "portions of the Surveillance" rather than referring wholly to "the Surveillance."

Conclusion/Summary

The proposed changes will provide the flexibility necessary to optimize both outage schedules and the utilization of resources, while still protecting the health and safety of the public and station personnel.

4.3 DG Parallel Testing Allowance

TXU Power recognizes that when a DG is paralleled to the offsite power source, the emergency power system is not independent of disturbances on the offsite power systems including, in the extreme sense, it can be vulnerable to the masking of voltage sensing for protective features. Hence, in order to serve as a dependable backup power source (i.e., to minimize the probability of losing electric power from any of the remaining supplies), only one DG is normally paralleled to the offsite source at a time to further reduce the vulnerability to LOOP during the test.
As noted in Section 3, the design verification review identified and analyzed a number of scenarios involving DGs, offsite power, the interaction of the power sources, postulated events and failures. Most of these scenarios are per design and the Current Licensing Basis as described in Section 3. Discussion of other of these events during DG testing is included below.

4.3.1 Additional Analyses - Effects of Events Occurring While a DG is Paralleled to Offsite Power During Testing

The following is an analysis of events that may be postulated to occur concurrent with DG testing, during those short time periods with the DG paralleled with offsite power. Specifically, Loss of Offsite Power (LOOP), and a combination of a LOOP and SIAS combined with failures, are analyzed.

LOOP

The parallel operation of the DG compromises the capability of UV relays to detect LOOP, because the DG may support the bus voltage. Therefore, the administrative controls for DG parallel operation are in place to further reduce the probability of LOOP occurring during DG parallel operation. These controls require that DG parallel testing (1) is not started if weather / grid conditions are not conducive for a

stable grid, (2) close monitoring of grid conditions during the test is maintained, and (3) testing is terminated if the grid conditions potentially may cause LOOP. The LOOP could occur due to:

- Sudden collapse of grid voltage.
- Loss of offsite source due to loss of offsite lines or tripping of switchyard breakers feeding the offsite source.
- Degraded voltage tripping of the bus source breaker.

The probability of sudden collapse of grid voltage or loss of offsite lines during DG parallel operation is minimized as a result of administrative controls in place for parallel operation. Therefore, these scenarios are not considered for DG parallel operation. As described in Section 3, the tripping of the source breaker by UV relays results in availability of both the DGs. Therefore, the scenarios evaluated for LOOP is loss of offsite source due to tripping of switchyard breakers.

In the event of a LOOP occurring while a DG is running and paralleled to offsite power for testing, the DG would continue supplying power to the existing loads on both safeguards buses and additional loads which would auto-start such as emergency feedwater. (In this scenario, the 6.9 kV Class 1E bus undervoltage relays may not trip because the bus voltage is being adequately supported by the DG.) In some plant Modes, loading could exceed the DG's capability. A preliminary evaluation of plant loads in this event indicates that in Mode 1 the resultant load of both safety busses is within the DG capacity, in Modes 2 or 3 the load is within the 110% overload capacity of the DG, and in Mode 4 the load could exceed the overload capacity and be expected to generate a protective action. (A confirmatory analysis will be performed to confirm this evaluation.) In Modes 1, 2, & 3 after recognition of the LOOP, the operator will terminate the test and both DGs will remain available to feed their bus loads. In Mode 4, the expected protective action would be a DG overcurrent trip and lock out as described in Section 3. This trip separates the safety buses and additionally starts the DG not under test. Also, the tripped DG restarts. The review of CPSES test data shows that as a result of this load rejection by the DG in parallel operation, the DG mechanical overspeed will not occur. Thus, both DGs will remain available to feed their bus loads.

However, if the DG under test does not trip as previously described, then a consequence of this scenario is that the DG under test continues to run in the normal, rather than the emergency mode while feeding both Train A and Train B buses. As a result, the automatic trips of the DG (see SR 3.8.1.13) are not bypassed until the operator shifts the DG to the emergency mode. This should be of no consequence during this short period of time and an insignificant impact on DG availability. Except for the unlikely case of overload, a single failure of an automatic trip or any other single failure will not prevent a safe shutdown.

LOOP and SIAS

In the accident analyses of the FSAR for some accident sequences, a LOOP is postulated to occur concurrently with an SIAS (which trips the reactor and turbine) for the purposes of providing a bounding analysis that challenges required safety features. Consideration of a LOOP occurring with an SIAS while a DG is under test involves a limited exposure window for these events. For other DBAs (e.g. loss of feedwater, feedwater line break, etc.) reactor and turbine trip occurs well before an SIAS. Notwithstanding, given such an unlikely scenario, the response of a DG to a LOOP and SIAS while the DG is being tested is dependent on which (LOOP or SIAS) occurs first (or whether the two events occur simultaneously), as described further below.

For the case of a LOOP and SIAS in which the SIAS slightly precedes or is concurrent with the LOOP, the sequence is as described in Section 3. Plant safety functions are maintained with consideration of a single failure.

For the case in which the SIAS is generated the following two cases were analyzed:

Case 1: Potential DG Overspeed and Lockout

As indicated previously for the LOOP case, the DG under test picks up the loads on both safety buses. At some time later, the SIAS signal, among other things, opens the DG breaker to the safety bus and starts the opposite train DG. Note that the SIAS signal places the running DG in the emergency mode and bypasses all automatic trips except overspeed and differential. Given that the projected load on the DG in Mode 1 is less that the full load rating, and the full load rejection capability of the DG is designed and tested per SR 3.8.1.10, the DG output breaker will re-close on the bus following load shed and a permissive received for breaker closing. Following the loss of voltage on the busses, the safety busses will now be separated. At the same time the opposite train DG will close in on and power the opposite train safety bus. This is as described in Section 3.

In the Mode 2, 3, or 4 situation, the loads on the DG which had been running in parallel when the output breaker opens would not cause an overspeed to occur, based on a detailed review of actual full load reject test data and the controlling dynamics of the speed governing system. The engine shaft speed (governing) control system only responds to the loss of approximately 110% rated load due to the physical limit on the fuel rack control shafts. The loss of load would allow a speed overshoot to approximately 475 rpm. It should be noted that the actual overspeed trip setpoint is approximately 517 rpm. (This is consistent with present testing data.) Therefore the overspeed device would not actuate and the DG would continue running in

emergency mode with the speed automatically reset to 450 rpm by the SI signal, and the DG output breaker would re-close and power the emergency bus. The safety function is automatically restored with no delay and no operator action.

Since this scenario involves a series of events including a DBA that would cause or be coincident with a LOOP, an SIAS that must follow the LOOP, and must occur in Modes 2, 3, and 4 in which the plant does not operate for a significant period of time, the scenario is not considered credible. Further, due to the limited time spent in these modes, and the other events occurring while transitioning those Modes (Modes 2, 3, and 4), it is not likely that DG testing would be occurring during this time. Further, the potential for the events generating the SIAS (e.g. FWLB) and the mitigating system requirements are much reduced in these limited Modes.

Case 2: A single failure of the DG output breaker to open (DG in parallel operation)

This scenario starts as in the design basis or in a similar fashion to the previous one, however a fault precludes the DG breaker from opening. Since the SIAS actuated the SISs for both trains, accident loads from both safety trains would begin loading on the one DG. At some point the overload on this DG is postulated to damage the engine and make it non-recoverable. Note that the SIAS signal placed the DG in the emergency mode and bypassed all automatic trips except overspeed and differential. Loss of power will be experienced to both trains at some point, and the unaffected DG breaker will close in and power the unaffected safety bus following load shedding and the permissive signal. The SIS for that train will once again sequence the accident loads as designed. This would cause a "double sequencing" of the accident loads due to the power interruption that occurs after the SIS has first started.

Although this scenario could occur in any Mode, including Mode 1, it still involves a very specific postulated series and timing of events. A very unlikely DBA has to occur coincident with testing in parallel. This has to be combined with a "smart" failure of the DG breaker under test to open. The most likely breaker failure is to close or to spuriously trip. Since the breaker would have been closed to begin the test, it is unlikely to be mechanically unable to open. For these reasons, this scenario is not considered credible.

In summary, such scenarios are highly unlikely as they involve the simultaneous occurrence of several conditions or low probability events. The probability of their occurrence will be further reduced if the DG parallel operation is not performed under grid/weather condition which may make the grid vulnerable to disturbances that may cause a LOOP. The precaution and limitation when a DG parallel operation is allowed, as discussed in Section 4.1., further reduce the probability of occurrence of LOOP, thus making the DG parallel operation impact on capability to safely shutdown the plant insignificant. The worst-case effect for most of the above

scenarios is to delay but not preclude system responses to the LOOP or SIAS. These limited scenarios, deemed not credible, are clearly much less likely to result in a loss of safety function than the more frequent situations in which safety equipment (e.g. the DG) is taken out of service per the provisions of the TS. The time periods and cumulative time involved with DG testing in parallel operation are fractions of the Completion Time (CT) of TS and of the total out of service time involved with other corrective or preventive maintenance of the DGs during a cycle. Further, performance of the required testing at power would not result in the inoperability of any other safety-related equipment or result in a challenge to any plant safety system.

The monthly surveillance testing of the DG currently required by SR 3.8.1.3, as well as the proposed performance of SR 3.8.1.9, SR 3.8.1.10, SR 3.8.1.11, SR 3.8.1.14, and SR 3.8.1.16, during unit power operations, all require the DG under test to be paralleled with offsite power for the period of time necessary to perform or restore from the required testing. In order to clearly identify in the Comanche Peak Licensing Basis, and to avoid confusion for the operators as to the DG status while under test, a proposed change would add the following Note to TS LCO 3.8.1:

> "One DG may be synchronized with the offsite power source under administrative controls for the purpose of surveillance testing."

The proposed Note is consistent with the guidance provided in 10CFR Appendix A Branch Technical Position ICSB-8 (PSB), "Use of Diesel-Generator Sets for Peaking," and Standard Review Plan (SRP) NUREG-0800 Section 8.3.1, Rev.2 - July 1981, "A-C Power Systems (Onsite)." The Notes also reflect the outcome of the NRC staff reviews of the parallel operation of the offsite and onsite power systems, as discussed in the staff conclusions provided in NRC Information Notice 84-69, "Operation of Emergency Diesel Generators," August 29, 1984, which state that "the NRC Standard Review Plan prohibits the use of EDGs for purposes other than supplying standby power, when needed, and permits interconnection of the onsite and offsite sources only for short periods of time for the purpose of EDG load retesting. During such testing, only one of the redundant EDGs is to be paralleled at any one time, leaving the other EDG(s) available in standby service."

Thus, the proposed Note would clarify that the DG under test need not be considered inoperable strictly as a consequence of being paralleled with offsite power to demonstrate OPERABILITY per the required SRs.

The associated TS Bases will also provide the administrative controls for performing surveillance testing with the DG connected to an offsite circuit by considering that:

a. Weather conditions are conducive for performing this SR.

b. The offsite power supply and switchyard conditions are conducive for performing this SR, which includes ensuring that switchyard access is

restricted and no potentially impactive maintenance within the switchyard is performed.

c. No equipment or systems assumed to be available for supporting the performance of the SR are removed from service.

d. Associated risks shall be managed in accordance with the TS 5.5.18 Configuration Risk Management Program.

During periods of parallel DG operation, administrative controls and the proposed LCO note are in place to ensure that only one DG is operated synchronized to the offsite power source. Operating procedures will be in place to increase the monitoring of alarms and indications that would be indicative of grid malfunctions or disturbances. The Control Room Staff will invoke a heightened level of awareness. The time period that the DG is operated synchronized will be limited to the time necessary to perform the surveillance requirements and to safely restore from the tests.

Additional discussion of Maintenance Rule considerations and CRMP applicable during DG testing is contained above in the discussion of grid disturbances and electrical perturbations.

4.4 Administrative Change

The deletion of TS LCO 3.8.1 Required Action A.3 one time 21 day Completion Time allowance for Startup Transformer XST2 preventive maintenance is strictly an administrative change. This allowance has now expired.

## 5.0 REGULATORY ANALYSIS

### 5.1 No Significant Hazards Consideration

TXU Power has evaluated whether or not a significant hazards consideration is involved with the proposed amendments by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of Amendment," as discussed below:

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

   Response: No.

   The design of plant equipment is not being modified by the proposed changes. In addition, the DGs and their associated emergency loads are accident mitigating features. As such, testing of the diesel generators (DGs) themselves is not

associated with any potential accident-initiating mechanism. Therefore, there will be no significant impact on any accident probabilities by the approval of the requested changes.

The changes include an increase in the online time that a DG under test will be paralleled to the grid (for SRs 3.8.1.10 and 3.8.1.14) or unavailable due to testing (per SR 3.8.1.13). However, the overall time that the DG is paralleled in all modes (outage /non-outage) should remain unchanged. As such, the ability of the tested DG to respond to a design basis accident could be adversely impacted by the proposed changes. However, the impacts are not considered significant based, in part, on the ability of the remaining DG to mitigate a DBA or provide safe shutdown. With regard to SR 3.8.1.10 and SR 3.8.1.14, experience shows that testing per these SRs typically does not perturb the electrical distribution system and share the same electrical configuration alignment as the current monthly surveillance. In addition, operating experience and qualitative evaluation of the probability of the DG or bus loads being adversely affected concurrent with or due to a significant grid disturbance, while the DG is being tested, support the conclusion that the proposed changes do not involve any significant increase in the likelihood of a safety-related bus blackout or damage to plant loads.

The SR changes that are consistent with TSTF-283 have been approved generically and for individual Licensees. The on-line tests allowed by the TSTF are only to be performed for the purpose of establishing OPERABILITY. Performance of these SRs during restricted MODES will require an assessment to assure plant safety is maintained or enhanced.

Deletion of expired TS LCO 3.8.1 Required Action A.3 one time 21 day Completion Time allowance for Startup Transformer XST2 preventive maintenance is an administrative change only.

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

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

   Response: No.

   The proposed changes would not create any new accidents since no changes are being made to the plant that would introduce any new accident causal mechanisms. Equipment will be operated in the same configuration as currently allowed for other DG SRs that allow testing during at-power operation. Deletion of expired TS LCO 3.8.1 Required Action A.3 one time 21 day Completion Time

allowance for Startup Transformer XST2 preventive maintenance is an administrative change only. This license amendment request does not impact any plant systems that are accident initiators; neither does it adversely impact any accident mitigating systems.

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

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

   Response: No.

   The proposed changes do not involve a significant reduction in the margin of safety. The margin of safety is related to the confidence in the ability of the fission product barriers to perform their design functions during and following an accident situation. These barriers include the fuel cladding, the reactor coolant system, and the containment system. The proposed changes do not directly affect these barriers, nor do they involve any significant adverse impact on the DGs which serve to support these barriers in the event of an accident concurrent with a loss of offsite power. The proposed changes to the testing requirements for the plant DGs do not affect the OPERABILITY requirements for the DGs, as verification of such OPERABILITY will continue to be performed as required (except during different allowed MODES). The changes have an insignificant impact on DG availability, as continued verification of OPERABILITY supports the capability of the DGs to perform their required function of providing emergency power to plant equipment that supports or constitutes the fission product barriers. Only one DG is to be tested at a time, so that the remaining DG will be available to safely shut down the plant if required. Consequently, performance of the fission product barriers will not be impacted by implementation of the proposed amendment.

   In addition, the proposed changes involve no changes to setpoints or limits established or assumed by the accident analysis. On this and the above basis, no safety margins will be impacted.

   Deletion of expired TS LCO 3.8.1 Required Action A.3 one time 21 day Completion Time allowance for Startup Transformer XST2 preventive maintenance is an administrative change only.

   Therefore, the proposed change does not involve a significant reduction in a margin of safety.

   Based on the above evaluation, TXU Power concludes that the proposed amendments present no 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.

5.2 Applicable Regulatory Requirements

The requirements of 10 CFR 50, Appendix A, GDC 17, "Electric Power Systems," and GDC 18, "Inspection and Testing of Electric Power Systems," are summarized below:

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.*

*The onsite electric power supplies, 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 loss-of-coolant accident 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 supplies 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."*

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."*

As described previously, and in accordance with GDC 17, the design of the AC electrical power system provides independence and redundancy to ensure an available source of power to the Engineered Safety Feature (ESF) systems. The onsite Class IE AC Distribution System for CPSES is divided into two load groups. A 6.9 kV ESF bus is associated with each load group. The two load groups are 100% redundant and are electrically and physically separated such that the loss of either group does not prevent the minimum safety functions from being performed. Each train has connections to two offsite power sources and a dedicated DG. Offsite power is supplied to the plant switchyards from the transmission network by five 345 kV and two 138 kV transmission lines. From the switchyards, two electrically and physically separated circuits provide AC power, through step down startup transformers, to the 6.9 kV ESF buses.

Further, the power systems are designed to be testable and subject to inspection pursuant to GDC 18. The testability of the DGs, in particular, is an enabling feature for performance of surveillance tests required by the Technical Specifications.

The most significant changes being proposed would modify test requirements for the DGs which provide emergency power to the 6.9 kV ESF buses in the event of a loss of offsite power pursuant to GDC 17. The test requirements are intended to verify and/or ensure continued OPERABILITY of the DGs. The proposed changes involve no changes to the required tests themselves except to allow certain tests to be performed during MODES for which performance of the affected tests is currently restricted. Evaluation of the proposed changes has determined that DG availability is not significantly affected by the proposed changes that the potential for significantly adverse electrical perturbations during tests such as SR 3.8.1.10 (full-load rejection test) is acceptably low, and that the potential for a grid disturbance causing DG unavailability while a DG is in test is quite low. Further, only one DG will be tested

at a time such that OPERABILITY of the other DG and its associated bus and bus loads will be unaffected. Testing will thus continue in a manner that supports DG OPERABILITY so that the DGs will be available to perform their intended safety function consistent with regulatory requirements.

10 CFR 50.36(c)(3), " Technical Specifications," requires a licensee's TSs to have SRs relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained, that facility operations are within safety limits, and that the limiting conditions for operation ( LCOs) will be met. The proposed changes would revise the SRs including mode restrictions based on the safety aspects of conducting the surveillances in specified modes.

In conclusion, the proposed changes continue to support a plant electrical design that meets GDC 17 and 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.

## 6.0 ENVIRONMENTAL CONSIDERATION

TXU Power has determined that the proposed amendment would change requirements with respect to the installation or use of a facility component located within the restricted area, as defined in 10CFR20, or would change an inspection or surveillance requirement. TXU Power has evaluated the proposed change and has determined that the change does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amount of effluent that may be released offsite, or (iii) a significant increase in the individual or cumulative occupational radiation exposure. Accordingly, the proposed change meets the eligibility criterion for categorical exclusion set forth in 10CFR51.22 (c)(9). Therefore, pursuant to 10CFR51.22 (b), an environmental assessment of the proposed change is not required.

## 7.0 REFERENCES

1. 10 CFR 50.90, "Application for Amendment of License or Construction Permit"

2. TSTF-283, Revision 3, "Modify Section 3.8 Mode restriction Notes"

3. 10 CFR 50.36(a), "Technical Specifications"

4. 10 CFR 50, Appendix A, GDC 17, "General Design Criteria for Nuclear Power Plants - Electric Power Systems"

5. 10 CFR 50, Appendix A, GDC 18, "Inspection and Testing of Electric Power Systems"

6. Regulatory Guide 1.6, dated 3/10/1971, "Independence Between Redundant Standby (Onsite) Power Sources And Between Their Distribution Systems (Safety Guide 6)"

7. Regulatory Guide 1.32, Revision 2, dated 02/01/77, "Criteria for Safety-related Electric Power Systems for Nuclear Power Plants"

8. IEEE-308-1974, Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations.

9. NUREG-0800, Standard Review Plan, Section 8.3.1, "A-C Power Systems (Onsite)

10. Branch Technical Position ICSB-8, Rev. 2 (7/81), "Use of Diesel-Generator Sets for Peaking"

11. Information Notice (IN) 84-69, "Operation of Emergency Diesel Generators"

12. Information Notice (IN) 84-69, Supplement 1, "Operation of Emergency Diesel Generators"

## 8.0 PRECEDENTS

1. The NRC issued License Amendment 173, Subject: Columbia Generating Station Operating License NPF-21 Request for Technical Specifications Amendment to Remove Operating Mode Restrictions for Emergency Diesel Generator Surveillance Testing, dated May 18, 2001.

2. The NRC issued License Amendment 162, Subject: Callaway Plant Unit 1 - Issuance of Amendment Re: Technical Specifications 3.8.1 and 3.8.4 - AC and DC Sources (TAC No. MB9664), dated June 14, 2004.

**ATTACHMENT 2 to TXX-04143**

**PROPOSED TECHNICAL SPECIFICATION CHANGES (MARK-UP)**

**Pages 3.8-1 through 3.8-16**

## 3.8 ELECTRICAL POWER SYSTEMS

### 3.8.1 AC Sources C 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;

b. Two diesel generators (DGs) capable of supplying the onsite Class 1E power distribution subsystem(s); and

c. Automatic load sequencers for Train A and Train B.

APPLICABILITY: MODES 1, 2, 3, and 4

---NOTE---
One DG may be synchronized with the offsite power source under administrative controls for the purpose of surveillance testing.
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ACTIONS

NOTE
LCO 3.0.4.b is not applicable to DGs. 109

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. One required offsite circuit inoperable. | A.1 Perform SR 3.8.1.1 for required OPERABLE offsite circuit. | 1 hour<br>AND<br>Once per 8 hours thereafter |
| | AND<br>NOTE<br>In MODES 1, 2 and 3, the TDAFW pump is considered a required redundant feature. | |
| | A.2 Declare required feature(s) with no offsite power available inoperable when its redundant required feature(s) is inoperable. | 24 hours from discovery of no offsite power to one train concurrent with inoperability of redundant required feature(s) |
| | AND<br>A.3 Restore required offsite circuit to OPERABLE status. | 72 hours<br>AND<br>6 days from discovery of failure to meet LCO<br>~~OR~~<br>~~21 days for a one time preventive maintenance outage on Startup Transformer XST2 to be completed by February 28, 2002~~ 88 |

(continued)

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ACTIONS (continued)

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| B. One DG inoperable. | B.1 | Perform SR 3.8.1.1 for the required offsite circuit(s). | 1 hour<br>AND<br>Once per 8 hours thereafter |
| | AND | | |
| | | ----------NOTE----------<br>In MODES 1, 2 and 3, the TDAFW pump is considered a required redundant feature.<br>---------- | |
| | B.2 | Declare required feature(s) supported by the inoperable DG inoperable when its required redundant feature(s) is inoperable. | 4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s) |
| | AND | | |
| | B.3.1 | Determine OPERABLE DG(s) is not inoperable due to common cause failure. | 24 hours |
| | OR | | |
| | | ----------NOTE----------<br>The SR need not be performed if the DG is already operating and loaded.<br>---------- | |
| | B.3.2 | Perform SR 3.8.1.2 for OPERABLE DG(s). | 24 hours |

(continued)

ACTIONS (continued)

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| B. (continued) | AND | | |
| | B.4 | Restore DG to OPERABLE status. | 72 hours<br>AND<br>6 days from discover of failure to meet LCO |
| C. Two required offsite circuits inoperable. | | ----------NOTE----------<br>In MODES 1, 2 and 3, the TDAFW pump is considered a required redundant feature.<br>---------- | |
| | 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 |
| | AND | | |
| | C.2 | Restore one required offsite circuit to OPERABLE status. | 24 hours |

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ACTIONS (continued)

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| D. One required offsite circuit inoperable.<br><br>AND<br><br>One DG inoperable. | ----------NOTE----------<br>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.<br>----------<br><br>D.1 Restore required offsite circuit to OPERABLE status.<br><br>OR<br><br>D.2 Restore DG to OPERABLE status. | <br><br><br><br><br>12 hours<br><br><br><br>12 hours |
| E. Two DGs inoperable. | E.1 Restore one DG to OPERABLE status. | 2 hours |
| F. One SI sequencer inoperable. | ----------NOTE----------<br>One required SI sequencer channel may be bypassed for up to 4 hours for surveillance testing provided the other channel is operable.<br>----------<br><br>F.1 Restore SI sequencer to OPERABLE status. | <br><br><br><br><br>12 hours |

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ACTIONS (continued)

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| G. Required Action and associated Completion Time of Condition A, B, C, D, E, or F not met. | G.1 | Be in MODE 3. | 6 hours |
| | AND | | |
| | G.2 | Be in MODE 5. | 36 hours |
| H. Three or more required AC sources inoperable. | H.1 | Enter LCO 3.0.3. | Immediately |
| I. One Blackout Sequencer inoperable | I.1 | Declare associated DG inoperable | Immediately |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.8.1.1 | Verify correct breaker alignment and indicated power availability for each required offsite circuit. | 7 days |

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SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | FREQUENCY |
|---|---|
| SR 3.8.1.2 ----------NOTES----------<br>1. Performance of SR 3.8.1.7 satisfies this SR.<br>2. All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading.<br>3. A modified DG start involving idling and gradual acceleration to synchronous speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.7 must be met.<br>----------<br>Verify each DG starts from standby conditions and achieves steady state voltage ≥ 6480 V and ≤ 7150 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz. | 31 days |
| SR 3.8.1.3 ----------NOTES----------<br>1. DG loadings may include gradual loading as recommended by the manufacturer.<br>2. Momentary transients outside the load range do not invalidate this test.<br>3. This Surveillance shall be conducted on only one DG at a time.<br>4. This SR shall be preceded by and immediately follow without shutdown a successful performance of SR 3.8.1.2 or SR 3.8.1.7.<br>----------<br>Verify each DG is synchronized and loaded and operates for ≥ 60 minutes at a load ≥ 6300 kW and ≤ 7000 kW. | 31 days |

(continued)

SURVEILLANCE REQUIREMENTS (continued)

| | SURVEILLANCE | FREQUENCY |
|---|---|---|
| SR 3.8.1.4 | Verify each day tank contains ≥ 1440 gal of fuel oil. | 31 days |
| SR 3.8.1.5 | Check for and remove accumulated water from each day tank. | 31 days |
| SR 3.8.1.6 | Verify the fuel oil transfer system operates to automatically transfer fuel oil from storage tank to the day tank. | 92 days |
| SR 3.8.1.7 | ----------NOTE----------<br>All DG starts may be preceded by an engine prelube period.<br>----------<br>Verify each DG starts from standby condition and achieves:<br>a. in ≤ 10 seconds, voltage ≥ 6480 V and frequency ≥ 58.8 Hz; and<br>b. steady state, voltage ≥ 6480 V and ≤ 7150V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz. | 184 days |
| SR 3.8.1.8 | ----------NOTE----------<br>~~Verify requirement during MODES 3, 4, 5, 6 or with core off-loaded.~~ This Surveillance shall not normally be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced.<br>----------<br>Verify automatic and manual transfer of AC power sources from the normal offsite circuit to each alternate required offsite circuit. | 18 months |

(continued)

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | FREQUENCY |
|---|---|
| SR 3.8.1.9 ~~NOTE~~ ~~Verify requirement during MODES 3, 4, 5, 6 or with core off-loaded.~~ This Surveillance shall not normally be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced. | |
| Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and:<br>a. Following load rejection, the frequency is ≤ 66.75 Hz; and<br>b. Within 3 seconds following load rejection, the voltage is ≤ 6480 V and ≤ 7150 V. | 18 months |
| SR 3.8.1.10 ~~NOTE~~ ~~Verify requirement during MODES 3, 4, 5, 6 or with core off-loaded.~~ | D |
| Verify each DG does not trip and voltage is maintained ≤ 8280 V during and following a load rejection of ≥ 6300 kW and ≤ 7000 kW. | 18 months |

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SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | FREQUENCY |
|---|---|
| SR 3.8.1.11 ----------NOTES----------<br>1. All DG starts may be preceded by an engine prelube period.<br>2. ~~Verify requirement during MODES 3, 4, 5, 6 or with core off-loaded.~~ This Surveillance shall not normally be performed in MODE 1 or 2. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced.<br>----------<br>Verify on an actual or simulated loss of offsite power signal:<br>a. De-energization of emergency buses;<br>b. Load shedding from emergency buses;<br>c. DG auto-starts from standby condition and:<br>1. energizes permanently connected loads in ≤ 10 seconds,<br>2. energizes auto-connected shutdown loads through automatic load sequencer,<br>3. maintains steady state voltage ≥ 6480 V and ≤ 7150 V,<br>4. maintains steady state frequency ≥ 58.8 Hz and ≤ 61.2 Hz, and<br>5. supplies permanently connected and auto-connected shutdown loads for ≥ 5 minutes. | 18 months |

(continued)

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | FREQUENCY |
|---|---|
| SR 3.8.1.12 ~~NOTES~~<br>~~1.~~ All DG starts may be preceded by prelube period.<br>~~2. Verify requirement during MODES 3, 4, 5, 6 or with core off-loaded.~~<br><br>Verify on an actual or simulated Safety Injection (SI) actuation signal each DG auto-starts from standby condition and:<br><br>a. In ≤ 10 seconds after auto-start and during tests, achieves voltage ≥ 6480 V and frequency ≥ 58.8 Hz;<br><br>b. Achieves steady state voltage ≥ 6480 V and ≤ 7150 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz;<br><br>c. Operates for ≥ 5 minutes; | 18 months |
| SR 3.8.1.13 ~~NOTE~~<br>~~1. Verify requirement during MODES 3, 4, 5, 6 or with core off-loaded.~~<br>~~2.~~ For Unit 2, testing need only be performed for LOOP concurrent with SI until startup following 2RFO5.<br><br>Verify each DG's automatic trips are bypassed on actual or simulated (i) loss of voltage signal on the emergency bus, and (ii) SI actuation signal, except:<br><br>a. Engine overspeed; and<br><br>b. Generator differential current. | 18 months |

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(continued)

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | FREQUENCY |
|---|---|
| SR 3.8.1.14 ----------NOTES---------- 1. ~~Momentary transients outside the load and power factor ranges do not invalidate this test.~~ 2. ~~Verify requirement during MODES 3, 4, 5, 6 or with core off-loaded.~~ ---------- Verify each DG operates for ≥ 24 hours: a. For ≥ 2 hours loaded ≥ 6900 kW and ≤ 7700 kW; and b. For the remaining hours of the test loaded ≥ 6300 kW and ≤ 7000 kW. | 18 months |
| SR 3.8.1.15 ----------NOTES---------- 1. This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG has operated ≥ 2 hours loaded ≥ 6300 kW and ≤ 7000 kW. Momentary transients outside of load range do not invalidate this test. 2. All DG starts may be preceded by an engine prelube period. ---------- Verify each DG starts and achieves: a. in ≤ 10 seconds, voltage ≥ 6480 V and frequency ≥ 58.8 Hz; and b. steady state, voltage ≥ 6480 V, and ≤ 7150 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz. | 18 months |

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(continued)

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | FREQUENCY |
|---|---|
| SR 3.8.1.16 NOTE<br>~~Verify requirement during MODES 3, 4, 5, 6 or with core off-loaded.~~ This Surveillance shall not normally be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced.<br><br>Verify each DG:<br><br>a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power;<br><br>b. Transfers loads to offsite power source; and<br><br>c. Returns to ready-to-load operation. | 18 months |
| SR 3.8.1.17 NOTE<br>~~Verify requirement during MODES 3, 4, 5, 6 or with core off-loaded.~~<br>This Surveillance shall not normally be performed in MODE 1 or 2. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced.<br><br>Verify, with a DG operating in test mode and connected to its bus, an actual or simulated SI actuation signal overrides the test mode by:<br><br>a. Returning DG to ready-to-load operation; and<br><br>b. Automatically energizing the emergency load from offsite power. | 18 months |

(continued)

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.8.1.18 | NOTE<br>~~Verify requirement during MODES 3, 4, 5, 6 or with core off-loaded.~~ This Surveillance shall not normally be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced.<br><br>Verify interval between each sequenced load block is within ± 10% of design interval for each automatic load sequencer. | 18 months |

(continued)

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.8.1.19 | ----------NOTES----------<br>1. All DG starts may be preceded by an engine prelube period.<br>2. ~~Verify requirement during MODES 3, 4, 5, 6 or with core off-loaded.~~This Surveillance shall not normally be performed in MODE 1 or 2. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced.<br>----------<br>Verify on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated SI actuation signal:<br>a. De-energization of emergency buses;<br>b. Load shedding from emergency buses; and<br>c. DG auto-starts from standby condition and:<br>1. energizes permanently connected loads in ≤ 10 seconds,<br>2. energizes auto-connected emergency loads through load sequencer,<br>3. achieves steady state voltage ≥ 6480 V and ≤ 7150 V,<br>4. achieves steady state frequency ≥ 58.8 Hz and ≤ 61.2 Hz, and<br>5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes. | 18 months |

(continued)

This page is included for Information Only.

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.8.1.20 | ----------NOTE----------<br>All DG starts may be preceded by an engine prelube period.<br>---------- | |
| | Verify when started simultaneously from standby condition, each DG achieves:<br><br>a. in ≤ 10 seconds, voltage ≥ 6480 V and frequency ≥ 58.8 Hz, and<br><br>b. steady state, voltage ≥ 6480 V, and ≤ 7150 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz. | 10 years |
| SR 3.8.1.21 | Calibrate BO sequencers. | 18 months |
| SR 3.8.1.22 | ----------NOTES----------<br>1. Verification of setpoint is not required.<br><br>2. Actuation of final devices is not included.<br>---------- | |
| | Perform TADOT for SI and BO sequencers. | 31 days on a STAGGERED TEST BASIS. |

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**ATTACHMENT 3 to TXX-04143**

**PROPOSED TECHNICAL SPECIFICATIONS BASES CHANGES (MARK-UP)**
**(For Information Only)**

**Pages B3.8-1 through B3.8-31**

This page is included for Information Only.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.1 AC Sources — Operating

BASES

BACKGROUND

The unit Class 1E AC Electrical Power Distribution System AC sources consist of the offsite power sources (preferred power source, and alternate), and the onsite standby emergency power sources (Train A and Train B diesel generators (DGs)). As required by 10 CFR 50, Appendix A, GDC 17 (Ref. 1), the design of the AC electrical power system provides independence and redundancy to ensure an available source of power to the Engineered Safety Feature (ESF) systems.

The onsite Class 1E AC Distribution System is divided into redundant load groups (trains) so that the loss of any one group does not prevent the minimum safety functions from being performed. Each train has connections to two offsite power sources and a dedicated DG.

Offsite power is supplied to the plant switchyards from the transmission network by five 345 KV and two 138 KV transmission lines. From the switchyards, two electrically and physically separated circuits provide AC power, through step down startup transformers, to the 6.9 kV ESF buses. A detailed description of the offsite power network and the circuits to the Class 1E ESF buses is found in the FSAR, Chapter 8 (Ref. 2).

An offsite circuit consists of all breakers, transformers, switches, interrupting devices, cabling, and controls required to transmit power from the offsite transmission network buses at plant switchyards to the onsite Class 1E ESF buses.

Certain required unit loads are started and/or returned to service in a predetermined sequence in order to prevent overloading the transformer supplying offsite power to the onsite Class 1E Distribution System. Within 2 minutes after the initiating signal is received, all automatic and permanently connected loads needed to recover the unit or maintain it in a safe condition are returned to service when the bus is energized or by the load sequencer.

The onsite standby power source for each 6.9 kV ESF bus is a dedicated DG. DGs 1EG1, 1EG2, 2EG1 and 2EG2 are dedicated to ESF buses 1EA1, 1EA2, 2EA1 and 2EA2 respectively. The DG starts automatically on a safety injection (SI) signal.

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This page is included for Information Only.

BASES

BACKGROUND (continued)

On an ESF bus undervoltage signal, the DG start signal is delayed 1 second to allow alternate source breaker closure. If the alternate source is not available the ESF bus undervoltage signal automatically starts the DG, (refer to LCO 3.3.5, "Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation"). As a result of degraded voltage the preferred source is tripped after a time delay (60 seconds with no SI signal and 8 seconds with an SI signal present). Subsequently, if the alternate source does not alleviate the degraded condition, the alternate source is tripped after a time delay of 1.9 seconds. After the offsite power is tripped as a consequence of ESF bus undervoltage or degraded voltage and the DG has started, it will automatically tie to its respective bus, independent of or coincident with an SI signal. The DGs will also start and operate in the standby mode without tying to the ESF bus on an SI signal alone. Following the trip of offsite power, an undervoltage signal strips nonpermanent loads from the ESF bus. When the DG is tied to the ESF bus, loads are then sequentially connected to its respective ESF bus by the automatic load 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 ESF electrical loads are automatically connected to the available alternate power source. If the alternate source is not available, then the ESF electrical loads are 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 loss of coolant accident (LOCA).

Certain required unit loads are started and/or returned to service in a predetermined sequence in order to prevent overloading the DG in the process. Within 2 minutes after the initiating signal is received, all loads needed to recover the unit or maintain it in a safe condition are returned to service when the bus is energized or by the load sequencer.

Ratings for Train A and Train B DGs satisfy the requirements of Regulatory Guide 1.9; Ref. (3) and IEEE 387 (Ref. 13). The continuous service rating of each DG is 7000 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 ESF buses are listed in Reference 2. The maximum calculated load is less than 6300 kW. This maximum continuous service load is reflected in selected surveillances.

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BASES (continued)

APPLICABLE SAFETY ANALYSES

The initial conditions of DBA and transient analyses in the FSAR, Chapter 6 (Ref. 4) and Chapter 15 (Ref. 5), assume ESF systems are OPERABLE. The AC electrical power sources are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System (RCS), and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS);and Section 3.6, Containment Systems.

The OPERABILITY of the AC electrical power sources is consistent with the initial assumptions of the Accident analyses and is based upon meeting the design basis of the unit. This results in maintaining at least one train of the onsite AC sources or one of the offsite AC sources OPERABLE during Accident conditions in the event of:

a. An assumed loss of all offsite power or all onsite AC power; and

b. A worst case single failure.

The AC sources satisfy Criterion 3 of 10CFR50.36(c)(2)(ii).

LCO

Two qualified circuits between the offsite transmission network buses at the plant switchyards and the onsite Class 1E Electrical Power System and separate and independent DGs for each train ensure availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an anticipated operational occurrence (AOO) or a postulated DBA.

Qualified offsite circuits are those that are described in the FSAR and are part of the licensing basis for the unit. In addition, one automatic load sequencer per train must be OPERABLE.

Each offsite circuit must be capable of maintaining rated frequency and voltage, and accepting required loads during an accident, while connected to the ESF buses.

[ Offsite circuit #1 is fed from the 138 kv switchyard and offsite circuit # 2 is fed from the 345 kv switchyard. Circuit #1 is the preferred source for Unit 2 and alternate source for Unit 1. Circuit # 2 is the preferred source for Unit 1 and alternate source for Unit 2. Each offsite circuit can supply 6.9 kv Train A and Train B ESF busses for both Unit 1 and Unit 2. ]

(continued)

BASES

LCO (continued) Each DG must be capable of starting, accelerating to rated speed and voltage, andconnecting to its respective ESF bus on receipt of bus undervoltage signal. 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 ESF buses. 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 Surveillance, e.g., capability of the DG to revert to ready-to-load status on an SI signal while operating in parallel test mode.

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

The offsite AC sources must be separate and independent (to the extent possible). For the onsite 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 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 an operable transfer mechanism to that bus to support operability of that circuit.

Each circuit of offsite source can feed both trains. Preferred source breakers are normally closed and alternate source breakers are normally open. Each bus has automatic capability to transfer to the alternate source on loss of preferred source.

LCO 3.8.1 is modified by a Note stating that one DG may be operated synchronized with the offsite power source under administrative controls for the purpose of Surveillance Testing. During such testing, only one of the redundant DGs shall be paralleled at any one time, leaving the other DG available in standby service.

Administrative controls for performing surveillance testing with the DG connected to an offsite circuit ensure or require that:

a. Weather conditions are conducive for performing the SR

b. The offsite power supply and switchyard conditions are conducive for performing the SR, which includes ensuring that switchyard access is restricted and no potentially impactive maintenance within the switchyard is performed.

(continued)

BASES (continued)

LCO (continued)

c. No equipment or systems assumed to be available for supporting the performance of the SR are removed from service.

d. Associated risks shall be managed in accordance with the TS 5.5.18 Configuration Risk Management Program.

The Note is consistent with the NRC position provided in Information Notice 84-69, which "prohibits the use of EDGs for purposes other than supplying standby power, when needed, and permits interconnection of the onsite and offsite sources only for short periods of time for the purpose of EDG load retesting." Thus, the DG under test need not be considered inoperable strictly due to being paralleled with offsite power during performance of the required testing.

APPLICABILITY

The AC sources and sequencers are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of AOOs or abnormal transients; and

b. Adequate core cooling is provided and containment OPERABILITY and other vital functions are maintained in the event of a postulated DBA. The AC power requirements for MODES 5 and 6 are covered in LCO 3.8.2, "AC Sources — Shutdown."

ACTIONS

A Note prohibits the application of LCO 3.0.4.b to an inoperable DG. There is an increased risk associated with entering a MODE or other specified condition in the Applicability with an inoperable DG and the provisions of LCO 3.0.4.b, which allow entry into a MODE or other specified condition in the Applicability with the LCO not met after performance of a risk assessment addressing inoperable systems and components, should not be applied in this circumstance.

A.1

To ensure a highly reliable power source remains with one offsite circuit inoperable, it is necessary to verify the OPERABILITY of the remaining required offsite circuit 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 not met. However, if a second required circuit fails SR 3.8.1.1, the second offsite circuit is inoperable, and Condition C, for two offsite circuits inoperable, is entered.

(continued)

This page is included for Information Only.

BASES

ACTIONS (continued)

A.2

Required Action A.2, which only applies if the train cannot be powered from an offsite source, is intended to provide assurance that an event coincident with a single failure of the associated DG will not result in a complete loss of safety function of critical redundant required features. These features are powered from the redundant AC electrical power train. This includes the motor driven auxiliary feedwater pumps and the TDAFW pump which must be available for mitigation of a Feedwater line break. Single train systems, other than the steam driven (turbine driven) auxiliary feedwater pump, are not included.

The Completion Time for Required Action A.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. The train has no offsite power supplying it loads; and

b. A required feature on the other train is inoperable.

If at any time during the existence of Condition A (one offsite circuit inoperable) with a train with no offsite power available, and a redundant required feature subsequently becomes inoperable, this Completion Time begins to be tracked.

Discovering no offsite power to one train of the onsite Class 1E Electrical Power Distribution System coincident with one or more inoperable required support or supported features, or both, that are associated with the other train that has offsite power, results in starting the Completion Times for the Required Action.

Twenty-four hours is acceptable because it minimizes risk while allowing time for restoration before subjecting the unit to transients associated with shutdown.

The remaining OPERABLE offsite circuit and DGs are adequate to supply electrical power to Train A and Train B of the onsite Class 1E Distribution System. The 24 hour Completion Time takes into account the component OPERABILITY of the redundant counterpart to the inoperable required feature. Additionally, the 24 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.

(continued)

BASES

ACTIONS (continued)

A.3

According to Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition A for a period that should not exceed 72 hours. With one offsite circuit inoperable, the reliability of the offsite system is degraded, and the potential for a loss of offsite power is increased, with attendant potential for a challenge to the unit safety systems. In this Condition, however, the remaining OPERABLE offsite circuit and DGs 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 A.3 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 A is entered while, for instance, a DG is inoperable and that DG is subsequently returned 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 offsite circuit. At this time, a DG could again become inoperable, the circuit 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 the 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 A.2, 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 that the LCO was initially not met, instead of at the time Condition A was entered.

~~A temporary Completion Time is connected to the Completion Time requirements above (72 hours AND 6 days from discovery of failure to meet LCO) with an "OR" connector. The temporary completion time is 21 days and applies to the performance of preventive maintenance on Startup Transformer XST2. The temporary Completion Time of 21 days expires on February 28, 2002. If, during the conduct of the prescribed XST2 maintenance outage, should any combination of the remaining operable AC Sources be determined inoperable (on an individual unit bases), current TS requirements would apply for any additional conditions which are entered.~~

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BASES

ACTIONS (continued)

B.1

To ensure a highly reliable power source remains with an inoperable DG, 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 the motor driven auxiliary feedwater pumps and the TDAFW pump which must be available for mitigation of a Feedwater line break. Single train systems, other than 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 an inoperable DG. 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 DG inoperable) a required feature subsequently becomes inoperable, this Completion Time would begin to be tracked.

Discovering one DG inoperable coincident with one or more inoperable required support or supported features, or both, that are associated with the OPERABLE DG, results in starting the Completion Time for the Required Action. Four hours from the discovery of these events existing

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BASES

ACTIONS

B.2 (continued)

concurrently is acceptable because it minimizes risk while allowing time for restoration before subjecting the unit to transients associated with shutdown.

In this Condition, the remaining OPERABLE DG 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 and B.3.2

Required Action B.3.1 provides an allowance to avoid unnecessary testing of the OPERABLE DG. 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. If the cause of inoperability exists on the other DG, the other DG would be declared inoperable upon discovery and Condition E of LCO 3.8.1 would be entered. Once the failure is repaired, the common cause failure no longer exists, and Required Action B.3.1 is satisfied. If the cause of the initial inoperable DG cannot be confirmed not to exist on the remaining DG, 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 or B.3.2, the applicable plant procedures 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. 7), 24 hours is reasonable to confirm that the OPERABLE DG is not affected by the same problem as the inoperable DG.

During performance of surveillance activities as a requirement for ACTION statements, the air-roll test shall not be performed.

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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 DG 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 DG. At this time, an offsite circuit could again become inoperable, the DG 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.

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

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BASES

ACTIONS

C.1 and C.2 (continued)

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 the motor driven auxiliary feedwater pumps and the TDAFW pump which must be available for mitigation of a Feedwater line break. Single train systems, other than the turbine driven auxiliary feedwater pump, are not included.

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 that involve one or more DGs inoperable.

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BASES

ACTIONS

C.1 and C.2 (continued)

However, two factors tend to decrease the severity of this level of degradation:

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 unit 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. 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, (for CPSES this requires both offsite sources and DG inoperable) 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 DG, without regard to whether a train is inoperable. LCO 3.8.9 provides the appropriate restrictions for a inoperable 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 Train A and Train B DGs 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 both DGs inoperable, operation may continue for a period that should not exceed 2 hours.

F.1

The SI sequencer(s) is an essential support system to both the offsite circuit and the DG associated with a given ESF bus. Furthermore, the sequencer is on the primary success path for most major AC electrically powered safety systems powered from the associated ESF bus. Therefore, loss of an ESF bus sequencer affects every major ESF system in the train. The 12 hour Completion Time provides a period of time to correct the problem commensurate with the importance of

(continued)

This page is included for Information Only.

BASES

ACTIONS

F.1 (continued)

maintaining sequencer OPERABILITY. This time period also ensures that the probability of an accident (requiring sequencer OPERABILITY) occurring during periods when the sequencer is inoperable is minimal.

This Required Action is modified by a note. The note allows one sequencer channel to be bypassed for surveillance testing provided the other channel is operable. The 4 hours allows sufficient time to perform the required testing. Based on the low probability of an event requiring the sequencer in combination with a failure to the operable sequencer channel during the 4 hours, this period of inoperability for testing is acceptable.

G.1 and G.2

If the inoperable AC electric power sources cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit 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 unit conditions from full power conditions in an orderly manner and without challenging plant systems.

H.1

Condition H corresponds to a level of degradation in which all redundancy in the AC electrical power supplies has been lost. 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 unit is required by LCO 3.0.3 to commence a controlled shutdown.

I.1

A Blackout sequencer is an essential support system to the DG associated with a given ESF bus. The sequencer is required to provide the system response to a loss of or degraded ESF bus voltage signal. Therefore, the loss of the Blackout sequencer causes the associated DG to become inoperable immediately.

(continued)

BASES (continued)

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 SR for demonstrating the OPERABILITY of the DGs are consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3), and Regulatory Guide 1.137 (Ref. 10).

Where the SR discussed herein specify voltage and frequency tolerances, the following is applicable.

The minimum steady state output voltage of 6480 V allows for voltage drops to motors and other equipment down to the 120 V level to ensure that the loads will not experience voltage less than the minimum rated voltage. The maximum steady state output voltage of 7150 V ensures that, under lightly loaded conditions, motors and other equipment down to the 120 V level will not experience voltages more than the maximum rated voltage. The specified minimum and maximum frequencies of the DG are 58.8 Hz and 61.2 Hz, respectively. These values are equal to ± 2% of the 60 Hz nominal frequency and are derived from the recommendations given in Regulatory Guide 1.9 (Ref. 3).

~~Specific Surveillance Requirements may be modified by a Note stating to verify the requirements during MODES 3, 4, 5, 6 or with the core off-loaded. These notes neither approve nor prohibit testing in MODES 1 and 2; however, for testing that is performed in MODES 1 and 2 (e.g. for post work testing) the testing may not be credited to satisfy the SR. Only the testing performed in MODES 3, 4, 5, 6 or with core off-loaded can be credited to satisfy the SR.~~

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)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.2 and SR 3.8.1.7

These SR help to ensure the availability of the standby electrical power supply to mitigate DBAs and transients and to maintain the unit in a safe shutdown condition.

To minimize the wear on moving parts that do not get lubricated when the engine is not running, these SR are modified by a Note (Note 2 for SR 3.8.1.2) to indicate that all DG starts for these Surveillances may be preceded by an engine prelube period. In addition, for SR 3.8.1.2, following prelube, a warmup period is allowed prior to loading.

For the purposes of SR 3.8.1.2 and SR 3.8.1.7 testing, the DGs are started from standby conditions. Standby conditions for a DG mean that the diesel is shutdown but is ready for either a manual or automatic start signal and is ready to pickup the required safety related loads. For SR 3.8.1.2 and SR 3.8.1.7 testing, the diesel should be started from ambient conditions which means the diesel engine is cold or at a temperature consistent with manufacturer's recommendations.

The DG shall start using one of the following signals: 1) Manual, 2) Simulated or actual safeguards bus undervoltage, 3) Safety Injection simulated or actual signal in conjuction with a simulated or actual loss of offsite power signal, or 4) a Safety Injection simulated or actual signal by itself.

For SR 3.8.1.2, in order to reduce stress and wear on diesel engines, the manufacturer recommends a modified start in which the starting speed of DGs is limited, warmup is limited to this lower speed, and the DGs are gradually accelerated to synchronous speed prior to loading. These start procedures are the intent of Note 3.

SR 3.8.1.7 requires that, at a 184 day Frequency, the DG starts from standby conditions, accelerates to 441 RPM, and achieves required voltage and frequency within 10 seconds. The 10 second start requirement supports the assumptions of the design basis LOCA analysis in the FSAR, Chapter 15 (Ref. 5).

The 10 second start requirement is not applicable to SR 3.8.1.2 (see Note 3) when a modified start procedure as described above is used. If a modified start is not used, the 10 second start requirement of SR 3.8.1.7 applies.

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.1.2 and SR 3.8.1.7 (continued)

Since SR 3.8.1.7 requires a 10 second start, it is more restrictive than SR 3.8.1.2, and it may be performed in lieu of SR 3.8.1.2. This is the intent of Note 1 of SR 3.8.1.2.

In addition to the SR requirements, the time for the DG to reach steady state operation, unless the modified DG start is employed, is periodically monitored and the trend evaluated to identify degradation of governor and voltage regulator performance.

The 31 day Frequency for SR 3.8.1.2, is consistent with Regulatory Guide 1.9 (Ref. 3) and Generic Letter 94-01 (Ref. 14). The 184 day Frequency for SR 3.8.1.7 is a reduction in cold testing consistent with Generic Letter 84-15 (Ref. 7). These Frequencies provide adequate assurance of DG OPERABILITY, while minimizing degradation resulting from testing.

SR 3.8.1.3

This Surveillance verifies that the DGs are capable of synchronizing with the offsite electrical system and accepting loads greater than or equal to the equivalent of the maximum expected accident loads. A minimum run time of 60 minutes is required to stabilize engine temperatures, while minimizing the time that the DG is connected to the offsite source.

Although no power factor requirements are established by this SR, the DG is normally operated at a power factor between 0.8 lagging and 1.0. The 0.8 value is the design rating of the machine, while the 1.0 is an operational limitation to ensure circulating currents are minimized. The load band is provided to avoid routine overloading of the DG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY.

The 31 day Frequency for this Surveillance is consistent with Regulatory Guide 1.9 (Ref. 3) and Generic Letter 94-01 (Ref. 14).

This SR is modified by four Notes. Note 1 indicates that diesel engine runs for this Surveillance may include gradual loading, as recommended by the manufacturer, so that mechanical stress and wear on the diesel engine are minimized. Note 2 states that momentary transients, because of changing bus loads, do not invalidate this test. Note 3 indicates that this Surveillance should be conducted on only one DG at a time in order to avoid common cause failures that might result from offsite circuit or grid perturbations. Note 4 stipulates a prerequisite requirement for performance of this SR. A successful DG start must precede this test to credit satisfactory performance.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.4

This SR provides verification that the level of fuel oil in the day tank is at or above the required level. The level is expressed as an equivalent volume in gallons, and is selected to ensure adequate fuel oil for a minimum of 1 hour of DG operation at full load plus 10% (562 gallons) plus 878 gallons which is credited in TS 3.8.3 in meeting the 7 day fuel oil storage requirement.

The 31 day Frequency is adequate to assure that a sufficient supply of fuel oil is available, since low level alarms are provided and facility operators would be aware of any large uses of fuel oil during this period.

SR 3.8.1.5

Microbiological fouling is a major cause of fuel oil degradation. There are numerous bacteria that can grow in fuel oil and cause fouling, but all must have a water environment in order to survive. Removal of water from the fuel oil day tanks once every 31 days eliminates the necessary environment for bacterial survival. This is the most effective means of controlling microbiological fouling. In addition, it eliminates the potential for water entrainment in the fuel oil during DG operation. Water may come from any of several sources, including condensation, ground water, rain water, contaminated fuel oil, and breakdown of the fuel oil by bacteria. Frequent checking for and removal of accumulated water minimizes fouling and provides data regarding the watertight integrity of the fuel oil system. The Surveillance Frequencies are established by Regulatory Guide 1.137 (Ref. 10). This SR is for preventative maintenance. The presence of water does not necessarily represent failure of this SR, provided the accumulated water is removed during the performance of this Surveillance.

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SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.6

This Surveillance demonstrates that each required fuel oil transfer pump operates and transfers fuel oil from its associated storage tank to its associated day tank. This is required to support continuous operation of standby power sources. This Surveillance provides assurance that the fuel oil transfer pump is OPERABLE, the fuel oil piping system is intact, the fuel delivery piping is not obstructed, and the controls and control systems for automatic fuel transfer systems are OPERABLE.

The frequency of 92 days is adequate to verify proper automatic operation of the fuel transfer pumps to maintain the required volume of fuel oil in the day tanks. This frequency corresponds to the testing requirements for pumps as contained in the ASME Code, Section XI (Ref. 11).

SR 3.8.1.7

See SR 3.8.1.2.

SR 3.8.1.8

Transfer of each 6.9 kV ESF bus power supply from the normal offsite circuit to the alternate offsite circuit demonstrates the OPERABILITY of the alternate circuit distribution network to power the shutdown loads. The 18 month Frequency of the Surveillance is based on engineering judgment, taking into consideration the unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by a Note. ~~The Note says to verify the requirement during MODES 3, 4, 5, 6 or with the core off-loaded.~~ The reason for the Note is that, during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g. post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when the Surveillance is performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment.

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SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.9

Each DG is provided with an engine overspeed trip to prevent damage to the engine. Recovery from the transient caused by the loss of a large load could cause diesel engine overspeed, which, if excessive, might result in a trip of the engine. This Surveillance demonstrates the DG load response characteristics and capability to reject the largest single load without exceeding predetermined voltage and frequency and while maintaining a specified margin to the overspeed trip. The single largest motor load on the bus at any given time is the Component Cooling Water pump load which has a name plate rating of 783 KW. This Surveillance may be accomplished by:

a. Tripping the DG output breaker with the DG carrying greater than or equal to its associated single largest post-accident load while paralleled to offsite power, or while solely supplying the bus; or

b. Tripping its associated single largest post-accident load with the DG solely supplying the bus.

As required by IEEE-308 (Ref. 12), the load rejection test is acceptable if the increase in diesel speed does not exceed 75% of the difference between synchronous speed and the overspeed trip setpoint, or 15% above synchronous speed, whichever is lower.

The time, voltage, and frequency tolerances specified in this SR are derived from Regulatory Guide 1.9 (Ref. 3) recommendations for response during load sequence intervals. The 3 seconds specified is equal to 60% of a typical 5 second load sequence interval associated with sequencing of the largest load. The voltage and frequency specified are consistent with the design range of the equipment powered by the DG. SR 3.8.1.9.a corresponds to the maximum frequency excursion, while SR 3.8.1.9.b is a steady state voltage value to which the system must recover following load rejection. The 18 month Frequency is consistent with the recommendation of Regulatory Guide 1.108 (Ref. 9).

This SR is modified by a Note. ~~The Note says to verify the requirement during MODES 3, 4, 5, 6 or with the core off-loaded.~~ The reason for the Note is that, during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g. post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with

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SURVEILLANCE REQUIREMENTS

SR 3.8.1.9 (continued)

these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when the Surveillance is performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment.

~~Examples of unplanned events may include:~~

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

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

SR 3.8.1.10

This Surveillance demonstrates the DG capability to reject a full load without overspeed tripping or exceeding the predetermined voltage limits. The DG full load rejection may occur because of a system fault or inadvertent breaker tripping. This Surveillance ensures proper engine generator load response under the simulated test conditions. This test simulates the loss of the total connected load that the DG experiences following a full load rejection and verifies that the DG does not trip upon loss of the load. These acceptance criteria provide for DG damage protection. While the DG is not expected to experience this transient during an event and continues to be available, this response ensures that the DG is not degraded for future application, including reconnection to the bus if the trip initiator can be corrected or isolated.

The 18 month Frequency is consistent with the recommendation of Regulatory Guide 1.9 (Ref.3) and is intended to be consistent with expected fuel cycle lengths.

~~This SR is modified by a Note. The Note says to verify the requirement during MODES 3, 4, 5, 6 or with the core off-loaded.~~

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SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.11

As required by Regulatory Guide 1.9 (Ref.3), this Surveillance demonstrates the as designed operation of the standby power sources during loss of the offsite source. This test verifies all safety functions encountered from the loss of offsite power, including shedding of the nonessential loads, energization of the emergency buses in ≤ 10 seconds after auto-start signal, and energization of the respective loads from the DG. It further demonstrates the capability of the DG to automatically maintain the required steady state voltage and frequency.

The DG autostart time of 10 seconds is derived from requirements of the accident analysis to respond to a design basis large break LOCA. The Surveillance should be continued for a minimum of 5 minutes in order to demonstrate that all starting transients have decayed and stability is achieved.

The requirement to verify the connection and power supply of permanent and autoconnected loads is intended to satisfactorily show the relationship of these loads to the DG loading logic. In certain circumstances, many of these loads cannot actually be connected or loaded without undue hardship or potential for undesired operation. For instance, Emergency Core Cooling Systems (ECCS) injection valves are not desired to be stroked open, or high pressure injection systems are not capable of being operated at full flow, or residual heat removal (RHR) systems performing a decay heat removal function are not desired to be realigned to the ECCS mode of operation. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG systems to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions. Standby conditions for a DG mean that the diesel is shutdown but is ready for either a manual or automatic start signal and is ready to pickup the required safety related loads. To minimize degradation resulting from testing, Diesel Generators may have the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations prior to DG start. ~~Note 2 says to verify the requirement during MODES 3, 4, 5, 6 or with the core off-loaded.~~ The reason for Note 2 is that performing the Surveillance would remove a required offsite circuit from service,

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is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g. post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1 or 2. Risk insights or deterministic methods may be used for the assessment.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.12

This Surveillance demonstrates that the DG automatically starts, achieves and maintains the required voltage and frequency within the specified time (10 seconds) from the safety injection signal and operates for ≥ 5 minutes. The 5 minute period provides sufficient time to demonstrate stability.

The Frequency of 18 months takes into consideration unit conditions required to perform the Surveillance and is intended to be consistent with the expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by ~~two~~ a Notes. The reason for the Note ~~1~~ is to minimize wear and tear ~~on the DGs~~ during testing. ~~For the purpose~~ of this testing, the DGs must be started from standby conditions. Standby conditions for a DG mean that the diesel is shutdown but is ready for either a manual or automatic start signal and is ready to pickup the required safety related loads. To minimize degradation resulting from testing, Diesel Generators may have the engine coolant and oil continuously circulated and temperature maintained ~~consistent~~ with manufacturer recommendations prior to DG start. ~~Note 2 says to verify the requirement during MODES 3, 4, 5, 6 or with the core off-loaded.~~

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SR 3.8.1.13

This Surveillance demonstrates that DG noncritical protective functions (e.g., high jacket water temperature) are bypassed on a DG emergency start which occurs from either a loss of voltage or an SI actuation test signal. The noncritical trips are bypassed during DBAs and provide an alarm on an abnormal engine condition. This alarm provides the operator with sufficient time to react appropriately. The DG availability to mitigate the DBA is more critical than protecting the engine against minor problems that are not immediately detrimental to emergency operation of the DG.

The 18 month Frequency is based on engineering judgment, taking into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

~~The SR is modified by a Note. The Note says to verify the requirement during MODES 3, 4, 5, 6 or with the core off-loaded.~~

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.14

Regulatory Guide 1.9 (Ref. 3), requires demonstration once per 18 months that the DGs can start and run continuously at full load capability for an interval of not less than 24 hours, ≥ 2 hours of which is at a load equivalent to approximately 110% of the continuous duty rating and the remainder of the time at a load equivalent to 90% to 100% of the continuous duty rating of the DG. For the purposes of the 2 hour run, the minimum load is approximately 110% of the 6300 kW maximum design load in lieu of the 7000 kW continuous rating. The DG start for this Surveillance can be performed either from ambient or hot conditions. The provisions for prelubricating and warmup, discussed in SR 3.8.1.2, and for gradual loading, discussed in SR 3.8.1.3, are applicable to this SR.

The load band is provided to avoid routine overloading of the DG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY.

The 18 month Frequency is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This Surveillance is modified by ~~two Notes.~~ a Note ~~1~~s which states that momentary transients due to changing bus loads do not invalidate this test. ~~Note 2 says to verify the requirement during MODES 3, 4, 5, 6 or with the core off-loaded.~~

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SR 3.8.1.15

This Surveillance demonstrates that the diesel engine can restart from a hot condition, such as subsequent to shutdown from normal Surveillances, and achieve the required voltage and frequency within 10 seconds. The 10 second time is derived from the requirements of the accident analysis to respond to a design basis large break LOCA. The 18 month Frequency is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3).

SURVEILLANCE REQUIREMENTS (continued)

~~SR 3.8.1.15 (continued)~~

The generator voltage shall be between 6480 V and 7150 V and frequency shall be 60± 1.2 Hz within 10 seconds after the start signal; the steady state generator voltage and frequency shall be maintained within these limits during this test.

This SR is modified by two Notes. Note 1 ensures that the test is performed with the diesel sufficiently hot. The load band is provided to avoid routine overloading of the DG. Routine overloads may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY. The requirement that the diesel has operated for at least 2 hours at full load conditions prior to performance of this Surveillance is based on manufacturer recommendations for achieving hot conditions. Momentary transients due to changing bus loads do not invalidate this test. Note 2 allows all DG starts to be preceded by an engine prelube period to minimize wear and tear on the diesel during testing.

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SR 3.8.1.16

As required by Regulatory Guide 1.9 (Ref. 3) this Surveillance ensures that the manual synchronization and automatic load transfer from the DG to the offsite source can be made and the DG can be returned to ready to load status when offsite power is restored. It also ensures that the autostart logic is reset to allow the DG to reload if a subsequent loss of offsite power occurs. The DG is considered to be in ready to load status when the DG is at rated speed and voltage, the output breaker is open and can receive an autoclose signal on bus undervoltage, and the load sequence timers are reset.

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(6), and takes into consideration unit conditions required to perform the Surveillance.

This SR is modified by a Note. ~~The Note says to verify the requirement during MODES 3, 4, 5, 6 or with the core off-loaded.~~ The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g. post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when the Surveillance is performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment.

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SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.17

Demonstration of the test mode override ensures that the DG availability under accident conditions will not be compromised as the result of testing and the DG will automatically reset to ready to load operation if a LOCA actuation signal is received during operation in the test mode. Ready to load operation is defined as the DG running at rated speed and voltage with the DG output breaker open. These provisions for automatic switchover are consistent with IEEE-308 (Ref. 13).

The intent of the requirement to automatically energize the emergency loads with offsite power is to show that the emergency loading was not affected by the DG operation in test mode. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the emergency loads to perform these functions is acceptable.

This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The 18 month Frequency is consistent with the recommendations of Regulatory Guide 1.9 (Ref.3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. ~~The Note says to verify the requirement during MODES 3, 4, 5, 6 or with the core off-loaded.~~ The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g. post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1 or 2. Risk insights or deterministic methods may be used for the assessment.

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SR 3.8.1.18

Under accident and loss of offsite power conditions loads are sequentially connected to the bus by the automatic load sequencer. The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading of the DGs due to high motor starting currents. The 10% load sequence time interval tolerance ensures that sufficient time exists for the DG to restore frequency and voltage prior to applying the next load and that safety analysis assumptions regarding ESF equipment time delays are not violated. Reference 2 provides a summary of the automatic loading of ESF buses.

SURVEILLANCE REQUIREMENTS (continued)

~~SR 3.8.1.18 (continued)~~

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(2), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. ~~The Note says to verify the requirement during MODES 3, 4, 5, 6 or with the core off-loaded.~~ The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g. post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1 or 2. Risk insights or deterministic methods may be used for the assessment.

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SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.19

In the event of a DBA coincident with a loss of offsite power, the DGs are required to supply the necessary power to ESF systems so that the fuel, RCS, and containment design limits are not exceeded.

This Surveillance demonstrates the DG operation, as discussed in the Bases for SR 3.8.1.11, during a loss of offsite power actuation test signal in conjunction with an SI actuation signal. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The Frequency of 18 months takes into consideration unit conditions required to perform the Surveillance and is intended to be consistent with an expected fuel cycle length of 18 months.

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions. Standby conditions for a DG mean that the diesel is shutdown but is ready for either a manual or automatic start signal and is ready to pickup the required safety related loads. To minimize degradation resulting from testing, Diesel Generators may have the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations prior to DG start. ~~Note 2 says to verify the requirement during MODES 3, 4, 5, 6 or with the core off-loaded.~~ The reason for Note 2 is that the performance of the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g. post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1 or 2. Risk insights or deterministic methods may be used for the assessment.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.20

This Surveillance demonstrates that the DG starting independence has not been compromised. Also, this Surveillance demonstrates that each engine can achieve proper speed (441 rpm) within the specified time when the DGs are started simultaneously.

The 10 year Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9).

This SR is modified by a Note. The reason for the Note is to minimize wear on the DG during testing. For the purpose of this testing, the DGs must be started from standby conditions. Standby conditions for a DG mean that the diesel is shutdown but is ready for either a manual or automatic start signal and is ready to pickup the required safety related loads. To minimize degradation resulting from testing, Diesel Generators may have the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations prior to DG start.

SR 3.8.1.21 and SR 3.8.1.22

These SRs ensure the proper functioning of the safety injection and blackout sequencers.

SR 3.8.1.21 applies to the blackout sequencer input undervoltage relays. These relays are calibrated every 18 months.

SR 3.8.1.22 applies to the Solid State Safeguards Sequencers (both the Safety Injection Sequencer and the Blackout Sequencer) and is the performance of a TADOT. This surveillance is performed every 31 days.

This SR is modified by two Notes. The first Note excludes verification of setpoints from the TADOT. The trip setpoints are verified by as part of the ESF Instrumentation. The second Note excludes actuation of final devices. Operation of the sequencer during power operations could disrupt normal operation and induce a plant transient.

(continued)

This page is included for Information Only.

BASES (continued)

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.
2. FSAR, Chapter 8.
3. Regulatory Guide 1.9 Rev 3, July 1993.
4. FSAR, Chapter 6.
5. FSAR, Chapter 15.
6. Regulatory Guide 1.93, Rev. 0, December 1974.
7. Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," July 2, 1984.
8. 10 CFR 50, Appendix A, GDC 18.
9. Regulatory Guide 1.108, Rev. 1, August 1977.
10. Regulatory Guide 1.137, January 1978.
11. ASME, Boiler and Pressure Vessel Code, Section XI.
12. IEEE Standard 308-1974.
13. IEEE Standard 387-1977
14. Generic Letter 94-01, "Removal of Accelerated Testing and Special Reporting Requirements for Emergency Diesel Generators," May 31, 1994.
15. ANSI C84.1

**ATTACHMENT 4 to TXX-04143**

**RETYPED TECHNICAL SPECIFICATION PAGES**

**Pages 3.8-1 through 3.8-16**

## 3.8 ELECTRICAL POWER SYSTEMS

### 3.8.1 AC Sources C 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;

b. Two diesel generators (DGs) capable of supplying the onsite Class 1E power distribution subsystem(s); and

c. Automatic load sequencers for Train A and Train B.

APPLICABILITY: MODES 1, 2, 3, and 4

---NOTE---
One DG may be synchronized with the offsite power source under administrative controls for the purpose of surveillance testing.
---

ACTIONS

NOTE
LCO 3.0.4.b is not applicable to DGs. 109

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| A. One required offsite circuit inoperable. | A.1 Perform SR 3.8.1.1 for required OPERABLE offsite circuit. | 1 hour<br>AND<br>Once per 8 hours thereafter |
| | AND<br>NOTE<br>In MODES 1, 2 and 3, the TDAFW pump is considered a required redundant feature. | |
| | A.2 Declare required feature(s) with no offsite power available inoperable when its redundant required feature(s) is inoperable. | 24 hours from discovery of no offsite power to one train concurrent with inoperability of redundant required feature(s) |
| | AND<br>A.3 Restore required offsite circuit to OPERABLE status. | 72 hours<br>AND<br>6 days from discovery of failure to meet LCO |

(continued)

This page is included for Information Only.

ACTIONS (continued)

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| B. One DG inoperable. | B.1 | Perform SR 3.8.1.1 for the required offsite circuit(s). | 1 hour<br>AND<br>Once per 8 hours thereafter |
| | AND | | |
| | | ----------NOTE----------<br>In MODES 1, 2 and 3, the TDAFW pump is considered a required redundant feature.<br>---------- | |
| | B.2 | Declare required feature(s) supported by the inoperable DG inoperable when its required redundant feature(s) is inoperable. | 4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s) |
| | AND | | |
| | B.3.1 | Determine OPERABLE DG(s) is not inoperable due to common cause failure. | 24 hours |
| | OR | | |
| | | ----------NOTE----------<br>The SR need not be performed if the DG is already operating and loaded.<br>---------- | |
| | B.3.2 | Perform SR 3.8.1.2 for OPERABLE DG(s). | 24 hours |

(continued)

This page is included for Information Only.

ACTIONS (continued)

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| B. (continued) | AND | | |
| | B.4 | Restore DG to OPERABLE status. | 72 hours<br>AND<br>6 days from discover of failure to meet LCO |
| C. Two required offsite circuits inoperable. | | ----------NOTE----------<br>In MODES 1, 2 and 3, the TDAFW pump is considered a required redundant feature.<br>---------- | |
| | 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 |
| | AND | | |
| | C.2 | Restore one required offsite circuit to OPERABLE status. | 24 hours |

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This page is included for Information Only.

ACTIONS (continued)

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| D. One required offsite circuit inoperable.<br><br>AND<br><br>One DG inoperable. | ----------NOTE----------<br>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.<br>----------<br>D.1 Restore required offsite circuit to OPERABLE status.<br><br>OR<br><br>D.2 Restore DG to OPERABLE status. | <br><br><br><br><br>12 hours<br><br><br><br>12 hours |
| E. Two DGs inoperable. | E.1 Restore one DG to OPERABLE status. | 2 hours |
| F. One SI sequencer inoperable. | ----------NOTE----------<br>One required SI sequencer channel may be bypassed for up to 4 hours for surveillance testing provided the other channel is operable.<br>----------<br>F.1 Restore SI sequencer to OPERABLE status. | <br><br><br><br><br>12 hours |

(continued)

This page is included for Information Only.

ACTIONS (continued)

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| G. Required Action and associated Completion Time of Condition A, B, C, D, E, or F not met. | G.1 | Be in MODE 3. | 6 hours |
| | AND | | |
| | G.2 | Be in MODE 5. | 36 hours |
| H. Three or more required AC sources inoperable. | H.1 | Enter LCO 3.0.3. | Immediately |
| I. One Blackout Sequencer inoperable | I.1 | Declare associated DG inoperable | Immediately |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.8.1.1 | Verify correct breaker alignment and indicated power availability for each required offsite circuit. | 7 days |

(continued)

This page is included for Information Only.

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | FREQUENCY |
|---|---|
| SR 3.8.1.2 ----------NOTES----------<br>1. Performance of SR 3.8.1.7 satisfies this SR.<br>2. All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading.<br>3. A modified DG start involving idling and gradual acceleration to synchronous speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.7 must be met.<br>----------<br>Verify each DG starts from standby conditions and achieves steady state voltage ≥ 6480 V and ≤ 7150 V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz. | 31 days |
| SR 3.8.1.3 ----------NOTES----------<br>1. DG loadings may include gradual loading as recommended by the manufacturer.<br>2. Momentary transients outside the load range do not invalidate this test.<br>3. This Surveillance shall be conducted on only one DG at a time.<br>4. This SR shall be preceded by and immediately follow without shutdown a successful performance of SR 3.8.1.2 or SR 3.8.1.7.<br>----------<br>Verify each DG is synchronized and loaded and operates for ≥ 60 minutes at a load ≥ 6300 kW and ≤ 7000 kW. | 31 days |

(continued)

SURVEILLANCE REQUIREMENTS (continued)

| | SURVEILLANCE | FREQUENCY |
|---|---|---|
| SR 3.8.1.4 | Verify each day tank contains ≥ 1440 gal of fuel oil. | 31 days |
| SR 3.8.1.5 | Check for and remove accumulated water from each day tank. | 31 days |
| SR 3.8.1.6 | Verify the fuel oil transfer system operates to automatically transfer fuel oil from storage tank to the day tank. | 92 days |
| SR 3.8.1.7 | ----------NOTE----------<br>All DG starts may be preceded by an engine prelube period.<br>----------<br>Verify each DG starts from standby condition and achieves:<br>a. in ≤ 10 seconds, voltage ≥ 6480 V and frequency ≥ 58.8 Hz; and<br>b. steady state, voltage ≥ 6480 V and ≤ 7150V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz. | 184 days 66 |
| SR 3.8.1.8 | ----------NOTE----------<br>This Surveillance shall not normally be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced.<br>----------<br>Verify automatic and manual transfer of AC power sources from the normal offsite circuit to each alternate required offsite circuit. | 18 months |

(continued)

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.8.1.9 | ----------NOTE----------<br>This Surveillance shall not normally be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced.<br>----------<br>Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and:<br>a. Following load rejection, the frequency is ≤ 66.75 Hz; and<br>b. Within 3 seconds following load rejection, the voltage is ≤ 6480 V and ≤ 7150 V. | 18 months |
| SR 3.8.1.10 | Verify each DG does not trip and voltage is maintained ≤ 8280 V during and following a load rejection of ≥ 6300 kW and ≤ 7000 kW. | 18 months |

(continued)

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | FREQUENCY |
|---|---|
| SR 3.8.1.11 ----------NOTES----------<br>1. All DG starts may be preceded by an engine prelube period.<br>2. This Surveillance shall not normally be performed in MODE 1 or 2. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced.<br>----------<br>Verify on an actual or simulated loss of offsite power signal:<br>a. De-energization of emergency buses;<br>b. Load shedding from emergency buses;<br>c. DG auto-starts from standby condition and:<br>1. energizes permanently connected loads in ≤ 10 seconds,<br>2. energizes auto-connected shutdown loads through automatic load sequencer,<br>3. maintains steady state voltage ≥ 6480 V and ≤ 7150 V,<br>4. maintains steady state frequency ≥ 58.8 Hz and ≤ 61.2 Hz, and<br>5. supplies permanently connected and auto-connected shutdown loads for ≥ 5 minutes. | 18 months |

(continued)

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | | FREQUENCY | |
|---|---|---|---|
| SR 3.8.1.12 | ----------NOTES----------<br>All DG starts may be preceded by prelube period.<br>----------<br><br>Verify on an actual or simulated Safety Injection (SI) actuation signal each DG auto-starts from standby condition and:<br><br>a. In ≤ 10 seconds after auto-start and during tests, achieves voltage ≥ 6480 V and frequency ≥ 58.8 Hz;<br><br>b. Achieves steady state voltage ≥ 6480 V and ≤ 7150 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz;<br><br>c. Operates for ≥ 5 minutes; | 18 months | 66 |
| SR 3.8.1.13 | ----------NOTE----------<br>For Unit 2, testing need only be performed for LOOP concurrent with SI until startup following 2RFO5.<br>----------<br><br>Verify each DG's automatic trips are bypassed on actual or simulated (i) loss of voltage signal on the emergency bus, and (ii) SI actuation signal, except:<br><br>a. Engine overspeed; and<br><br>b. Generator differential current. | 18 months | 69 |

(continued)

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.8.1.14 | ----------NOTES----------<br>Momentary transients outside the load and power factor ranges do not invalidate this test.<br>----------<br>Verify each DG operates for ≥ 24 hours:<br>a. For ≥ 2 hours loaded ≥ 6900 kW and ≤ 7700 kW; and<br>b. For the remaining hours of the test loaded ≥ 6300 kW and ≤ 7000 kW. | 18 months |
| SR 3.8.1.15 | ----------NOTES----------<br>1. This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG has operated ≥ 2 hours loaded ≥ 6300 kW and ≤ 7000 kW. Momentary transients outside of load range do not invalidate this test.<br>2. All DG starts may be preceded by an engine prelube period.<br>----------<br>Verify each DG starts and achieves:<br>a. in ≤ 10 seconds, voltage ≥ 6480 V and frequency ≥ 58.8 Hz; and<br>b. steady state, voltage ≥ 6480 V, and ≤ 7150 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz. | 18 months |

66

(continued)

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.8.1.16 | ----------NOTE----------<br>This Surveillance shall not normally be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced.<br>----------<br>Verify each DG:<br>a. Synchronizes with offsite power source while loaded with emergency loads upon a simulated restoration of offsite power;<br>b. Transfers loads to offsite power source; and<br>c. Returns to ready-to-load operation. | 18 months |
| SR 3.8.1.17 | ----------NOTE----------<br>This Surveillance shall not normally be performed in MODE 1 or 2. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced.<br>----------<br>Verify, with a DG operating in test mode and connected to its bus, an actual or simulated SI actuation signal overrides the test mode by:<br>a. Returning DG to ready-to-load operation; and<br>b. Automatically energizing the emergency load from offsite power. | 18 months |

(continued)

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.8.1.18 | ----------NOTE----------<br>This Surveillance shall not normally be performed in MODE 1 or 2. However, this Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced.<br>----------<br>Verify interval between each sequenced load block is within ± 10% of design interval for each automatic load sequencer. | 18 months |

(continued)

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.8.1.19 | ----------NOTES----------<br>1. All DG starts may be preceded by an engine prelube period.<br><br>2. This Surveillance shall not normally be performed in MODE 1 or 2. However, portions of the Surveillance may be performed to reestablish OPERABILITY provided an assessment determines the safety of the plant is maintained or enhanced.<br>---<br><br>Verify on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated SI actuation signal:<br><br>a. De-energization of emergency buses;<br><br>b. Load shedding from emergency buses; and<br><br>c. DG auto-starts from standby condition and:<br><br>1. energizes permanently connected loads in ≤ 10 seconds,<br><br>2. energizes auto-connected emergency loads through load sequencer,<br><br>3. achieves steady state voltage ≥ 6480 V and ≤ 7150 V,<br><br>4. achieves steady state frequency ≥ 58.8 Hz and ≤ 61.2 Hz, and<br><br>5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes. | 18 months |

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This page is included for Information Only.

SURVEILLANCE REQUIREMENTS (continued)

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.8.1.20 | ----------NOTE----------<br>All DG starts may be preceded by an engine prelube period.<br>----------<br>Verify when started simultaneously from standby condition, each DG achieves:<br>a. in ≤ 10 seconds, voltage ≥ 6480 V and frequency ≥ 58.8 Hz, and<br>b. steady state, voltage ≥ 6480 V, and ≤ 7150 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz. | 10 years |
| SR 3.8.1.21 | Calibrate BO sequencers. | 18 months |
| SR 3.8.1.22 | ----------NOTES----------<br>1. Verification of setpoint is not required.<br>2. Actuation of final devices is not included.<br>----------<br>Perform TADOT for SI and BO sequencers. | 31 days on a STAGGERED TEST BASIS. |

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**ATTACHMENT 5 to TXX-04143**

**RETYPED TECHNICAL SPECIFICATION BASES PAGES**
**(For Information Only)**

**Pages B3.8-1 through B3.8-31**

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.1 AC Sources — Operating

BASES

BACKGROUND

The unit Class 1E AC Electrical Power Distribution System AC sources consist of the offsite power sources (preferred power source, and alternate), and the onsite standby emergency power sources (Train A and Train B diesel generators (DGs)). As required by 10 CFR 50, Appendix A, GDC 17 (Ref. 1), the design of the AC electrical power system provides independence and redundancy to ensure an available source of power to the Engineered Safety Feature (ESF) systems.

The onsite Class 1E AC Distribution System is divided into redundant load groups (trains) so that the loss of any one group does not prevent the minimum safety functions from being performed. Each train has connections to two offsite power sources and a dedicated DG.

Offsite power is supplied to the plant switchyards from the transmission network by five 345 KV and two 138 KV transmission lines. From the switchyards, two electrically and physically separated circuits provide AC power, through step down startup transformers, to the 6.9 kV ESF buses. A detailed description of the offsite power network and the circuits to the Class 1E ESF buses is found in the FSAR, Chapter 8 (Ref. 2).

An offsite circuit consists of all breakers, transformers, switches, interrupting devices, cabling, and controls required to transmit power from the offsite transmission network buses at plant switchyards to the onsite Class 1E ESF buses.

Certain required unit loads are started and/or returned to service in a predetermined sequence in order to prevent overloading the transformer supplying offsite power to the onsite Class 1E Distribution System. Within 2 minutes after the initiating signal is received, all automatic and permanently connected loads needed to recover the unit or maintain it in a safe condition are returned to service when the bus is energized or by the load sequencer.

The onsite standby power source for each 6.9 kV ESF bus is a dedicated DG. DGs 1EG1, 1EG2, 2EG1 and 2EG2 are dedicated to ESF buses 1EA1, 1EA2, 2EA1 and 2EA2 respectively. The DG starts automatically on a safety injection (SI) signal.

(continued)

BASES

BACKGROUND (continued)

On an ESF bus undervoltage signal, the DG start signal is delayed 1 second to allow alternate source breaker closure. If the alternate source is not available the ESF bus undervoltage signal automatically starts the DG, (refer to LCO 3.3.5, "Loss of Power (LOP) Diesel Generator (DG) Start Instrumentation"). As a result of degraded voltage the preferred source is tripped after a time delay (60 seconds with no SI signal and 8 seconds with an SI signal present). Subsequently, if the alternate source does not alleviate the degraded condition, the alternate source is tripped after a time delay of 1.9 seconds. After the offsite power is tripped as a consequence of ESF bus undervoltage or degraded voltage and the DG has started, it will automatically tie to its respective bus, independent of or coincident with an SI signal. The DGs will also start and operate in the standby mode without tying to the ESF bus on an SI signal alone. Following the trip of offsite power, an undervoltage signal strips nonpermanent loads from the ESF bus. When the DG is tied to the ESF bus, loads are then sequentially connected to its respective ESF bus by the automatic load 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 ESF electrical loads are automatically connected to the available alternate power source. If the alternate source is not available, then the ESF electrical loads are 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 loss of coolant accident (LOCA).

Certain required unit loads are started and/or returned to service in a predetermined sequence in order to prevent overloading the DG in the process. Within 2 minutes after the initiating signal is received, all loads needed to recover the unit or maintain it in a safe condition are returned to service when the bus is energized or by the load sequencer.

Ratings for Train A and Train B DGs satisfy the requirements of Regulatory Guide 1.9; Ref. (3) and IEEE 387 (Ref. 13). The continuous service rating of each DG is 7000 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 ESF buses are listed in Reference 2. The maximum calculated load is less than 6300 kW. This maximum continuous service load is reflected in selected surveillances.

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES

The initial conditions of DBA and transient analyses in the FSAR, Chapter 6 (Ref. 4) and Chapter 15 (Ref. 5), assume ESF systems are OPERABLE. The AC electrical power sources are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System (RCS), and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS);and Section 3.6, Containment Systems.

The OPERABILITY of the AC electrical power sources is consistent with the initial assumptions of the Accident analyses and is based upon meeting the design basis of the unit. This results in maintaining at least one train of the onsite AC sources or one of the offsite AC sources OPERABLE during Accident conditions in the event of:

a. An assumed loss of all offsite power or all onsite AC power; and

b. A worst case single failure.

The AC sources satisfy Criterion 3 of 10CFR50.36(c)(2)(ii).

LCO

Two qualified circuits between the offsite transmission network buses at the plant switchyards and the onsite Class 1E Electrical Power System and separate and independent DGs for each train ensure availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an anticipated operational occurrence (AOO) or a postulated DBA.

Qualified offsite circuits are those that are described in the FSAR and are part of the licensing basis for the unit. In addition, one automatic load sequencer per train must be OPERABLE.

Each offsite circuit must be capable of maintaining rated frequency and voltage, and accepting required loads during an accident, while connected to the ESF buses.

Offsite circuit #1 is fed from the 138 kv switchyard and offsite circuit # 2 is fed from the 345 kv switchyard. Circuit #1 is the preferred source for Unit 2 and alternate source for Unit 1. Circuit # 2 is the preferred source for Unit 1 and alternate source for Unit 2. Each offsite circuit can supply 6.9 kv Train A and Train B ESF busses for both Unit 1 and Unit 2.

(continued)

BASES

LCO (continued)

Each DG must be capable of starting, accelerating to rated speed and voltage, and connecting to its respective ESF bus on receipt of bus undervoltage signal. 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 ESF buses. 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 Surveillance, e.g., capability of the DG to revert to ready-to-load status on an SI signal while operating in parallel test mode. | 1

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

The offsite AC sources must be separate and independent (to the extent possible). For the onsite 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 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 an operable transfer mechanism to that bus to support operability of that circuit.

Each circuit of offsite source can feed both trains. Preferred source breakers are normally closed and alternate source breakers are normally open. Each bus has automatic capability to transfer to the alternate source on loss of preferred source.

LCO 3.8.1 is modified by a Note stating that one DG may be operated synchronized with the offsite power source under administrative controls for the purpose of Surveillance Testing. During such testing, only one of the redundant DGs shall be paralleled at any one time, leaving the other DG available in standby service.

Administrative controls for performing surveillance testing with the DG connected to an offsite circuit ensure or require that:

a. Weather conditions are conducive for performing the SR.

b. The offsite power supply and switchyard conditions are conducive for performing the SR, which includes ensuring that switchyard access is restricted and no potentially impactive maintenance within the switchyard is performed.

(continued)

BASES

LCO (continued)

c. No equipment or systems assumed to be available for supporting the performance of the SR are removed from service.

d. Associated risks shall be managed in accordance with the TS 5.5.18 Configuration Risk Management Program.

The Note is consistent with the NRC position provided in Information Notice 84-69, which "prohibits the use of EDGs for purposes other than supplying standby power, when needed, and permits interconnection of the onsite and offsite sources only for short periods of time for the purpose of EDG load retesting." Thus, the DG under test need not be considered inoperable strictly due to being paralleled with offsite power during performance of the required testing.

APPLICABILITY

The AC sources and sequencers are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of AOOs or abnormal transients; and

b. Adequate core cooling is provided and containment OPERABILITY and other vital functions are maintained in the event of a postulated DBA. The AC power requirements for MODES 5 and 6 are covered in LCO 3.8.2, "AC Sources — Shutdown."

ACTIONS

A Note prohibits the application of LCO 3.0.4.b to an inoperable DG. There is an increased risk associated with entering a MODE or other specified condition in the Applicability with an inoperable DG and the provisions of LCO 3.0.4.b, which allow entry into a MODE or other specified condition in the Applicability with the LCO not met after performance of a risk assessment addressing inoperable systems and components, should not be applied in this circumstance. 34

A.1

To ensure a highly reliable power source remains with one offsite circuit inoperable, it is necessary to verify the OPERABILITY of the remaining required offsite circuit 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 not met. However, if a second required circuit fails SR 3.8.1.1, the second offsite circuit is inoperable, and Condition C, for two offsite circuits inoperable, is entered.

(continued)

BASES

ACTIONS (continued)

A.2

Required Action A.2, which only applies if the train cannot be powered from an offsite source, is intended to provide assurance that an event coincident with a single failure of the associated DG will not result in a complete loss of safety function of critical redundant required features. These features are powered from the redundant AC electrical power train. This includes the motor driven auxiliary feedwater pumps and the TDAFW pump which must be available for mitigation of a Feedwater line break. Single train systems, other than the steam driven (turbine driven) auxiliary feedwater pump, are not included.

The Completion Time for Required Action A.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. The train has no offsite power supplying it loads; and

b. A required feature on the other train is inoperable.

If at any time during the existence of Condition A (one offsite circuit inoperable) with a train with no offsite power available, and a redundant required feature subsequently becomes inoperable, this Completion Time begins to be tracked.

Discovering no offsite power to one train of the onsite Class 1E Electrical Power Distribution System coincident with one or more inoperable required support or supported features, or both, that are associated with the other train that has offsite power, results in starting the Completion Times for the Required Action.

Twenty-four hours is acceptable because it minimizes risk while allowing time for restoration before subjecting the unit to transients associated with shutdown.

The remaining OPERABLE offsite circuit and DGs are adequate to supply electrical power to Train A and Train B of the onsite Class 1E Distribution System. The 24 hour Completion Time takes into account the component OPERABILITY of the redundant counterpart to the inoperable required feature. Additionally, the 24 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.

(continued)

BASES

ACTIONS (continued)

A.3

According to Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition A for a period that should not exceed 72 hours. With one offsite circuit inoperable, the reliability of the offsite system is degraded, and the potential for a loss of offsite power is increased, with attendant potential for a challenge to the unit safety systems. In this Condition, however, the remaining OPERABLE offsite circuit and DGs 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 A.3 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 A is entered while, for instance, a DG is inoperable and that DG is subsequently returned 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 offsite circuit. At this time, a DG could again become inoperable, the circuit 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 the 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 A.2, 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 that the LCO was initially not met, instead of at the time Condition A was entered.

(continued)

BASES

ACTIONS (continued)

B.1

To ensure a highly reliable power source remains with an inoperable DG, 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 the motor driven auxiliary feedwater pumps and the TDAFW pump which must be available for mitigation of a Feedwater line break. Single train systems, other than 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 an inoperable DG. 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 DG inoperable) a required feature subsequently becomes inoperable, this Completion Time would begin to be tracked.

Discovering one DG inoperable coincident with one or more inoperable required support or supported features, or both, that are associated with the OPERABLE DG, results in starting the Completion Time for the Required Action. Four hours from the discovery of these events existing

(continued)

BASES

ACTIONS

B.2 (continued)

concurrently is acceptable because it minimizes risk while allowing time for restoration before subjecting the unit to transients associated with shutdown.

In this Condition, the remaining OPERABLE DG 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 and B.3.2

Required Action B.3.1 provides an allowance to avoid unnecessary testing of the OPERABLE DG. 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. If the cause of inoperability exists on the other DG, the other DG would be declared inoperable upon discovery and Condition E of LCO 3.8.1 would be entered. Once the failure is repaired, the common cause failure no longer exists, and Required Action B.3.1 is satisfied. If the cause of the initial inoperable DG cannot be confirmed not to exist on the remaining DG, 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 or B.3.2, the applicable plant procedures 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. 7), 24 hours is reasonable to confirm that the OPERABLE DG is not affected by the same problem as the inoperable DG.

During performance of surveillance activities as a requirement for ACTION statements, the air-roll test shall not be performed.

(continued)

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 DG 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 DG. At this time, an offsite circuit could again become inoperable, the DG 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.

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

(continued)

BASES

ACTIONS

C.1 and C.2 (continued)

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 the motor driven auxiliary feedwater pumps and the TDAFW pump which must be available for mitigation of a Feedwater line break. Single train systems, other than the turbine driven auxiliary feedwater pump, are not included.

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 that involve one or more DGs inoperable.

(continued)

BASES

ACTIONS

C.1 and C.2 (continued)

However, two factors tend to decrease the severity of this level of degradation:

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 unit 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. 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, (for CPSES this requires both offsite sources and DG inoperable) 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 DG, without regard to whether a train is inoperable. LCO 3.8.9 provides the appropriate restrictions for a inoperable train.

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

(continued)

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 Train A and Train B DGs 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 both DGs inoperable, operation may continue for a period that should not exceed 2 hours.

F.1

The SI sequencer(s) is an essential support system to both the offsite circuit and the DG associated with a given ESF bus. Furthermore, the sequencer is on the primary success path for most major AC electrically powered safety systems powered from the associated ESF bus. Therefore, loss of an ESF bus sequencer affects every major ESF system in the train. The 12 hour Completion Time provides a period of time to correct the problem commensurate with the importance of

(continued)

BASES

ACTIONS

F.1 (continued)

maintaining sequencer OPERABILITY. This time period also ensures that the probability of an accident (requiring sequencer OPERABILITY) occurring during periods when the sequencer is inoperable is minimal.

This Required Action is modified by a note. The note allows one sequencer channel to be bypassed for surveillance testing provided the other channel is operable. The 4 hours allows sufficient time to perform the required testing. Based on the low probability of an event requiring the sequencer in combination with a failure to the operable sequencer channel during the 4 hours, this period of inoperability for testing is acceptable.

G.1 and G.2

If the inoperable AC electric power sources cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit 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 unit conditions from full power conditions in an orderly manner and without challenging plant systems.

H.1

Condition H corresponds to a level of degradation in which all redundancy in the AC electrical power supplies has been lost. 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 unit is required by LCO 3.0.3 to commence a controlled shutdown.

I.1

A Blackout sequencer is an essential support system to the DG associated with a given ESF bus. The sequencer is required to provide the system response to a loss of or degraded ESF bus voltage signal. Therefore, the loss of the Blackout sequencer causes the associated DG to become inoperable immediately.

(continued)

BASES (continued)

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 SR for demonstrating the OPERABILITY of the DGs are consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3), and Regulatory Guide 1.137 (Ref. 10).

Where the SR discussed herein specify voltage and frequency tolerances, the following is applicable.

The minimum steady state output voltage of 6480 V allows for voltage drops to motors and other equipment down to the 120 V level to ensure that the loads will not experience voltage less than the minimum rated voltage. The maximum steady state output voltage of 7150 V ensures that, under lightly loaded conditions, motors and other equipment down to the 120 V level will not experience voltages more than the maximum rated voltage. The specified minimum and maximum frequencies of the DG are 58.8 Hz and 61.2 Hz, respectively. These values are equal to ± 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

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.2 and SR 3.8.1.7

These SR help to ensure the availability of the standby electrical power supply to mitigate DBAs and transients and to maintain the unit in a safe shutdown condition.

To minimize the wear on moving parts that do not get lubricated when the engine is not running, these SR are modified by a Note (Note 2 for SR 3.8.1.2) to indicate that all DG starts for these Surveillances may be preceded by an engine prelube period. In addition, for SR 3.8.1.2, following prelube, a warmup period is allowed prior to loading.

For the purposes of SR 3.8.1.2 and SR 3.8.1.7 testing, the DGs are started from standby conditions. Standby conditions for a DG mean that the diesel is shutdown but is ready for either a manual or automatic start signal and is ready to pickup the required safety related loads. For SR 3.8.1.2 and SR 3.8.1.7 testing, the diesel should be started from ambient conditions which means the diesel engine is cold or at a temperature consistent with manufacturer's recommendations. 1

The DG shall start using one of the following signals: 1) Manual, 2) Simulated or actual safeguards bus undervoltage, 3) Safety Injection simulated or actual signal in conjuction with a simulated or actual loss of offsite power signal, or 4) a Safety Injection simulated or actual signal by itself.

For SR 3.8.1.2, in order to reduce stress and wear on diesel engines, the manufacturer recommends a modified start in which the starting speed of DGs is limited, warmup is limited to this lower speed, and the DGs are gradually accelerated to synchronous speed prior to loading. These start procedures are the intent of Note 3.

SR 3.8.1.7 requires that, at a 184 day Frequency, the DG starts from standby conditions, accelerates to 441 RPM, and achieves required voltage and frequency within 10 seconds. The 10 second start requirement supports the assumptions of the design basis LOCA analysis in the FSAR, Chapter 15 (Ref. 5).

The 10 second start requirement is not applicable to SR 3.8.1.2 (see Note 3) when a modified start procedure as described above is used. If a modified start is not used, the 10 second start requirement of SR 3.8.1.7 applies.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.2 and SR 3.8.1.7 (continued)

Since SR 3.8.1.7 requires a 10 second start, it is more restrictive than SR 3.8.1.2, and it may be performed in lieu of SR 3.8.1.2. This is the intent of Note 1 of SR 3.8.1.2.

In addition to the SR requirements, the time for the DG to reach steady state operation, unless the modified DG start is employed, is periodically monitored and the trend evaluated to identify degradation of governor and voltage regulator performance. 3

The 31 day Frequency for SR 3.8.1.2, is consistent with Regulatory Guide 1.9 (Ref. 3) and Generic Letter 94-01 (Ref. 14). The 184 day Frequency for SR 3.8.1.7 is a reduction in cold testing consistent with Generic Letter 84-15 (Ref. 7). These Frequencies provide adequate assurance of DG OPERABILITY, while minimizing degradation resulting from testing.

SR 3.8.1.3

This Surveillance verifies that the DGs are capable of synchronizing with the offsite electrical system and accepting loads greater than or equal to the equivalent of the maximum expected accident loads. A minimum run time of 60 minutes is required to stabilize engine temperatures, while minimizing the time that the DG is connected to the offsite source.

Although no power factor requirements are established by this SR, the DG is normally operated at a power factor between 0.8 lagging and 1.0. The 0.8 value is the design rating of the machine, while the 1.0 is an operational limitation to ensure circulating currents are minimized. The load band is provided to avoid routine overloading of the DG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY.

The 31 day Frequency for this Surveillance is consistent with Regulatory Guide 1.9 (Ref. 3) and Generic Letter 94-01 (Ref. 14).

This SR is modified by four Notes. Note 1 indicates that diesel engine runs for this Surveillance may include gradual loading, as recommended by the manufacturer, so that mechanical stress and wear on the diesel engine are minimized. Note 2 states that momentary transients, because of changing bus loads, do not invalidate this test. Note 3 indicates that this Surveillance should be conducted on only one DG at a time in order to avoid common cause failures that might result from offsite circuit or grid perturbations. Note 4 stipulates a prerequisite requirement for performance of this SR. A successful DG start must precede this test to credit satisfactory performance.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.4

This SR provides verification that the level of fuel oil in the day tank is at or above the required level. The level is expressed as an equivalent volume in gallons, and is selected to ensure adequate fuel oil for a minimum of 1 hour of DG operation at full load plus 10% (562 gallons) plus 878 gallons which is credited in TS 3.8.3 in meeting the 7 day fuel oil storage requirement.

The 31 day Frequency is adequate to assure that a sufficient supply of fuel oil is available, since low level alarms are provided and facility operators would be aware of any large uses of fuel oil during this period.

SR 3.8.1.5

Microbiological fouling is a major cause of fuel oil degradation. There are numerous bacteria that can grow in fuel oil and cause fouling, but all must have a water environment in order to survive. Removal of water from the fuel oil day tanks once every 31 days eliminates the necessary environment for bacterial survival. This is the most effective means of controlling microbiological fouling. In addition, it eliminates the potential for water entrainment in the fuel oil during DG operation. Water may come from any of several sources, including condensation, ground water, rain water, contaminated fuel oil, and breakdown of the fuel oil by bacteria. Frequent checking for and removal of accumulated water minimizes fouling and provides data regarding the watertight integrity of the fuel oil system. The Surveillance Frequencies are established by Regulatory Guide 1.137 (Ref. 10). This SR is for preventative maintenance. The presence of water does not necessarily represent failure of this SR, provided the accumulated water is removed during the performance of this Surveillance.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.6

This Surveillance demonstrates that each required fuel oil transfer pump operates and transfers fuel oil from its associated storage tank to its associated day tank. This is required to support continuous operation of standby power sources. This Surveillance provides assurance that the fuel oil transfer pump is OPERABLE, the fuel oil piping system is intact, the fuel delivery piping is not obstructed, and the controls and control systems for automatic fuel transfer systems are OPERABLE.

The frequency of 92 days is adequate to verify proper automatic operation of the fuel transfer pumps to maintain the required volume of fuel oil in the day tanks. This frequency corresponds to the testing requirements for pumps as contained in the ASME Code, Section XI (Ref. 11).

SR 3.8.1.7

See SR 3.8.1.2.

SR 3.8.1.8

Transfer of each 6.9 kV ESF bus power supply from the normal offsite circuit to the alternate offsite circuit demonstrates the OPERABILITY of the alternate circuit distribution network to power the shutdown loads. The 18 month Frequency of the Surveillance is based on engineering judgment, taking into consideration the unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by a Note. The reason for the Note is that, during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g. post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.8 (continued)

when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when the Surveillance is performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment.

SR 3.8.1.9

Each DG is provided with an engine overspeed trip to prevent damage to the engine. Recovery from the transient caused by the loss of a large load could cause diesel engine overspeed, which, if excessive, might result in a trip of the engine. This Surveillance demonstrates the DG load response characteristics and capability to reject the largest single load without exceeding predetermined voltage and frequency and while maintaining a specified margin to the overspeed trip. The single largest motor load on the bus at any given time is the Component Cooling Water pump load which has a name plate rating of 783 KW. This Surveillance may be accomplished by:

a. Tripping the DG output breaker with the DG carrying greater than or equal to its associated single largest post-accident load while paralleled to offsite power, or while solely supplying the bus; or

b. Tripping its associated single largest post-accident load with the DG solely supplying the bus.

As required by IEEE-308 (Ref. 12), the load rejection test is acceptable if the increase in diesel speed does not exceed 75% of the difference between synchronous speed and the overspeed trip setpoint, or 15% above synchronous speed, whichever is lower.

The time, voltage, and frequency tolerances specified in this SR are derived from Regulatory Guide 1.9 (Ref. 3) recommendations for response during load sequence intervals. The 3 seconds specified is equal to 60% of a typical 5 second load sequence interval associated with sequencing of the largest load. The voltage and frequency specified are consistent with the design range of the equipment powered by the DG. SR 3.8.1.9.a corresponds to the maximum frequency excursion, while SR 3.8.1.9.b is a steady state voltage value to which the system must recover following load rejection. The 18 month Frequency is consistent with the recommendation of Regulatory Guide 1.108 (Ref. 9).

This SR is modified by a Note. The reason for the Note is that, during

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.9 (continued)

operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g. post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when the Surveillance is performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment.

SR 3.8.1.10

This Surveillance demonstrates the DG capability to reject a full load without overspeed tripping or exceeding the predetermined voltage limits. The DG full load rejection may occur because of a system fault or inadvertent breaker tripping. This Surveillance ensures proper engine generator load response under the simulated test conditions. This test simulates the loss of the total connected load that the DG experiences following a full load rejection and verifies that the DG does not trip upon loss of the load. These acceptance criteria provide for DG damage protection. While the DG is not expected to experience this transient during an event and continues to be available, this response ensures that the DG is not degraded for future application, including reconnection to the bus if the trip initiator can be corrected or isolated.

The 18 month Frequency is consistent with the recommendation of Regulatory Guide 1.9 (Ref.3) and is intended to be consistent with expected fuel cycle lengths.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.11

As required by Regulatory Guide 1.9 (Ref.3), this Surveillance demonstrates the as designed operation of the standby power sources during loss of the offsite source. This test verifies all safety functions encountered from the loss of offsite power, including shedding of the nonessential loads, energization of the emergency buses in ≤ 10 seconds after auto-start signal, and energization of the respective loads from the DG. It further demonstrates the capability of the DG to automatically maintain the required steady state voltage and frequency. | 4

The DG autostart time of 10 seconds is derived from requirements of the accident analysis to respond to a design basis large break LOCA. The Surveillance should be continued for a minimum of 5 minutes in order to demonstrate that all starting transients have decayed and stability is achieved.

The requirement to verify the connection and power supply of permanent and autoconnected loads is intended to satisfactorily show the relationship of these loads to the DG loading logic. In certain circumstances, many of these loads cannot actually be connected or loaded without undue hardship or potential for undesired operation. For instance, Emergency Core Cooling Systems (ECCS) injection valves are not desired to be stroked open, or high pressure injection systems are not capable of being operated at full flow, or residual heat removal (RHR) systems performing a decay heat removal function are not desired to be realigned to the ECCS mode of operation. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG systems to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions. Standby conditions for a DG mean that the diesel is shutdown but is ready for either a manual or automatic start signal and is ready to pickup the required safety related loads. To minimize degradation resulting from testing, Diesel Generators may have the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations prior to DG start. The reason for Note 2 is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical | 1

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.11 (continued)

distribution system, and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g. post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1 or 2. Risk insights or deterministic methods may be used for the assessment.

SR 3.8.1.12

This Surveillance demonstrates that the DG automatically starts, achieves and maintains the required voltage and frequency within the specified time (10 seconds) from the safety injection signal and operates for ≥ 5 minutes. The 5 minute period provides sufficient time to demonstrate stability.

The Frequency of 18 months takes into consideration unit conditions required to perform the Surveillance and is intended to be consistent with the expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by a Note. The reason for the Note is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions. Standby conditions for a DG mean that the diesel is shutdown but is ready for either a manual or automatic start signal and is ready to pickup the required safety related loads. To minimize degradation resulting from testing, Diesel Generators may have the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations prior to DG start. 1

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.13

This Surveillance demonstrates that DG noncritical protective functions (e.g., high jacket water temperature) are bypassed on a DG emergency start which occurs from either a loss of voltage or an SI actuation test signal. The noncritical trips are bypassed during DBAs and provide an alarm on an abnormal engine condition. This alarm provides the operator with sufficient time to react appropriately. The DG availability to mitigate the DBA is more critical than protecting the engine against minor problems that are not immediately detrimental to emergency operation of the DG. 5

The 18 month Frequency is based on engineering judgment, taking into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.8.1.14

Regulatory Guide 1.9 (Ref. 3), requires demonstration once per 18 months that the DGs can start and run continuously at full load capability for an interval of not less than 24 hours, ≥ 2 hours of which is at a load equivalent to approximately 110% of the continuous duty rating and the remainder of the time at a load equivalent to 90% to 100% of the continuous duty rating of the DG. For the purposes of the 2 hour run, the minimum load is approximately 110% of the 6300 kW maximum design load in lieu of the 7000 kW continuous rating. The DG start for this Surveillance can be performed either from ambient or hot conditions. The provisions for prelubricating and warmup, discussed in SR 3.8.1.2, and for gradual loading, discussed in SR 3.8.1.3, are applicable to this SR. 4

The load band is provided to avoid routine overloading of the DG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY.

The 18 month Frequency is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This Surveillance is modified by a Note which states that momentary transients due to changing bus loads do not invalidate this test.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.15

This Surveillance demonstrates that the diesel engine can restart from a hot condition, such as subsequent to shutdown from normal Surveillances, and achieve the required voltage and frequency within 10 seconds. The 10 second time is derived from the requirements of the accident analysis to respond to a design basis large break LOCA. The 18 month Frequency is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 3).

The generator voltage shall be between 6480 V and 7150 V and frequency shall be 60± 1.2 Hz within 10 seconds after the start signal; the steady state generator voltage and frequency shall be maintained within these limits during this test.

This SR is modified by two Notes. Note 1 ensures that the test is performed with the diesel sufficiently hot. The load band is provided to avoid routine overloading of the DG. Routine overloads may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY. The requirement that the diesel has operated for at least 2 hours at full load conditions prior to performance of this Surveillance is based on manufacturer recommendations for achieving hot conditions. Momentary transients due to changing bus loads do not invalidate this test. Note 2 allows all DG starts to be preceded by an engine prelube period to minimize wear and tear on the diesel during testing.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.16

As required by Regulatory Guide 1.9 (Ref. 3) this Surveillance ensures that the manual synchronization and automatic load transfer from the DG to the offsite source can be made and the DG can be returned to ready to load status when offsite power is restored. It also ensures that the autostart logic is reset to allow the DG to reload if a subsequent loss of offsite power occurs. The DG is considered to be in ready to load status when the DG is at rated speed and voltage, the output breaker is open and can receive an autoclose signal on bus undervoltage, and the load sequence timers are reset. | 4

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(6), and takes into consideration unit conditions required to perform the Surveillance.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g. post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when the Surveillance is performed in MODE 1 or 2. Risk insights or deterministic methods may be used for this assessment. |

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.17

Demonstration of the test mode override ensures that the DG availability under accident conditions will not be compromised as the result of testing and the DG will automatically reset to ready to load operation if a LOCA actuation signal is received during operation in the test mode. Ready to load operation is defined as the DG running at rated speed and voltage with the DG output breaker open. These provisions for automatic switchover are consistent with IEEE-308 (Ref. 13).

The intent of the requirement to automatically energize the emergency loads with offsite power is to show that the emergency loading was not affected by the DG operation in test mode. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the emergency loads to perform these functions is acceptable.

This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The 18 month Frequency is consistent with the recommendations of Regulatory Guide 1.9 (Ref.3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g. post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1 or 2. Risk insights or deterministic methods may be used for the assessment.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.18

Under accident and loss of offsite power conditions loads are sequentially connected to the bus by the automatic load sequencer. The sequencing logic controls the permissive and starting signals to motor breakers to prevent overloading of the DGs due to high motor starting currents. The 10% load sequence time interval tolerance ensures that sufficient time exists for the DG to restore frequency and voltage prior to applying the next load and that safety analysis assumptions regarding ESF equipment time delays are not violated. Reference 2 provides a summary of the automatic loading of ESF buses.

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(2), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g. post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1 or 2. Risk insights or deterministic methods may be used for the assessment.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.19

In the event of a DBA coincident with a loss of offsite power, the DGs are required to supply the necessary power to ESF systems so that the fuel, RCS, and containment design limits are not exceeded.

This Surveillance demonstrates the DG operation, as discussed in the Bases for SR 3.8.1.11, during a loss of offsite power actuation test signal in conjunction with an SI actuation signal. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

The Frequency of 18 months takes into consideration unit conditions required to perform the Surveillance and is intended to be consistent with an expected fuel cycle length of 18 months.

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions. Standby conditions for a DG mean that the diesel is shutdown but is ready for either a manual or automatic start signal and is ready to pickup the required safety related loads. To minimize degradation resulting from testing, Diesel Generators may have the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations prior to DG start. The reason for Note 2 is that the performance of the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g. post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1 or 2. Risk insights or deterministic methods may be used for the assessment. 1

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.20

This Surveillance demonstrates that the DG starting independence has not been compromised. Also, this Surveillance demonstrates that each engine can achieve proper speed (441 rpm) within the specified time when the DGs are started simultaneously.

The 10 year Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9).

This SR is modified by a Note. The reason for the Note is to minimize wear on the DG during testing. For the purpose of this testing, the DGs must be started from standby conditions. Standby conditions for a DG mean that the diesel is shutdown but is ready for either a manual or automatic start signal and is ready to pickup the required safety related loads. To minimize degradation resulting from testing, Diesel Generators may have the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations prior to DG start. 1

SR 3.8.1.21 and SR 3.8.1.22

These SRs ensure the proper functioning of the safety injection and blackout sequencers.

SR 3.8.1.21 applies to the blackout sequencer input undervoltage relays. These relays are calibrated every 18 months.

SR 3.8.1.22 applies to the Solid State Safeguards Sequencers (both the Safety Injection Sequencer and the Blackout Sequencer) and is the performance of a TADOT. This surveillance is performed every 31 days.

This SR is modified by two Notes. The first Note excludes verification of setpoints from the TADOT. The trip setpoints are verified by as part of the ESF Instrumentation. The second Note excludes actuation of final devices. Operation of the sequencer during power operations could disrupt normal operation and induce a plant transient.

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BASES (continued)

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.
2. FSAR, Chapter 8.
3. Regulatory Guide 1.9 Rev 3, July 1993.
4. FSAR, Chapter 6.
5. FSAR, Chapter 15.
6. Regulatory Guide 1.93, Rev. 0, December 1974.
7. Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," July 2, 1984.
8. 10 CFR 50, Appendix A, GDC 18.
9. Regulatory Guide 1.108, Rev. 1, August 1977.
10. Regulatory Guide 1.137, January 1978.
11. ASME, Boiler and Pressure Vessel Code, Section XI.
12. IEEE Standard 308-1974.
13. IEEE Standard 387-1977
14. Generic Letter 94-01, "Removal of Accelerated Testing and Special Reporting Requirements for Emergency Diesel Generators," May 31, 1994.
15. ANSI C84.1