Advanced Passive 1000 (AP1000)
Generic Technical Specification Traveler (GTST)

Title: Changes related to Section 3.8.3, Inverters - Operating

I. Technical Specifications Task Force (TSTF) Travelers, Approved Since Revision 2 of STS NUREG-1431, and Used to Develop this GTST

TSTF Number and Title:

None

STS NUREGs Affected:

NA

NRC Approval Date:

NA

TSTF Classification:

NA

II. Reference Combined License (RCOL) Standard Departures (Std. Dep.), RCOL COL Items, and RCOL Plant-Specific Technical Specifications (PTS) Changes Used to Develop this GTST

RCOL Std. Dep. Number and Title:

None

RCOL COL Item Number and Title:

None

RCOL PTS Change Number and Title:

VEGP LAR DOC D13: LCO Statement in TS 3.8.3, Inverters - Operating, is revised deleting details.

III. Comments on Relations Among TSTFs, RCOL Std. Dep., RCOL COL Items, and RCOL PTS Changes

This section discusses changes: (1) that were applicable to previous designs, but are not to the current design; (2) that are already incorporated in the GTS; and (3) that are superseded by another change.

TSTF-432, Rev. 1, Changes to Technical Specification End States, is based on Topical Report, WCAP-16294. WCAP-16294 did not consider AP1000 design and is therefore not applicable for AP1000 STS without further analyses. TSTF-432 was not considered.

IV. Additional Changes Proposed as Part of this GTST (modifications proposed by NRC staff and/or clear editorial changes or deviations identified by preparer of GTST)

Clarification of nomenclature used for Class 1E electric power distribution subsystems, consistent with VEGP LAR DOC A112.

V. Applicability

Affected Generic Technical Specifications and Bases:

Section 3.8.3 Inverters – Operating

Changes to the Generic Technical Specifications and Bases:

LCO 3.8.3 is revised deleting "(Divisions A and D, one each and Divisions B and C two each; six total)." "DC bus" and "AC instrument and control bus(es)" are respectively replaced with "DC electrical power distribution subsystems" and "AC instrument and control electric power distribution subsystem(s)."

Actions are revised to present inoperabilities of "divisions" and surveillance requirement is revised removing "buses" with "electric power distribution subsystems."

LCO Section of the Bases was revised to include the details regarding the number of inverters in each of the divisions. The terminology of "bus(es)", "divisions", "electric power distribution subsystems" are used consistently with respect to the specifications.

VI. Traveler Information

Description of TSTF changes:

NA

Rationale for TSTF changes:

NA

Description of changes in RCOL Std. Dep., RCOL COL Item(s), and RCOL PTS Changes:

RCOL PTS Change VEGP LAR DOC D13:

The change deletes descriptive information from the LCO statement. Specifically, it deletes "(Divisions A and D, one each and Divisions B and C two each; six total)" from the LCO statement. This description is added in the LCO Section of the Bases. Specifically, in the second sentence, second paragraph of LCO in the Bases, following "The six inverters," the deletion from the LCO statement is added.

Rationale for changes in RCOL Std. Dep., RCOL COL Item(s), and RCOL PTS Changes:

As described in TSTF-GG-05-01, subsection 4.1.4.a, the LCO is intended to describe, as simply as possible, the lowest functional capability or performance levels of equipment required for the safe operation of the facility. It is acceptable to generically refer to the system, subsystem, component, or parameter that is the subject of the LCO and provide the specific scope/boundaries in the Bases. In addition, TSTF-GG-05-01, subsection 3.3.1.g, recommends avoiding the overuse of parenthetical type statements within sentences, as they generally make the sentence longer, more complicated, and more difficult to understand. The proposed change to the LCO simplifies the LCO statement, is consistent with the intent of the current wording, and remains consistent with the wording of the Actions entry conditions.

The removal of these design details from the TS is acceptable because this type of information is not necessary to be included in the TS to provide adequate protection of public health and safety. TS 3.8.3 still retains a requirement for the Division A, B, C, and D inverters to be Operable. Also, this change is acceptable because these types of design details are adequately controlled in the TS Bases. Changes to the Class 1E inverter design are controlled in accordance with 10 CFR 50.59 and 10 CFR 52, Appendix D, Section VIII. Changes to the Bases are controlled by the TS Bases Control Program. This program provides for the evaluation of changes to ensure the Bases are properly controlled. This change is designated as a less restrictive removal of detail change because design details for meeting TS requirements are currently in the TS Bases.

Description of additional changes proposed by NRC staff/preparer of GTST:

In response to the RAI Letter no. 1, Question 16-16 of VEGP LAR DOC A112, VEGP agreed to clarify that both DC and AC instrument and control divisions are electrical power distribution subsystems, and to delete "bus" from the name for subsystem "AC instrument and control" to

more closely align with terminology in FSAR Chapter 8. The changes were implemented for TS 3.8.5 and TS 3.8.6. This section, TS 3.8.3, also needed similar changes.

LCO description was revised to replace "bus(es)" with "electric power distribution subsystem(s)." ACTIONS and SURVEILLANCE REQUIREMENTS were modified to use "division" or "electric power distribution subsystem," as appropriate. Correspondingly, Bases discussions were revised to use to the same terminology.

Rationale for additional changes proposed by NRC staff/preparer of GTST:

The nomenclature used for Class 1E electrical power distribution subsystems were inconsistent across different section of the TS. These inconsistencies cause confusion and could lead to erroneous interpretations. The changes made as part of VEGP LAR DOC A112 clarify that both DC and AC instrument and control divisions are electrical power distribution subsystems. Also, Actions were revised to present inoperabilities of divisions. Similar changes are made here to make this section consistent with other sections in this STS. This is acceptable as it provides clarity and consistency in the use of terminology within and across the TS sections. These changes are considered editorial in nature.

VII. GTST Safety Evaluation

Technical Analysis:

The deletion of details from the LCO statement is acceptable for AP1000 STS because such details are not necessary and can contribute to distractions. Without the details, the requirements are adequately defined and are consistent with other requirements and can be implemented without difficulty. The changes made are consistent with the current Writer's Guide.

The inclusion of details in the Bases provides explanation as needed and can be evaluated and controlled for changes under the TS Bases Control Program. The TS Bases Control Program provides for the evaluation of changes to ensure that the Bases are properly controlled. These changes simplify the LCO statement making it easier to implement while maintaining the details in the Bases. The changes are acceptable for AP1000 STS.

The remaining changes are editorial, clarifying, grammatical, or otherwise considered administrative. These changes do not affect the technical content, but improve the readability, implementation, and understanding of the requirements, and are therefore acceptable.

References to Previous NRC Safety Evaluation Reports (SERs):

None

VIII. Review Information

Evaluator Comments:

None

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Review Information:

Availability for public review and comment on Revision 0 of this traveler approved by NRC staff on Thursday, May 22, 2014.

NRC Final Approval Date:

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IX. Evaluator Comments for Consideration in Finalizing Technical Specifications and Bases

None

X. References Used in GTST

1. AP1000 DCD, Revision 19, Section 16, "Technical Specifications," June 2011 (ML11171A500).

2. Southern Nuclear Operating Company, Vogtle Electric Generating Plant, Unit 3 and 4, Technical Specifications Upgrade License Amendment Request, February 24, 2011 (ML12065A057).

3. TSTF-GG-05-01, Technical Specification Task Force (TSTF) Writer's Guide for Plant-Specific Improved Technical Specifications, Revision 1.

4. RAI Letter No. 01 Related to License Amendment Request (LAR) 12-002 for the Vogtle Electric Generating Plant Units 3 and 4 Combined Licenses, September 7, 2012 (ML12251A355).

5. Southern Nuclear Operating Company, Vogtle Electric Generating Plant, Units 3 and 4, Response to Request for Additional Information Letter No. 01 Related to License Amendment Request LAR-12-002, ND-12-2015, October 04, 2012 (ML12286A363 and ML12286A360).

6. NRC Safety Evaluation (SE) for Amendment No. 13 to Combined License (COL) No. NPF-91 for Vogtle Electric Generating Plant (VEGP) Unit 3, and Amendment No. 13 to COL No. NPF-92 for VEGP Unit 4, September 9, 2013 (ADAMS Package Accession No. ML13238A337), which contains:

ML13238A355,	Cover Letter - Issuance of License Amendment No. 13 for Vogtle Units 3 and 4 (LAR 12-002).
ML13238A359,	Enclosure 1 - Amendment No. 13 to COL No. NPF-91
ML13239A256,	Enclosure 2 - Amendment No. 13 to COL No. NPF-92
ML13239A284,	Enclosure 3 - Revised plant-specific TS pages (Attachment to Amendment No. 13)
ML13239A287,	Enclosure 4 - Safety Evaluation (SE), and Attachment 1 - Acronyms
ML13239A288,	SE Attachment 2 - Table A - Administrative Changes
ML13239A319,	SE Attachment 3 - Table M - More Restrictive Changes
ML13239A333,	SE Attachment 4 - Table R - Relocated Specifications
ML13239A331,	SE Attachment 5 - Table D - Detail Removed Changes
ML13239A316,	SE Attachment 6 - Table L - Less Restrictive Changes

The following documents were subsequently issued to correct an administrative error in Enclosure 3:

ML13277A616,	Letter - Correction To The Attachment (Replacement Pages) - Vogtle Electric Generating Plant Units 3 and 4- Issuance of Amendment Re: Technical Specifications Upgrade (LAR 12-002) (TAC No. RP9402)
ML13277A637,	Enclosure 3 - Revised plant-specific TS pages (Attachment to Amendment No. 13) (corrected)

6. TSTF-GG-05-01, "Writer's Guide for Plant-Specific Improved Technical Specifications," June 2005.

XI. MARKUP of the Applicable GTS Section for Preparation of the STS NUREG

The entire section of the Specifications and the Bases associated with this GTST is presented next.

Changes to the Specifications and Bases are denoted as follows: Deleted portions are marked in strikethrough red font, and inserted portions in bold blue font.

3.8 ELECTRICAL POWER SYSTEMS

3.8.3 Inverters – Operating

LCO 3.8.3 The Division A, B, C, and D inverters ~~(Divisions A and D, one each and Divisions B and C two each; six total)~~ shall be OPERABLE.

----------NOTES----------
One inverter may be disconnected from its associated DC ~~bus~~ **electric power distribution subsystem** for ≤ 72 hours to perform an equalizing charge on its associated battery, providing:

1. The associated instrument and control **electric power distribution subsystem**~~bus~~ is energized from its Class 1E constant voltage source transformer; and

2. All other AC instrument and control **electric power distribution subsystems**~~buses~~ are energized from their associated OPERABLE inverters.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One inverter inoperable.	A.1 ----------NOTE---------- Enter applicable Conditions and Required Actions of LCO 3.8.5 “Distribution Systems - Operating” with any instrument and control **division**~~bus~~ de-energized. ----------	
	Restore inverter to OPERABLE status.	24 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
3.8.3.1	Verify correct inverter voltage, frequency, and alignment to required AC instrument and control **electric power distribution subsystems**~~buses~~.	7 days

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.3 Inverters – Operating

BASES

BACKGROUND

The inverters are the preferred source of power for the Class 1E AC instrument and control **divisions**~~buses~~ because of the stability and reliability they achieve. Divisions A and D, each consist of one Class 1E inverter. Divisions B and C, each consist of two inverters. The function of the inverter is to convert Class 1E DC electrical power to AC electrical power, thus providing an uninterruptible power source for the instrumentation and controls for the Protection and Safety Monitoring System (PMS). The inverters are powered from the Class 1E 250 V battery sources (Ref. 1).

Under normal operation, a Class 1E inverter supplies power to the Class 1E AC instrument and control **electric power distribution subsystem**~~bus~~. If the inverter is inoperable or the Class 1E 250 VDC input to the inverter is unavailable, the Class 1E AC instrument and control **electric power distribution subsystem**~~bus~~ is powered from the backup source associated with the same division via a static transfer switch featuring a make-before-break contact arrangement. In addition, a manual mechanical bypass switch is used to provide a backup power source to the Class 1E AC instrument and control bus when the inverter is removed from service. The backup source is a Class 1E regulating 480-208/ 120 volt transformer providing a regulated output to the Class 1E AC instrument and control bus through a static transfer switch and a manual bypass switch.

In addition to powering safety loads, the Class 1E AC power sources are used for emergency lighting in the main control room and remote shutdown workstation. When a normal AC power source for emergency lighting is lost, the loads are automatically transferred to a Class 1E AC power source. Specific details on inverters and their operating characteristics are found in Chapter 8 (Ref. 1).

BASES

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) transient analyses in Chapter 6 (Ref. 2) and Chapter 15 (Ref. 3), assume engineered safety features are OPERABLE. The inverters are designed to provide the required capacity, capability, redundancy, and reliability to ensure the availability of necessary power to the PMS instrumentation and controls 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 Technical Specifications 3.2 (Power Distribution Limits), 3.4 (Reactor Coolant System), and 3.6 (Containment Systems).

The OPERABILITY of the inverters is consistent with the initial assumptions of the accident analyses and is based on meeting the design basis of the unit. This includes maintaining at least three of the four Divisions of AC instrument and control ~~buses~~ OPERABLE during accident conditions in the event of:

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

b. A worst case single failure.

Inverters are a part of distribution systems, and as such, satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The inverters ensure the availability of AC electrical power for the systems instrumentation required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA.

Maintaining the required inverters OPERABLE ensures that the redundancy incorporated into the design of the PMS instrumentation and controls is maintained. The six inverters **(Divisions A and D, one each and Divisions B and C two each; six total)** ensure an uninterruptible supply of AC electrical power to the six Class 1E AC instrument and control buses even if all AC power sources are de-energized.

OPERABLE inverters require that the Class 1E AC instrument and control **electric power distribution subsystems**~~bus~~ be powered by the inverter with output voltage and frequency within tolerances, and the power input to the inverter from a 250 VDC station battery.

BASES

LCO (continued)

This LCO is modified by a Note that allows one inverter to be disconnected from its associated Class 1E DC **electric power distribution subsystem**~~bus~~ for ≤ 72 hours, if the associated Class 1E AC instrument and control **electric power distribution subsystem** ~~bus~~ is powered from its Class 1E regulating transformer during the period and all other inverters are OPERABLE. This allows an equalizing charge to be placed on one battery bank. If the inverter was not disconnected, the resulting voltage condition might damage the inverter. These provisions minimize the loss of equipment that would occur in the event of a loss of offsite power. The 72 hour time period for the allowance minimizes the time during which a loss of offsite power could result in the loss of equipment energized from the affected Class 1E AC instrument and control bus while taking into consideration the time required to perform an equalizing charge on the battery bank.

The intent of this Note is to limit the number of inverters that may be disconnected. Only the inverter associated with the single battery bank undergoing an equalizing charge may be disconnected. All other inverters must be aligned to their associated batteries.

APPLICABILITY

The inverters 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.

Inverter requirements for MODES 5 and 6 are covered in the Bases for LCO 3.8.4, “Inverters Shutdown.”

BASES

ACTIONS

A.1

With a required inverter inoperable, its associated Class 1E AC instrument and control **division** ~~bus~~ is automatically energized from its regulating transformer. A manual switch is also provided which can be used if the static transfer switch does not properly function.

For this reason a Note has been included in Condition A requiring the entry into the Conditions and Required Actions of LCO 3.8.5, "Distribution Systems - Operating." This ensures that the **instrument and control division**~~vital bus~~ is re-energized within 12 hours.

Required Action A.1 allows 24 hours to fix the inoperable inverter and return it to service. The 24 hour time limit is based upon engineering judgment, taking into consideration the time required to repair an inverter and the additional risk to which the unit is exposed because of the inverter inoperability. This has to be balanced against the risk of an immediate shutdown, along with the potential challenges to safety systems such a shutdown might entail. When the AC instrument and control **electric power distribution subsystem** ~~bus~~ is powered from its regulating transformer, it is relying upon interruptible AC electrical power sources (offsite and onsite). The uninterruptible inverter source to the AC instrument and control **electric power distribution subsystems** ~~buses~~ is the preferred source for powering instrumentation trip setpoint devices.

B.1 and B.2

If the inoperable DC electrical power subsystem cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to MODE 5 where the probability and consequences on an event are minimized. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.3.1

This Surveillance verifies that the inverters are functioning properly with all required switches and circuit breakers closed and Class 1E AC instrument and control **electric power distribution subsystems** ~~buses~~ energized from the inverter. The verification of proper voltage and frequency output ensures that the required power is readily available for the PMS instrumentation connected to the Class 1E AC instrument and control buses. The 7 day Frequency takes into account the effectiveness of the voltage and frequency instruments, the redundant capability of the inverters, and other indications available in the control room that alert the operator to inverter malfunctions.

REFERENCES

1. Section 8.3.2.1.1.2, “Class 1E Uninterruptible Power Supplies.”
2. Chapter 6, “Engineered Safety Features.”
3. Chapter 15, “Accident Analyses.”

XII. Applicable STS Subsection After Incorporation of this GTST's Modifications

The entire subsection of the Specifications and the Bases associated with this GTST, following incorporation of the modifications, is presented next.

3.8 ELECTRICAL POWER SYSTEMS

3.8.3 Inverters – Operating

LCO 3.8.3 The Division A, B, C, and D inverters shall be OPERABLE.

----------NOTES----------
One inverter may be disconnected from its associated DC electric power distribution subsystem for ≤ 72 hours to perform an equalizing charge on its associated battery, providing:

1. The associated instrument and control electric power distribution subsystem is energized from its Class 1E constant voltage source transformer; and

2. All other AC instrument and control electric power distribution subsystems are energized from their associated OPERABLE inverters.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One inverter inoperable.	A.1 ----------NOTE---------- Enter applicable Conditions and Required Actions of LCO 3.8.5 “Distribution Systems - Operating” with any instrument and control division de-energized. ---------- Restore inverter to OPERABLE status.	24 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND	6 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. (continued)	B.2 Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
3.8.3.1	Verify correct inverter voltage, frequency, and alignment to required AC instrument and control electric power distribution subsystems.	7 days

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.3 Inverters – Operating

BASES

BACKGROUND

The inverters are the preferred source of power for the Class 1E AC instrument and control divisions because of the stability and reliability they achieve. Divisions A and D, each consist of one Class 1E inverter. Divisions B and C, each consist of two inverters. The function of the inverter is to convert Class 1E DC electrical power to AC electrical power, thus providing an uninterruptible power source for the instrumentation and controls for the Protection and Safety Monitoring System (PMS). The inverters are powered from the Class 1E 250 V battery sources (Ref. 1).

Under normal operation, a Class 1E inverter supplies power to the Class 1E AC instrument and control electric power distribution subsystem. If the inverter is inoperable or the Class 1E 250 VDC input to the inverter is unavailable, the Class 1E AC instrument and control electric power distribution subsystem is powered from the backup source associated with the same division via a static transfer switch featuring a make-before-break contact arrangement. In addition, a manual mechanical bypass switch is used to provide a backup power source to the Class 1E AC instrument and control bus when the inverter is removed from service. The backup source is a Class 1E regulating 480-208/ 120 volt transformer providing a regulated output to the Class 1E AC instrument and control bus through a static transfer switch and a manual bypass switch.

In addition to powering safety loads, the Class 1E AC power sources are used for emergency lighting in the main control room and remote shutdown workstation. When a normal AC power source for emergency lighting is lost, the loads are automatically transferred to a Class 1E AC power source. Specific details on inverters and their operating characteristics are found in Chapter 8 (Ref. 1).

BASES

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) transient analyses in Chapter 6 (Ref. 2) and Chapter 15 (Ref. 3), assume engineered safety features are OPERABLE. The inverters are designed to provide the required capacity, capability, redundancy, and reliability to ensure the availability of necessary power to the PMS instrumentation and controls 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 Technical Specifications 3.2 (Power Distribution Limits), 3.4 (Reactor Coolant System), and 3.6 (Containment Systems).

The OPERABILITY of the inverters is consistent with the initial assumptions of the accident analyses and is based on meeting the design basis of the unit. This includes maintaining at least three of the four Divisions of AC instrument and control OPERABLE during accident conditions in the event of:

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

b. A worst case single failure.

Inverters are a part of distribution systems, and as such, satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

LCO

The inverters ensure the availability of AC electrical power for the systems instrumentation required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA.

Maintaining the required inverters OPERABLE ensures that the redundancy incorporated into the design of the PMS instrumentation and controls is maintained. The six inverters (Divisions A and D, one each and Divisions B and C two each; six total) ensure an uninterruptible supply of AC electrical power to the six Class 1E AC instrument and control buses even if all AC power sources are de-energized.

OPERABLE inverters require that the Class 1E AC instrument and control electric power distribution subsystems be powered by the inverter with output voltage and frequency within tolerances, and the power input to the inverter from a 250 VDC station battery.

BASES

LCO (continued)

This LCO is modified by a Note that allows one inverter to be disconnected from its associated Class 1E DC electric power distribution subsystem for ≤ 72 hours, if the associated Class 1E AC instrument and control electric power distribution subsystem is powered from its Class 1E regulating transformer during the period and all other inverters are OPERABLE. This allows an equalizing charge to be placed on one battery bank. If the inverter was not disconnected, the resulting voltage condition might damage the inverter. These provisions minimize the loss of equipment that would occur in the event of a loss of offsite power. The 72 hour time period for the allowance minimizes the time during which a loss of offsite power could result in the loss of equipment energized from the affected Class 1E AC instrument and control bus while taking into consideration the time required to perform an equalizing charge on the battery bank.

The intent of this Note is to limit the number of inverters that may be disconnected. Only the inverter associated with the single battery bank undergoing an equalizing charge may be disconnected. All other inverters must be aligned to their associated batteries.

APPLICABILITY

The inverters 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.

Inverter requirements for MODES 5 and 6 are covered in the Bases for LCO 3.8.4, “Inverters Shutdown.”

BASES

ACTIONS

A.1

With a required inverter inoperable, its associated Class 1E AC instrument and control division is automatically energized from its regulating transformer. A manual switch is also provided which can be used if the static transfer switch does not properly function.

For this reason a Note has been included in Condition A requiring the entry into the Conditions and Required Actions of LCO 3.8.5, “Distribution Systems - Operating.” This ensures that the instrument and control division is re-energized within 12 hours.

Required Action A.1 allows 24 hours to fix the inoperable inverter and return it to service. The 24 hour time limit is based upon engineering judgment, taking into consideration the time required to repair an inverter and the additional risk to which the unit is exposed because of the inverter inoperability. This has to be balanced against the risk of an immediate shutdown, along with the potential challenges to safety systems such a shutdown might entail. When the AC instrument and control electric power distribution subsystem is powered from its regulating transformer, it is relying upon interruptible AC electrical power sources (offsite and onsite). The uninterruptible inverter source to the AC instrument and control electric power distribution subsystems is the preferred source for powering instrumentation trip setpoint devices.

B.1 and B.2

If the inoperable DC electrical power subsystem cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to MODE 5 where the probability and consequences on an event are minimized. To achieve this status, the plant must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.3.1

This Surveillance verifies that the inverters are functioning properly with all required switches and circuit breakers closed and Class 1E AC instrument and control electric power distribution subsystems energized from the inverter. The verification of proper voltage and frequency output ensures that the required power is readily available for the PMS instrumentation connected to the Class 1E AC instrument and control buses. The 7 day Frequency takes into account the effectiveness of the voltage and frequency instruments, the redundant capability of the inverters, and other indications available in the control room that alert the operator to inverter malfunctions.

REFERENCES

1. Section 8.3.2.1.1.2, “Class 1E Uninterruptible Power Supplies.”
2. Chapter 6, “Engineered Safety Features.”
3. Chapter 15, “Accident Analyses.”