E. ENVIRONMENTAL CONSIDERATION

APS has determined that the proposed amendment involves no changes in the amount or type of effluent that may be released offsite, and results in no increase in individual or cumulative occupational radiation exposure. As described above, the proposed TS amendment involves no significant hazards consideration and, as such, meets the eligibility criteria for categorical exclusion set forth in 10CFR 51.22(c)(9).

F. REVISED TECHNICAL SPECIFICATION PAGES

Unit 1, 2, and 3: Pages 3.3.7-3 and 3.8.1-5

G. RETYPED TECHNICAL SPECIFICATION PAGES

Unit 1, 2, and 3: Pages 3.3.7-3 and 3.8.1-5

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.7.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.7.2	Perform CHANNEL FUNCTIONAL TEST.	18 months
SR 3.3.7.3	Perform CHANNEL CALIBRATION with setpoint Allowable Values as follows: a. Degraded Voltage Function ≥ 3697 V and ≤ 3786 V Time delay: ≤ 35 seconds at 3744 V; and b. Loss of Voltage Function ≥ 3250 V Time delay: ≤ 1.4 seconds at 2929.5 V.	18 months

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. Electrical Distribution System input voltage less than limits.	G.1 Block one train of fast bus transfer AND G.2.1 Block the opposite train of fast bus transfer OR G.2.2.1 Start, load and separate the opposite train DG from offsite power AND G.2.2.2 Restore Electrical Distribution System input voltage to within limits	1 hour 2 hours 2 hours 72 hours
H. Required Action and Associated Completion Time of Condition A, B, C, D, E, F, or G not met.	H.1 Be in MODE 3. AND H.2 Be in MODE 5.	6 hours 36 hours
I. Three or more required AC sources inoperable.	I.1 Enter LCO 3.0.3.	Immediately

INSERT 1

Insert for TS 3.8.1, Condition G

INSERT 1

G.	One or more required offsite circuit(s) do not meet required capability.	G.1 Restore required capability of the offsite circuit(s). OR ----------NOTE---------- Enter LCO 3.8.1 Condition A or C for required offsite circuit(s) inoperable. ---------- G.2 Transfer the ESF bus(es) from the offsite circuit(s) to the EDG(s).	1 hour 1 hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.3.7.1	Perform CHANNEL CHECK.	12 hours
SR 3.3.7.2	Perform CHANNEL FUNCTIONAL TEST.	18 months
SR 3.3.7.3	Perform CHANNEL CALIBRATION with setpoint Allowable Values as follows: a. Degraded Voltage Function ≥ 3697 V and ≤ 3786 V Time delay: ≤ 35 seconds; and b. Loss of Voltage Function Time delay: ≤ 2.4 seconds at 0 V.	18 months

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. One or more required offsite circuit(s) do not meet required capability.	G.1 Restore required capability of the offsite circuit(s). OR ----------NOTE---------- Enter LCO 3.8.1 Condition A or C for required offsite circuit(s) inoperable. ---------- G.2 Transfer the ESF bus(es) from the offsite circuit(s) to the EDG(s).	1 hour 1 hour
H. Required Action and Associated Completion Time of Condition A, B, C, D, E, F, or G not met.	H.1 Be in MODE 3. AND H.2 Be in MODE 5.	6 hours 36 hours
I. Three or more required AC sources inoperable.	I.1 Enter LCO 3.0.3.	Immediately

ENCLOSURE 2

Revised Technical Specification Bases

B 3.3 INSTRUMENTATION

B 3.3.7 Diesel Generator (DG) – Loss of Voltage Start (LOVS)

BASES

BACKGROUND

The DGs provide a source of emergency power when offsite power is either unavailable or insufficiently stable to allow safe unit operation. Undervoltage protection will generate a LOVS in the event a Loss of Voltage (LOV) or Degraded Voltage (DV) condition occurs. There is one LOVS for each 4.16 kV vital bus.

INSERT 1 →

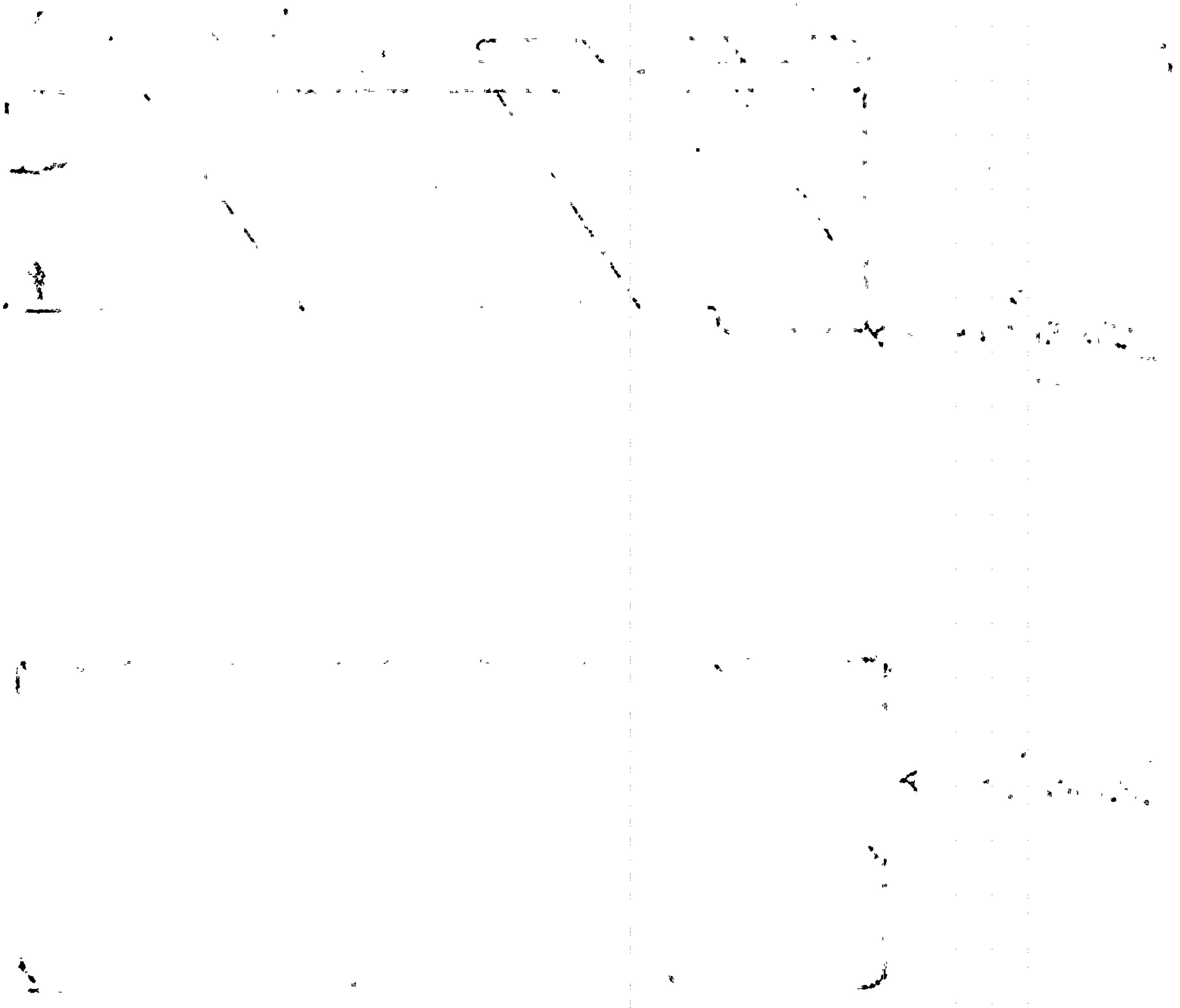
Four solid-state degraded voltage relays and four undervoltage relays with inverse time characteristics are provided on each 4.16 kV Class 1E instrument bus for the purpose of detecting a sustained undervoltage condition or a loss of bus voltage, respectively. The Loss Of Voltage relays generate a LOVS if the voltage is below 70% for a short time or below 78% for a longer time. The Degraded Voltage relays generate a LOVs if voltage is below 90% for a long time. The Balance of Plant Engineered Safety Features Activation System (BOP ESFAS) Loss of Power/Load Shed (LOP/LS) module receives inputs from the LOV and DV relays. The LOP/LS module has four channels, each of the channels has one LOV input and one DV input. If either a LOV or DV signal is received in that channel, the channel trips. If any 2 of the 4 channels trip, a signal is sent to the BOP ESFAS Diesel Generator Start Signal (DGSS) module starting the diesel. The LOVS initiated actions are described in "Onsite Power Systems" (Ref. 1).

Trip Setpoints and Allowable Values

INSERT 2 →

The trip setpoints and Allowable Values are based on the analytical limits presented in "Onsite Power Systems," Reference 1. The selection of these trip setpoints is such that adequate protection is provided when all sensor and processing time delays are taken into account. To allow for calibration tolerances, instrumentation uncertainties, and instrument drift, Allowable Values specified in SR 3.3.7.3 are conservatively adjusted with respect to the analytical limits. A detailed description of the methodology used to calculate the trip setpoints, including their explicit uncertainties, is provided in Reference 3. The actual nominal trip setpoint is normally still more

(continued)



Insert for TS Bases 3.3.7, Background

INSERT 1

Four solid-state relays and four induction disk relays are provided on each 4.16 kV Class 1E bus for the purpose of detecting a sustained degraded voltage or a loss of bus voltage condition, respectively. The protective function of the Degraded Voltage Relays is maintained by assuring that they always actuate when voltage is ≤3697 V. To prevent spurious actuations, the Degraded Voltage Relays will not actuate when voltage is >3786 V. The time delay for the Degraded Voltage Relays is a maximum of 35 seconds and is not affected by the voltage level at which they are actuated. The Loss of Voltage Relays actuate at a lower voltage. Their time delay varies depending on the voltage level, the lower the voltage, the shorter the time delay. The primary function of the Loss of Voltage Relays is to trip in 2.4 seconds or less for a complete loss of voltage condition.

INSERT 2

Based on the trip setpoint, Calculation 13-EC-PB-202 (Ref. 5) establishes allowable minimum dropout and maximum reset values for the Degraded Voltage Relays, taking into account calibration tolerances, instrumentation uncertainties, and instrument drift. Maintaining the minimum dropout voltage (≥3697 V and ≤3786 V) ensures protection during sustained degraded voltage conditions. Maintaining the maximum reset voltage (approximately 3805 V, Ref. 6) prevents spurious actuation during analyzed conditions. Calculations 01, 02, 03-EC-MA-221 (Ref. 6) verify that the voltage will recover above the maximum reset value following the most adverse accident loading scenario, and that the relays will not actuate during the transient period of automatic load sequencing.

BASES

BACKGROUND

Trip Setpoints and Allowable Values (continued)

conservative than that required by the plant specific setpoint calculations. If the measured trip setpoint does not exceed the documented Surveillance acceptance criteria, the undervoltage relay is considered OPERABLE.

Setpoints in accordance with the Allowable Values will ensure that the consequences of accidents will be acceptable, providing the plant is operated from within the LCOs at the onset of the accident and the equipment functions as designed.

The undervoltage protection scheme has been designed to protect the plant from spurious trips caused by the offsite power source. A complete loss of offsite power will result in approximately a 2 second delay in LOVS actuation. The DG starts and is available to accept loads within a 10 second time interval on the Engineered Safety Features Actuation System (ESFAS) or LOVS. Emergency power is established within the maximum time delay assumed for each event analyzed in the accident analysis (Ref. 2).

Since there are four protective channels in a two-out-of-four trip logic for each division of the 4.16 kV power supply, no single sensor failure will cause or prevent protective system actuation.

APPLICABLE SAFETY ANALYSES

The DG-LOVS is required for Engineered Safety Features (ESF) systems to function in any accident with a loss of offsite power. Its design basis is that of the ESFAS.

(continued)

[redacted]

BASES

SURVEILLANCE REQUIREMENTS

SR 3.3.7.2 (continued)

The as found and as left values must also be recorded and reviewed for consistency.

SR 3.3.7.3

SR 3.3.7.3 is the performance of a CHANNEL CALIBRATION every 18 months. The CHANNEL CALIBRATION verifies the accuracy of each component within the instrument channel. This includes calibration of the Loss of Voltage and Degraded Voltage relays and demonstrates that the equipment falls within the specified operating characteristics defined by the manufacturer. The Surveillance verifies that the channel responds to a measured parameter within the necessary range and accuracy. CHANNEL CALIBRATION leaves the channel adjusted to account for instrument drift between successive surveillances to ensure the instrument channel remains operational. CHANNEL CALIBRATIONS must be performed consistent with the plant specific setpoint analysis. Any setpoint adjustment shall be consistent with the assumptions of the current plant specific setpoint analysis.

The as found and as left values must also be recorded and reviewed for consistency.

The setpoints, as well as the response to a Loss of Voltage and Degraded Voltage test, shall include a single point verification that the trip occurs within the required delay time, as shown in Reference 1. The Frequency is based upon the assumption of an 18 month calibration interval for the determination of the magnitude of equipment drift in the setpoint analysis.

REFERENCES

1. UFSAR, Section 8.3
2. UFSAR, Chapter 15.
3. Controlled Dwg. Relay Setpoint Sheets.
4. 10 CFR 50, Appendix A, GDC 21.

INSERT 1

Insert for TS Bases 3.3.7, References

INSERT 1

5. Calculation 13-EC-PB-202

6. Calculations 01, 02, 03-EC-MA-221

BASES

BACKGROUND (continued)

The onsite standby power source for each 4.16 Kv ESF bus is a dedicated DG. DG-A and DG-B are dedicated to ESF buses PBA-S03 and PBB-S04, respectively. A DG starts automatically (in emergency mode) on a safety injection actuation signal (SIAS) (i.e., low pressurizer pressure or high containment pressure signals), auxiliary feedwater actuation signals (AFAS-1 and AFAS-2) (e.g., low steam generator level), or on a loss of power (an ESF bus degraded voltage or undervoltage signal). After the DG has started, it will automatically tie to its respective bus after offsite power is tripped as a consequence of ESF bus undervoltage or degraded voltage, independent of or coincident with a SIAS or AFAS signal. Following the loss of offsite power, the sequencer sheds 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. The DGs will also start and operate in the standby mode (running unloaded) without tying to the ESF bus on a SIAS or AFAS.

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

Certain required unit loads are returned to service in a predetermined sequence in order to prevent overloading the DG in the process. Within 40 seconds after the initiating signal is received, all loads needed to recover the unit or maintain it in a safe condition are returned to service.

Ratings for Train A and Train B DGs satisfy the requirements of Regulatory Guide 1.9 (Ref. 3). The continuous service rating of each DG is 5500 Kw with 10% overload permissible for up to 2 hours in any 24 hour period. The ESF loads that are powered from the 4.16 Kv ESF buses are listed in the updated FSAR, Chapter 8 (Ref. 2).

INSERT 1 →

(continued)

Insert for TS Bases 3.8.1, Background

INSERT 1

Offsite power sources must have the capability to effect a safe shutdown and to mitigate the effects of an accident as specified in Regulatory Guide 1.93 (Ref. 6). As a result of certain anticipated operational occurrences (AOOs) and design basis accidents (DBAs), the voltage to ESF buses PBA-S03 and PBB-S04 would change as a result of one or more of the following three automatic operations: (1) tripping of the generating unit, (2) fast bus transfer of the non-Class 1E distribution system to the startup transformers, and (3) powering of the ESF loads by the automatic load sequencer. Analyses have been performed to determine the magnitude of voltage change due to each of these operations. Under conditions where these voltage changes would result in either inadequate voltages to the ESF equipment or tripping of the degraded voltage relays, the guidance from Regulatory Guide 1.93 (Ref. 6) is not met and the affected offsite circuit(s) do not meet their required capability.

Tripping of a Palo Verde unit can result in either a decrease or increase in the switchyard voltage due to the change in the flow of volt-amperes reactive (VARs) into or out of the electrical grid. The maximum voltage change (following the trip of the only operating unit) has been determined analytically. This analysis bounds the condition of one 525 kV line out of service and no Palo Verde unit on line during the event (assumes unit trip at the beginning of the event). In that case, tripping of the unit results in loss of local switchyard voltage control, and the switchyard voltage has more latitude to change than it would with one or both of the other Palo Verde units remaining on line. When generating power, the Palo Verde units provide automatic regulation of the switchyard voltage.

If an accident results in a loss of local switchyard voltage control (last operating unit loses capability to regulate switchyard voltage) and more than one 525 kV transmission line is out of service, the condition is not bounded by the transmission system studies. Therefore, the post-trip switchyard voltage is indeterminate, and it must be considered that both offsite circuits do not meet their required capability.

Voltage analyses also conclude that the maximum switchyard voltage should not exceed 535.5 kV. However, even if this limit is exceeded, the offsite circuits still have the capability to effect a safe shutdown, mitigate the effects of an accident, and continue to meet the operability requirements of Regulatory Guide 1.93 (Ref. 6). Although sustained overvoltages can cause accelerated aging of electrical equipment, this would not cause catastrophic equipment failure or unavailability. Furthermore, an overvoltage condition can be corrected quickly by adjustment of the MVAR output of the Palo Verde generator(s). Therefore, there is no LCO for high switchyard voltage.

INSERT 1 (continued)

Grid frequency can also affect the operation of safety equipment. For example, high frequency can result in an excessive differential pressure across motor operated valves, and low frequency can result in substandard pump flow. There are no LCOs for offsite circuit frequency, because the grid frequency is continuously monitored and maintained within a tight tolerance by non-Palo Verde organizations. These organizations utilize various automatic and manual methods to control frequency, such as maintaining a spinning reserve, load shedding, and turbine-governor controls. Analyses, as documented in UFSAR Appendix 8B (Ref. 2), and operating experience have demonstrated that the tripping of a Palo Verde unit has a minimal effect on grid frequency.

BASES INSERT B

ACTIONS

A.1

To ensure a highly reliable power source remains with the 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.

A.2

Required Action A.2, which only applies if the train (i.e., ESF bus) 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 require Class 1E power from PBA-S03 or PBB-S04 ESF buses to be OPERABLE, and include: charging pumps; radiation monitors Train A RU-29 and Train B RU-30 (TS 3.3.9), Train A RU-31 and Train B RU-145; pressurizer heaters (TS 3.4.9); ECCS (TS 3.5.3 and TS 3.5.4); containment spray (TS 3.6.6); containment isolation valves NCA-UV-402, NCB-UV-403, WCA-UV-62, and WCB-UV-61 (TS 3.6.3); containment hydrogen monitors (TS 3.3.10); hydrogen recombiners (TS 3.6.7); auxiliary feedwater system (TS 3.7.5); essential cooling water system (TS 3.7.7); essential spray pond system (TS 3.7.8); essential chilled water system (TS 3.7.10); control room essential filtration system (TS 3.7.11); control room emergency air temperature control system (TS 3.7.12); ESF pump room air exhaust cleanup system (TS 3.7.13); shutdown cooling subsystems (TS 3.4.6, 3.4.7, 3.4.8, and 3.4.15); and fuel building ventilation. Mode applicability is as specified in each appropriate TS section.

(continued)

Insert for TS Bases 3.8.1, Actions

INSERT 1

Condition A applies only when the offsite circuit is unavailable to commence automatic load sequencing in the event of a design basis accident (DBA). In cases where the offsite circuit is available for sequencing, but a DBA could cause actuation of the Degraded Voltage Relays, Condition G applies.

BASES

ACTIONS

C.1 and C.2 (continued)

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. 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 Regulatory Guide 1.93 (Ref. 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.

INSERT 1 →

(continued)

Insert for TS Bases 3.8.1, Actions

INSERT 1

Condition C applies only when the offsite circuits are unavailable to commence automatic load sequencing in the event of a design basis accident (DBA). In cases where the offsite circuits are available for sequencing, but a DBA could cause actuation of the Degraded Voltage Relays, Condition G applies.

BASES

ACTIONS (continued)

F.1 and F.2

The 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 load group. The 24 hour Completion Time provides a period of time to correct the problem commensurate with the importance of 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. Required Action F.2 is intended to provide assurance that a single failure of a DG Sequencer will not result in a complete loss of safety function of critical redundant required features.

INSERT 13 →

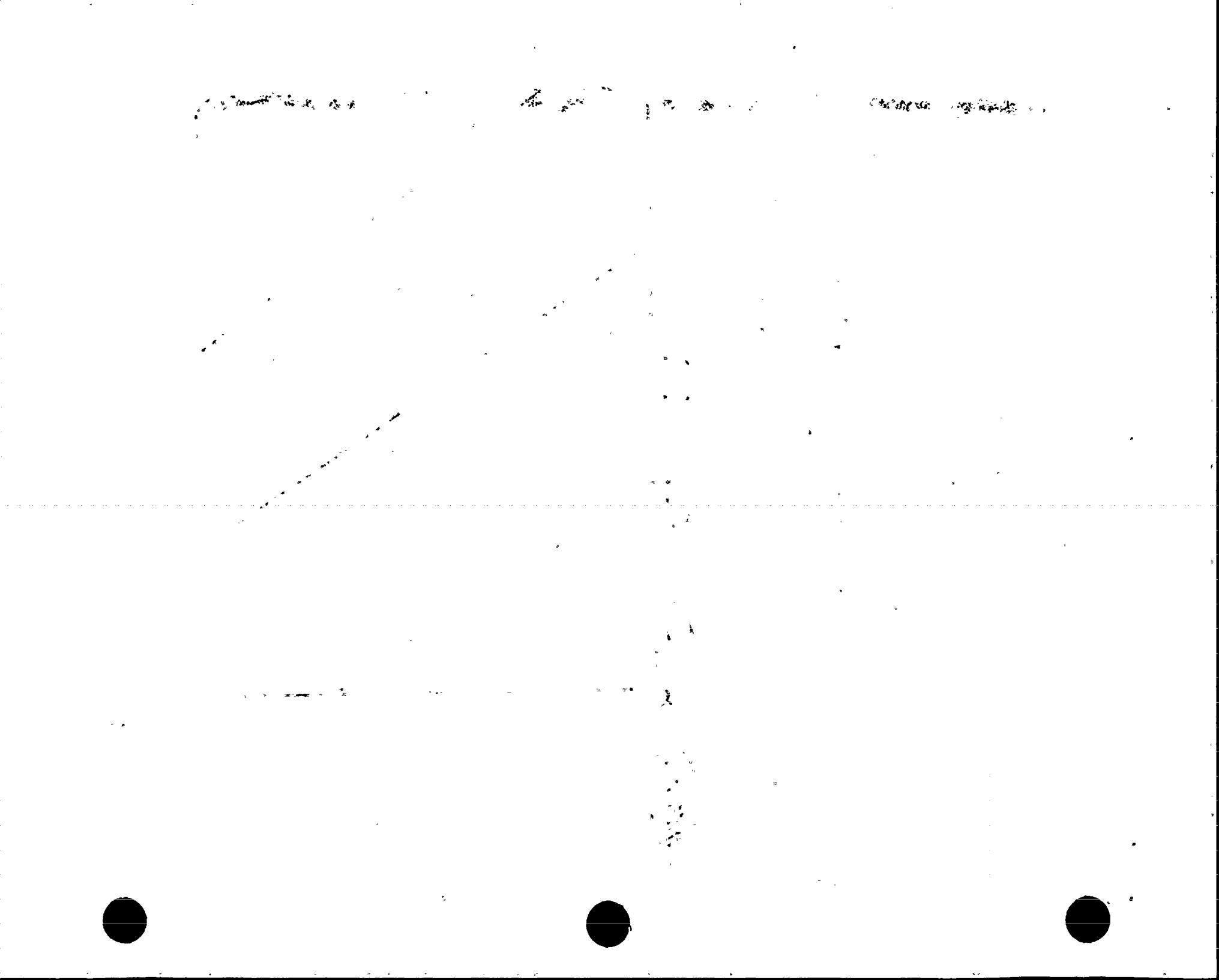
G.1 G.2.1, G.2/2.1 and G.2 2/2

To ensure adequate voltage is delivered to downstream electrical equipment, the Electrical Distribution System (EDS) requires an adequate input voltage. Failure to assure adequate input voltage, may result in double sequencing should an accident requiring sequencer operation and a Fast Bus Transfer (FBT) occur during the period of low input voltage to the EDS.

Adequate EDS voltage is assured by maintenance of switchyard voltage at or above 524 kV for Unit 1, and 518 kV for Units 2 and 3, when all three startup transformers are in service. When only two startup transformers are in service, adequate voltage is assured to all three Units by maintaining switchyard voltage at or above 525 kV. Blocking FBT ensures adequate EDS voltage by preventing the non-Class 1E House Loads from depressing the Class 1E 4.16 kV switchgear voltage.

Action G.2.1 applies only if switchgear breakers NAN-S03B and NAN-S04B are open (i.e, FBT has not yet occurred). If breakers NAN-S03B and NAN-S04B are closed (i.e., FBT has occurred) and the degraded voltage relays (DVRs) have not activated, then the LCO is met, regardless of switchyard voltage, and no action is required as the DVRs are capable

(continued)



Insert for TS Bases 3.8.1, Actions

INSERT 1

To ensure offsite circuits will not be lost as a consequence of a DBE, certain voltage and loading conditions must be maintained. Failure to maintain these conditions may result in double sequencing should an accident requiring sequencer operation occur.

The operability of the offsite circuits is assured by maintenance of their required capability of the offsite circuits. The required capability of the offsite circuits requires that a review be performed if any of the following conditions exists:

- The steady-state switchyard voltage is less than 525 kV, or
- Only one of the Palo Verde units is online and capable of regulating switchyard voltage (generator synchronized to the grid and automatic VAR control equipment in service).

If any of these conditions exist then the Post Trip Loading needs to be evaluated to determine if the offsite circuits meet the required capability. The maximum Post-Trip Loading (MVA_{MAX}) is determined using the following limit:

$$MVA_{MAX} = 2 \times (kV - 490)$$

Where kV = Post-Trip Switchyard Voltage.

The two critical parameters, Post-Trip Switchyard Voltage and Post-Trip Loading, cannot be measured prior to a unit trip. Therefore, they are derived based on the following (as applied individually to each offsite circuit):

Post-Trip Switchyard Voltage

The Post-Trip switchyard voltage is based on the following:

- With one or both of the other Palo Verde units online and available to regulate the switchyard voltage, or with the unit under consideration not capable of regulating switchyard voltage, the switchyard voltage will not change significantly following an accident in the unit under consideration. In this condition, assume a post-trip switchyard voltage equal to the measured steady-state pre-trip level. A review of the required capability of the offsite circuits is only required if the switchyard voltage is less than 525 kV. A transient excursion below the 525 kV voltage limit for 35 seconds or less does not require a review of the required capability. This is based on the credited 35 second time delay of the degraded voltage relay.

INSERT 1 (continued)

- If the unit being reviewed is the only Palo Verde unit available to regulate the switchyard voltage and all five 525 kV lines in service (Devers, Kyrene, North Gila, Westwing 1, and Westwing 2), assume a post-trip switchyard voltage of 515.4 kV.
- If the unit being reviewed is the only Palo Verde unit available to regulate the switchyard voltage and four of the five 525 kV lines in service, assume a post-trip switchyard voltage of 512 kV.
- If the unit being reviewed is the only Palo Verde unit available to regulate the switchyard voltage and less than four 525 kV lines in service, the offsite circuits do not meet their required capability.

Post-Trip Loading

Post-trip loading is the loading, in MVA (megavolt-amperes), that would be supplied by the associated startup transformer secondary winding immediately after the completion of the automatic load sequencing resulting from a LOCA or other design basis accident. The magnitude of post-trip loading is affected by several switching conditions. The loads for each of the load blocks that would be connected to the offsite circuit (i.e., startup transformer secondary winding) immediately after sequencing would be summed to determine the post-trip loading. The loads for each of the load blocks are listed in the following table:

Load Block	When Load Block Must be Included	Load (MVA)
1. Emergency loads on EPBAS03 or EPBBS04.	Always.	6
2. House loads on ENANS01 or ENANS02.	When the offsite circuit is feeding the house loads or fast bus transfer is enabled.	43 or as measured
3. Other load groups bus NBNS01 or NBNS02.	When load block 2 is included and it is feeding the other load group's NB bus via tie breaker ENBNS01C.	8 or as measured
4. Other unit's non-accident Class 1E loads on EPBAS03 or EPBBS04.	When the offsite circuit is feeding another unit's Class 1E loads.	3 or as measured
5. Water Reclamation Facility (WRF) loads on 1ENANS05 or 1ENANS06.	When the offsite circuit is feeding the WRF.	10 or as measured
6. Other common loads on 1ENANS05 or 1ENANS06.	When the offsite circuit is feeding non-WRF common loads.	3 or as measured

INSERT 1 (continued)

The formula for MVA_{MAX} is based on calculations, 01, 02, 03-EC-MA-221, which analyze many different bus alignment conditions. The load limit is conservative, with sufficient margin to account for analytical uncertainties and to provide assurance that the degraded voltage relays will not actuate as a result of an accident.

If an accident results in a loss of local switchyard voltage control (last operating unit trips), transmission system studies have concluded that the switchyard voltage will stabilize at or above the levels specified above, depending on the number of 525 kV transmission lines in service. At these switchyard voltages, post-trip loading at or below the allowed MVA_{MAX} assures that the degraded voltage relays will not actuate.

If the required capability in Condition G is not met, the effects of an AOO or DBA could cause further depression of the voltage at the ESF bus and actuation of the degraded voltage relays. These actuations would result in disconnection of the bus from the offsite circuits. Regulatory Guide 1.93 (Ref. 6) defines this condition as "The Available Offsite Power Sources Are One Less Than the LCO" or "The Available Offsite AC Power Sources Are Two Less Than the LCO," depending on the number of affected circuits. However, degraded post-trip voltage could also cause ESF electrical equipment to be exposed to a degraded condition during the degraded voltage relay time-out period. There is a risk that equipment misoperation or damage could occur during this time. In this scenario, the ESF equipment may not perform as designed following an automatic disconnection of the offsite circuits and reconnection to the diesel generators (DGs), even though adequate power is available from the DG. For certain DBAs, an additional consideration is that the initial sequencing of the ESF equipment onto the offsite circuits, subsequent tripping of the degraded voltage relays, and interruption in equipment credited in the UFSAR Chapter 6 and 15 safety analyses could challenge the credited equipment response times. Therefore, it is appropriate to implement Required Actions that are more stringent than those specified in Condition A or C.

Required Action G.1 requires restoration of the required capability of the offsite circuit(s). This could be accomplished a number of ways that include, but are not limited to, reducing the post-trip loading (e.g., block fast bus transfer or remove another load) or increase/restore switchyard voltage to an acceptable level. Required Action G.1 is applicable to all offsite circuits that do not meet the required capability. Required Action G.2 requires that the ESF bus for each offsite circuit that does not meet the required capability be loaded on the DG. With more than one offsite circuit that does not meet the required capability, Condition G could be satisfied for each offsite circuit by the use of Required Action G.1 or G.2. The Completion Time for both Required Action G.1 and G.2 is one hour. The one hour time limit is appropriate and consistent with the need to remove the unit from this condition, because the level of degradation exceeds that described in Regulatory Guide 1.93 (Ref. 6) for two offsite circuits inoperable. The regulatory guide assumes that an adequate onsite

INSERT 1 (continued)

power source is still available to both safety trains, but in a scenario involving automatic load sequencing and low voltage to the ESF buses, adequate voltage is not assured from any of the power sources for the following systems immediately after the accident signal has been generated (i.e., while the degraded voltage relay is timing out): radiation monitors Train A RU-29 or Train B RU-30 (TS 3.3.9), Train B RU-145; ECCS (TS 3.5.3); containment spray (TS 3.6.6); containment isolation valves (TS 3.6.3); auxiliary feedwater system (TS 3.7.5); essential cooling water system (TS 3.7.7); essential spray pond system (TS 3.7.8); essential chilled water system (TS 3.7.10); control room essential filtration system (TS 3.7.11); ESF pump room air exhaust cleanup system (TS 3.7.13); and fuel building ventilation.

Required Action G.2 is modified by a Note. The reason for the Note is to ensure that the offsite circuit is not inoperable for a time greater than the Completion Time allowed by LCO 3.8.1 Condition A or C. Therefore, if Conditions A or C are entered, the Completion Time clock for Conditions A and C would start at the time Condition G was entered.

BASES

ACTIONS (continued)

of determining adequate voltage at the Class 1E 4.16 KV buses. Also, if the switchyard voltage perturbation is less than 28.62 seconds, then the LCO is met and no action is required as the perturbation is less than the current, minimum time delay of the DVRs.

Starting, loading and separating the opposite train's EDG from offsite power prevents FBT from depressing the Class 1E 4.16 kV bus voltage. In addition, this configuration provides offsite power to half of the House Loads to provide forced circulation in the event of a plant trip.

Action G.2.2.1 applies only if switchgear breakers NAN-S03B and NAN-S04B are open (i.e. FBT has not yet occurred). If breakers NAN-S03B and NAN-S04B are closed (i.e., FBT has occurred) and the degraded voltage relays (DVRs) have not activated, then the LCO is met, regardless of switchyard voltage, and no action is required as the DVRs are capable of determining adequate voltage at the Class 1E 4.16 kV buses. Also, if the switchyard voltage perturbation is less than 28.62 seconds, then the LCO is met and no action is required as the perturbation is less than the current, minimum time delay of the DVRs.

(continued)

BASES

ACTIONS
(continued)

The 72 hour completion time establishes a limit on the maximum time allowed to restore adequate Electrical Distribution System (EDS) input voltage. Regulatory Guide 1.93 (Ref. 6) recognizes that under certain conditions it may be safer to continue operation at full or reduced power for a limited time than to effect an immediate shutdown based on the loss of some of the required electric power sources. Action G balances the risk of a forced shutdown against the risk of remaining at power with EDS input voltage restored by blocking Fast Bus Transfer or starting, loading, and separating EDGs from offsite power. Action G.2.1 maintains the availability of all four electric power sources, however, House Loads would not be available for forced circulation capability during plant trips. Action G.2.2.1 reduces the number of available electric power sources and maintains partial forced circulation capability.

H.1 and H.2

If the inoperable AC electrical 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 unit systems.

I.1

Condition I 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.

(continued)

ENCLOSURE 3

Revised UFSAR Pages

Table 7.3-1B

ENGINEERED SAFETY FEATURES RESPONSE TIMES

(Sheet 3 of 3)

INITIATING SIGNAL AND FUNCTION	RESPONSE TIME IN SECONDS
11. 4.16 kV Emergency Bus ~~Undervoltage (Degraded Voltage)~~ Degraded Voltage	
~~Loss of Power 90% system voltage~~ LOP	≤ 35.0
12. 4.16 kV Emergency Bus ~~Undervoltage (loss of Voltage)~~ Loss of Voltage	
~~Loss of Power~~ LOP	≤ 2.4

REVISE

TABLE NOTATIONS

a. Diesel generator starting and sequence loading delays included. Response time limit includes movement of valves and attainment of pump or blower discharge pressure.

b. Diesel generator starting delays not included. Offsite power available. Response time limit includes movement of valves and attainment of pump or blower discharge pressure.

c. MFIV valves tested at simulated operating conditions; valves tested at static flow conditions to ≤ 8.6[a]/8.6[b] seconds.

d. Radiation detectors are exempt from response time testing. The response time of the radiation signal portion of the channel shall be measured from the detector output or from the input of first electronic component in channel to closure of dampers M-HJA-M01, M-HJA-M52, M-HJB-M01 and M-HJB-M55.

e. Dampers M-HJA-M01, M-HJA-M52, M-HJB-M01, and M-HJB-M55. |9

Table 7.3-11A

ENGINEERED SAFETY FEATURES ACTUATION SYSTEM SETPOINTS AND MARGINS TO ACTUATION

Actuation Signal	Typical Full Power	Normal Operation Range	Trip Setpoint	Margin to Actuation
SIAS & CIAS				
Low pressurizer pressure	2,250 psia	2,100-2,350 psia	≥1,837 psia[a]	263 psi
High containment pressure	0 psig	0 psig	≤3 psig	3 psi
.....				
~~Loss of Power~~ LOP Loss of Voltage 4.16 kV Emergency Bus/~~Undervoltage (Loss of voltage)~~	4160 V	REVISE →	~~≥3250 V~~(g)	
Degraded Voltage 4.16 kV Emergency Bus/~~Undervoltage (Degraded voltage)~~	4160 V		3697 to 3786 V	

.....

REVISE

g. See ~~also~~ figure 8.3-10.

requirements of the safety-related loads at all onsite system distribution levels.

2. Coincident (two-out-of-four) logic is used to preclude the spurious trip of the offsite source.
3. The time delays are such that: DELETE

   - ~~The allowable time delay, including margin, does not exceed the maximum time delay that is assumed in accident analyses.~~
   - The selected time delay minimizes the ability of short duration disturbances to reduce the availability of the offsite power source(s).
   - The allowed time duration of a degraded voltage condition at all distribution system levels does not result in failure of safety systems or components.

4. The voltage sensors will automatically initiate the disconnection of offsite power sources whenever the voltage setpoint and time delay limits have been exceeded.
5. The voltage sensors are designed to satisfy the applicable requirements of IEEE Standard 279-1971, Criteria for Protection Systems for Nuclear Power Generating Stations.
6. The Technical Specifications include limiting conditions for operation, surveillance

REVISE

requirements, ~~trip setpoints with minimum and maximum limits,~~ and allowable values for the degraded voltage relay voltage and time settings.