

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

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**Title: Changes related to Section 3.8.5, Distribution Systems - Operating**

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**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:**

TSTF-439-A, Rev. 2, Eliminate Second Completion Times Limiting Time from Discovery of Failure to Meet an LCO

**STS NUREGs Affected:**

TSTF-439-A, Rev. 2: NUREG-1430, -1431, -1432, -1433, and -1434

**NRC Approval Date:**

TSTF-439-A, Rev. 2: 01-Dec-2005

**TSTF Classification:**

TSTF-439-A, Rev. 2: Technical Change

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**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:**

RCOL PTS VEGP LAR DOC A104: Revision of TS 3.8.5 Condition E to add "of Condition A, B, C, or D."

RCOL PTS VEGP LAR DOC A112: Revision of TS 3.8.5 to delete "bus" from the name for subsystem "AC instrument and control" and to specify the two electrical power distribution subsystems in a list format. Also, revise wording such that the description of a Condition ends with "Division inoperable" or "Divisions inoperable", and the description of a Required Action ends with "Division to OPERABLE status." (DOC 112 was revised in response to NRC RAI letter No. 01, Question 16-16.)

RCOL PTS VEGP LAR DOC L04: VEGP TS Section 1.3, "Completion Time" is revised to remove second Completion Time and replace the current discussion of second Completion Time with a new one. Second Completion Times included in TS 3.8.5 are deleted.

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### **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to previous designs, but are not to the current design; (2) that are already incorporated in the GTS; and (3) that are superseded by another change.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-439-A and VEGP LAR DOC L04 address same changes in AP1000 TS 3.8.5. Following incorporation of changes due to TSTF-439-A, no additional change was needed for VEGP LAR L04.

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.

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**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)**

None

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**V. Applicability****Affected Generic Technical Specifications and Bases:**

Section 3.8.5 Distribution Systems – Operating

**Changes to the Generic Technical Specifications and Bases:**

TS 3.8.5 "Distribution Systems - Operating" is revised to delete "bus" from the name of subsystem "AC instrument and control" and to specify the two electrical power distribution subsystems in a list format. (VEGP LAR DOC A112)

TS 3.8.5 Conditions A, B, C, and D are revised to move "Division" or "Divisions" such that the description of the Condition reads "Division inoperable" or "Divisions inoperable." (VEGP LAR DOC A112)

TS 3.8.5 Required Actions A.1, B.1, C.1, and D.1 are revised to add "division" such that each of these "Restore" Required Action ends with "division to OPERABLE status." (VEGP LAR DOC A112)

TS 3.8.5 Required Action C.1 and Required Action D.1 are revised from "Restore ..." to "Restore one..." (VEGP LAR DOC A112)

Second Completion Times for Conditions A, B, C, and D are deleted. (TSTF-439-A; VEGP LAR DOC L04)

TS 3.8.5 Condition E is revised to "Required Action and associated Completion Time of Condition A, B, C, and D not met" by adding "of Condition A, B, C, and D." (VEGP LAR DOC A102)

TS 3.8.5 Condition F is revised to remove "divisions with" and "distribution subsystems" to state "Two inoperable divisions that result in a loss of safety function." (VEGP LAR DOC A112)

The discussion in the Bases is revised to be consistent with the wordings in the Specifications. The revisions include deletion of "bus" from the name of subsystem "AC instrument and control" and use of "division" or "divisions," as appropriate. (VEGP LAR DOC A112)

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## **VI. Traveler Information**

### **Description of TSTF changes:**

#### **TSTF-439-A**

TSTF-439-A deletes a second completion time that was included for certain Required Actions to establish a limit on the maximum time allowed for any combination of Conditions that result in a single continuous failure to meet the LCO. These (second) completion times are joined by an "AND" logical connector to the Condition-specific Completion Time and state "X days from discovery of failure to meet the LCO (where "X" varies by specification)."

### **Rationale for TSTF changes:**

#### **TSTF-439-A**

TSTF-439-A deletes the second completion time because two new programs (Maintenance Rule and Reactor Oversight Process) that currently apply and make the use of the second completion time unnecessary. The adoption of a second Completion Time was based on an NRC concern that a plant could continue to operate indefinitely with an LCO governing safety significant systems never being met by alternately meeting the requirements of separate Conditions. In 1991, the NRC could not identify any regulatory requirement or program which could prevent this misuse of the Technical Specifications. However, that is no longer the case. There are now two programs which would provide a strong disincentive to continued operation with concurrent multiple inoperabilities of the type the second Completion Times were designed to prevent.

*The Maintenance Rule:* 10 CFR 50.65 (a)(1), the Maintenance Rule, requires each licensee to monitor the performance or condition of SSCs against licensee-established goals to ensure that the SSCs are capable of fulfilling their intended functions. If the performance or condition of an SSC does not meet established goals, appropriate corrective action is required to be taken. The NRC Resident Inspectors monitor the licensee's Corrective Action process and could take action if the licensee's maintenance program allowed the systems required by a single LCO to become concurrently inoperable multiple times. The performance and condition monitoring activities required by 10 CFR 50.65 (a)(1) and (a)(2) would identify if poor maintenance practices resulted in multiple entries into the ACTIONS of the Technical Specifications and unacceptable unavailability of these SSCs. The effectiveness of these performance monitoring activities, and associated corrective actions, is evaluated at least every refueling cycle, not to exceed 24 months per 10 CFR 50.65 (a)(3).

Under the Technical Specifications the Completion Time for one system is not affected by other inoperable equipment. The second Completion Times were an attempt to influence the Completion Time for one system based on the condition of another system, if the two systems were required by the same LCO. However 10 CFR 50.65(a)(4) is a much better mechanism to apply this influence as the Maintenance Rule considers all inoperable risk-significant equipment, not just the one or two systems governed by the same LCO.

Under 10 CFR 50.65(a)(4), the risk impact of all inoperable risk-significant equipment is assessed and managed when performing preventative or corrective maintenance. The risk assessments are conducted using the procedures and guidance endorsed by Regulatory Guide 1.182, "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants."

Regulatory Guide 1.182 endorses the guidance in Section 11 of NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." These documents address general guidance for conduct of the risk assessment, quantitative and qualitative guidelines for establishing risk management actions, and example risk management actions. These include actions to plan and conduct other activities in a manner that controls overall risk, increased risk awareness by shift and management personnel, actions to reduce the duration of the condition, actions to minimize the magnitude of risk increases (establishment of backup success paths or compensatory measures), and determination that the proposed maintenance is acceptable. This comprehensive program provides much greater assurance of safe plant operation than the second Completion Times in the Technical Specifications.

*The Reactor Oversight Process:* NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," describes the tracking and reporting of performance indicators to support the NRC's Reactor Oversight Process (ROP). The NEI document is endorsed by RIS 2001-11, "Voluntary Submission of Performance Indicator Data." NEI 99-02, Section 2.2, describes the Mitigating Systems Cornerstone. NEI 99-02 specifically addresses emergency AC Sources (which encompasses the AC Sources and Distribution System LCOs), and the Auxiliary Feedwater system. Extended unavailability of these systems due to multiple entries into the ACTIONS would affect the NRC's evaluation of the licensee's performance under the ROP.

In addition to these programs, a requirement is added to Section 1.3 of the Technical Specifications to require licensees to have administrative controls to limit the maximum time allowed for any combination of Conditions that result in a single contiguous occurrence of failing to meet the LCO. These administrative controls should consider plant risk and shall limit the maximum contiguous time of failing to meet the LCO. This Technical Specification requirement, when considered with the regulatory processes discussed above, provide an equivalent or superior level of plant safety without the unnecessary complication of the Technical Specifications by second Completion Times on some Specifications.

IN NUREG-1430, 1431, and 1432, Specification 3.8.9, Distribution Systems - Operating, has an 8 hour Completion Time for one or more AC electrical power distribution subsystems inoperable (Condition A), and a 2 hour Completion Time for one or more AC vital bus (Condition B) or one or more DC electrical power subsystems (Condition C) inoperable. Conditions A, B, and C have a second Completion Time of 16 hours from discovery of failure to meet the LCO. The second Completion Time is not needed. First, it is unusual for an AC electrical power subsystem or AC vital bus to be inoperable without causing a reactor trip. Secondly, Completion Times are very short (8 and 2 hours) providing little time to restore systems such that the Conditions overlap and multiple inoperabilities occur. Lastly, should any overlapping inoperabilities that result in a loss of safety function occur, a plant shutdown in accordance with LCO 3.0.3 is required.

As discussed above, the concern regarding the multiple continuous entries into Conditions without meeting the LCO is addressed by two programs (Maintenance Rule and Reactor Oversight Program) and the administrative control required by Section 1.3 of the Technical Specifications. Therefore, this potential concern is no longer an issue and the Technical Specifications can be simplified by eliminating the second Completion Times with no detriment to plant safety.

**Description of changes in RCOL Std. Dep., RCOL COL Item(s), and RCOL PTS Changes:**VEGP LAR DOC A104:

TS 3.8.5, "Distribution Systems - Operating," Condition E is revised from "Required Action and associated Completion Time not met," to "Required Action and associated Completion Time of Condition A, B, C, or D not met" (i.e., adding "of Condition A, B, C, or D").

VEGP LAR DOC A112:

TS 3.8.5 "Distribution Systems - Operating" is revised to delete "bus" from the name of subsystem "AC instrument and control" and to specify the two electrical power distribution subsystems in a list format.

TS 3.8.5, "Distribution Systems - Operating," Conditions A, B, C, and D are revised to move "Division" or "Divisions" such that the Condition reads "Division inoperable" or "Divisions inoperable"; for example Condition A is revised to "One AC instrument and control division inoperable."

TS 3.8.5 Required Actions A.1, B.1, C.1, and D.1 are revised to add "Division" such that each of these "Restore" Required Action reads "Division to OPERABLE status." For example, Required Action A.1 is revised to "Restore AC instrument and control division to OPERABLE status."

TS 3.8.5 Required Action C.1 and Required Action D.1 are revised from "Restore..." to "Restore one... ."

TS 3.8.5 Condition F is revised to remove "divisions with " and "distribution subsystems" to state "Two inoperable divisions that result in a loss of safety function."

VEGP LAR DOC L04:

Current TS Section 1.3, "Completion Times," Example 1.3-3 is revised to eliminate the Required Action A.1 and Required Action B.1 second Completion Times, and to replace the discussion regarding second Completion Times with a new discussion. The second Completion Times associated with current TS 3.8.5, "Distribution Systems - Operating," Required Actions A.1, B.1, C.1, and D.1 are also deleted.

**Rationale for changes in RCOL Std. Dep., RCOL COL Item(s), and RCOL PTS Changes:**VEGP LAR DOC A104:

Currently, TS 3.8.5 Condition E does not specify which Required Actions and associated Completion Times not met would require entry into Condition F.

TSTF-GG-05-01, Subsection 4.1.6, paragraph i.5 provides guidance on the appropriate Condition wording for Conditions that are required to be entered as a result of failing to satisfactorily complete another Required Action. As stated in the guidance, if the Condition is



only entered for failure of some of the Required Actions, the entry condition shall include a specific listing of the applicable Conditions. A listing is not provided only if all Required Action failures would lead to entering the subject Condition. For TS 3.8.5, failing to complete Required Action F.1 would not allow reentering Condition E.

These changes (wording preferences, editorial changes, reformatting, revised numbering, etc.) are made to provide clarification and for consistency with TSTF-GG-05-01. These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the TS.

#### VEGP LAR DOC A112:

The nomenclature used for the two Class 1E electrical power distribution subsystems is clarified by deleting "bus" from the name for subsystem "AC instrument and control" and the TS 3.8.5 LCO reformatted to clarify that both DC and AC instrument and control divisions are electrical power distribution subsystems. The Actions are revised to present inoperabilities of divisions.

As described in the TS Bases, current TS 3.8.5 Action A provides the requirements when one division of the AC instrument and control electrical power distribution subsystem is inoperable and current Action B provides the requirements when one division of the DC electrical power distribution subsystem is inoperable. Current TS 3.8.5 Actions C and D provide the requirements when two divisions of the AC instrument and control electrical power distribution subsystem are inoperable and two divisions of DC electrical power distribution subsystems are inoperable, respectively. The revised wording of the Conditions and Required Actions provides for clarity and consistency without changing the intent or technical requirements. Therefore, usability is enhanced.

In the event two divisions of AC instrument and control electrical power distribution subsystem are inoperable, once a single division of AC instrument and control is restored to Operable status, TS 3.8.5 Condition C no longer applies. Thus Required Action C.1 is clarified to "Restore one AC instrument and control division to OPERABLE status." Only a single AC instrument and control division must be restored within the required 2 hours. Since Action A was also entered when the first division of AC instrument and control became inoperable, Action A governs the restoration of the remaining inoperable AC instrument and control division. Therefore, for clarity and consistency with the actual requirements, proposed TS 3.8.5 Required Actions C.1 and D.1 only require the restoration of one AC instrument and control division and one DC division, respectively. Minor wording clarification and reformatting are made for consistency and more standard TS phrasing.

Since these changes do not result in any technical change to the current requirements, they are considered administrative. These changes are designated as administrative changes and are acceptable because they do not result in technical changes to the TS.

#### VEGP LAR DOC L04:

In adopting TSTF-439 into Revision 3.1 of the NUREG-1431 the NRC Staff concluded that multiple continuous entries into Conditions, without meeting the LCO, is acceptable because these practices are controlled by licensee's configuration risk management programs, which were implemented to meet the requirements of the maintenance rule to assess and manage risk. The TS controls, coupled with the licensee's configuration risk management programs, provide adequate assurance against inappropriate use of Combinations of Conditions that result in a single contiguous occurrence of failing to meet the LCO. Final Safety Analysis Report (FSAR) Chapter 17 describes implementation of the Operational Phase Reliability Assurance Activities (OPRAA), which appropriately addresses the NRC Staff's evaluation and conclusion

regarding licensee's configuration risk management programs. The VEGP OPRAA includes implementation of the Maintenance Rule Program to meet the requirements of 10 CFR 50.65.

Accordingly, TS requirements, when considered with the regulatory processes discussed above, provide an equivalent or superior level of plant safety without the unnecessary complication of the TS by second Completion Times on some Specifications that are deleted with this change.

In addition, a requirement is being included in TS Section 1.3 to require administrative controls to limit the maximum time allowed for any combination of Conditions that result in a single contiguous occurrence of failing to meet the LCO.

These administrative controls will consider plant risk and limit the maximum contiguous time of failing to meet the LCO. This TS requirement, when considered with the regulatory processes discussed above, provide an equivalent or superior level of plant safety without the unnecessary complication of the TS by second Completion Times on some Specifications. Current TS 3.8.5 Required Actions A.1, B.1, C.1, and D.1 are the only uses of this second Completion Time to limit the maximum contiguous time of failing to meet the LCO, and are therefore also deleted with this change.

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

None

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

NA

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## VII. GTST Safety Evaluation

### Technical Analysis:

#### Deletion of Second Completion Time

The deletion of second completion time in the Required Actions is justified because two programs (Maintenance Rule and Reactor Oversight Program) that will be part of AP1000 plant operation make the use of the second completion time unnecessary. The adoption of a second Completion Time on designs of operating plants was based on an NRC concern that a plant could continue to operate indefinitely with an LCO governing safety significant systems never being met by alternately meeting the requirements of separate Conditions. In 1991, the NRC could not identify any regulatory requirement or program which could prevent this misuse of the Technical Specifications. However, that is not the case with AP1000 plants.

There are now two programs which would provide a strong disincentive to continued operation with concurrent multiple inoperabilities of the type the second Completion Times were designed to prevent.

*The Maintenance Rule:* 10 CFR 50.65 (a)(1), the Maintenance Rule, requires each licensee to monitor the performance or condition of SSCs against licensee-established goals to ensure that the SSCs are capable of fulfilling their intended functions. If the performance or condition of an SSC does not meet established goals, appropriate corrective action is required to be taken. The NRC Resident Inspectors monitor the licensee's Corrective Action process and could take action if the licensee's maintenance program allowed the systems required by a single LCO to become concurrently inoperable multiple times. The performance and condition monitoring activities required by 10 CFR 50.65 (a)(1) and (a)(2) would identify if poor maintenance practices resulted in multiple entries into the ACTIONS of the Technical Specifications and unacceptable unavailability of these SSCs. The effectiveness of these performance monitoring activities, and associated corrective actions, is evaluated at least every refueling cycle, not to exceed 24 months per 10 CFR 50.65 (a)(3). Under the Technical Specifications, the Completion Time for one system is not affected by other inoperable equipment. The second Completion Times were an attempt to influence the Completion Time for one system based on the condition of another system, if the two systems were required by the same LCO. However 10 CFR 50.65(a)(4) is a much better mechanism to apply this influence as the Maintenance Rule considers all inoperable risk-significant equipment, not just the one or two systems governed by the same LCO.

Under 10 CFR 50.65(a)(4), the risk impact of all inoperable risk-significant equipment is assessed and managed when performing preventative or corrective maintenance. The risk assessments are conducted using the procedures and guidance endorsed by Regulatory Guide 1.182, "Assessing and Managing Risk Before Maintenance Activities at Nuclear Power Plants." Regulatory Guide 1.182 endorses the guidance in Section 11 of NUMARC 93-01, "Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants." These documents address general guidance for conduct of the risk assessment, quantitative and qualitative guidelines for establishing risk management actions, and example risk management actions. These include actions to plan and conduct other activities in a manner that controls overall risk, increased risk awareness by shift and management personnel, actions to reduce the duration of the condition, actions to minimize the magnitude of risk increases (establishment of backup success paths or compensatory measures), and determination that the proposed maintenance is acceptable. This comprehensive program provides much greater assurance of safe plant operation than the second Completion Times in the Technical Specifications.

*The Reactor Oversight Process:* NEI 99-02, "Regulatory Assessment Performance Indicator Guideline," describes the tracking and reporting of performance indicators to support the NRC's Reactor Oversight Process (ROP). The NEI document is endorsed by RIS 2001-11, "Voluntary Submission of Performance Indicator Data." NEI 99-02, Section 2.2, describes the Mitigating Systems Cornerstone. NEI 99-02 specifically addresses emergency AC Sources (which encompasses the AC Sources and Distribution System LCOs), and the Auxiliary Feedwater system. Extended unavailability of these systems due to multiple entries into the ACTIONS would affect the NRC's evaluation of the licensee's performance under the ROP.

In addition to these programs, a requirement is added to Section 1.3 of the Technical Specifications to require licensees to have administrative controls to limit the maximum time allowed for any combination of Conditions that result in a single contiguous occurrence of failing to meet the LCO. These administrative controls should consider plant risk and shall limit the maximum contiguous time of failing to meet the LCO. This Technical Specification requirement, when considered with the regulatory processes discussed above, provide an equivalent or superior level of plant safety without the unnecessary complication of the Technical Specifications by second Completion Times on some Specifications.

As discussed above, the concern regarding the multiple continuous entries into Conditions without meeting the LCO is addressed by two programs (Maintenance Rule and Reactor Oversight Program) and the administrative control required by Section 1.3 of the Technical Specifications. Therefore, this potential concern is no longer an issue and the Technical Specifications can be simplified by eliminating the second Completion Times with no detriment to plant safety.

Accordingly, the removal of the additional completion times in the AP1000 STS is justified and acceptable.

#### Removal of "bus" from the name of subsystem "AC instrument and control"

In TS 3.8.5, deletion of "bus" from the name of subsystem "AC instrument and control" is acceptable since this change closely aligns the description with the terminology in FSAR Chapter 8 and brings consistency with other TS Sections. This change also clarifies that both DC and AC instrument and control divisions are electrical power distribution subsystems.

#### Revision of Condition E adding "of Condition A, B, C, or D"

Currently, TS 3.8.5 Condition E does not specify which Required Actions and associated Completion Times not met would require entry into Condition F. Without inclusion of such a list, the Required Action for failing to meet Condition A, B, C, or D is not defined. In addition, as per the STS Writer's Guide, if the Condition is only entered for failure of some of the Required Actions, the entry condition shall include a specific listing of the applicable Conditions. Accordingly, the addition, specifying the list of applicable Conditions, is needed and is applicable.

This change provides clarification in the Specification and will help their implementation. It is, therefore, acceptable.

#### Changes to clarify wording of different Condition and Required Actions:

The changes in the wording of Conditions A, B, C, and D and the associated Required Actions provide useful clarification. The revised wording of the Conditions and Required Actions

provides for consistency without changing the intent or technical requirements. Therefore, usability is enhanced.

In the event two Divisions of AC instrument and control buses are inoperable, once a single Division of AC instrument and control bus is restored to Operable status, TS 3.8.5 Condition C no longer applies. Thus Required Action C.1 is clarified to "Restore one AC instrument and control bus Division to OPERABLE status." Only a single AC instrument and control bus Division must be restored within the required 2 hours. Since Action A was also entered when the first Division of AC instrument and control buses became inoperable, Action A governs the restoration of the remaining inoperable AC instrument and control bus. Therefore, for clarity and consistency with the actual requirements, proposed TS 3.8.5 Required Actions C.1 and D.1 only require the restoration of one AC instrument and control bus Division and one DC electrical power distribution subsystem Division, respectively.

These wording changes provide useful clarify and will contribute to proper implementation of the requirements. Therefore, these changes are acceptable.

Remaining changes:

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

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## **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

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**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.
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**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

## 3.8.5 Distribution Systems – Operating

LCO 3.8.5 The **following** Division A, B, C, and D ~~AC instrument and control bus and DC~~ electrical power distribution subsystems shall be OPERABLE.:

- a. **DC; and**
- b. **AC instrument and control.**

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

## ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One <del>Division</del> AC instrument and control <del>bus-division</del> inoperable.	A.1 Restore AC instrument and control <del>bus-division</del> to OPERABLE status.	6 hours  <del>AND</del>  <del>12 hours from discovery of failure to meet the LCO</del>
B. One <del>Division</del> DC <del>electrical power distribution subsystem</del> <b>division</b> inoperable.	B.1 Restore DC <del>electrical power distribution subsystem</del> <b>division</b> to OPERABLE status.	6 hours  <del>AND</del>  <del>12 hours from discovery of failure to meet the LCO</del>
C. Two <del>Divisions</del> AC instrument and control <del>bus-divisions</del> inoperable	C.1 Restore <b>one</b> AC instrument and control <del>bus-division</del> to OPERABLE status.	2 hours  <del>AND</del>  <del>16 hours from discovery of failure to meet the LCO.</del>

## ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. Two <del>Divisions</del> -DC <del>electrical power distribution subsystem</del> <b>divisions</b> inoperable.	D.1 Restore <b>one</b> DC <del>electrical power distribution subsystem</del> <b>division</b> to OPERABLE status.	2 hours  <del>AND</del>  <del>16 hours from discovery of failure to meet the LCO.</del>
E. Required Action and associated Completion Time <b>of Condition A, B, C, or D</b> not met.	E.1 Be in MODE 3.  <u>AND</u>  E.2 Be in MODE 5.	6 hours    36 hours
F. Two <del>Divisions with</del> inoperable <b>divisions</b> <del>distribution subsystems</del> that result in a loss of safety function.	F.1 Enter LCO 3.0.3	Immediately

## SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
3.8.5.1 Verify correct breaker and switch alignments and voltage to required DC and AC instrument and control <del>bus</del> electrical power distribution subsystems.	7 days

## B 3.8 ELECTRICAL POWER SYSTEMS

### B 3.8.5 Distribution Systems – Operating

#### BASES

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**BACKGROUND** The onsite Class 1E and DC and UPS electrical power distribution system is divided by division into four independent AC and DC electrical power distribution subsystems (Divisions A, B, C, and D).

The Class 1E AC distribution Divisions A and D each consists of one 208/120 V bus. The Class 1E AC distribution Divisions B and C each consists of two 208/120 V buses. The buses are normally powered from separate inverters which are connected to the respective Division Class 1E battery banks. The backup source provided for each Division for the Class 1E AC instrument and control buses is a Class 1E regulating transformer providing regulated output to the Class 1E AC instrument and control buses through a static transfer switch and a manual bypass switch. Power to the transformer is provided by the nonsafety related Main AC Power System. Additional description of this system may be found in the Bases for Specification 3.8.3, "Inverters - Operating."

The Class 1E DC distribution Divisions A and D each consists of one 250 VDC bus. The Class 1E DC distribution Divisions B and C each consists of two 250 VDC buses. The buses for the four Divisions are normally powered from their associated Division battery chargers. The backup source for each Class 1E DC bus is its associated Class 1E battery bank. Additionally, there is one installed spare Class 1E battery bank and one installed spare Class 1E battery charger, which can provide backup power to a Class 1E DC bus in the event that one of the battery banks or one of the chargers is out of service. Additional description of this system may be found in the Bases for Specification 3.8.1, "DC Sources Operating."

The list of all required distribution buses is presented in Table B 3.8.5-1 and shown in Section 8.3.2 (Ref. 1).

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BASES

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APPLICABLE  
SAFETY  
ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in Chapter 6 (Ref. 2) and Chapter 15 (Ref. 3), assume engineered safety features (ESFs) are OPERABLE. The Class 1E AC and DC electrical power distribution systems are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to the ESFs 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 Class 1E AC and DC electrical power distribution systems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining at least three of the four Divisions of Class 1E AC and DC power distribution systems OPERABLE during accident conditions in the event of:

- a. An assumed loss of all offsite and onsite AC power sources; and
- b. A worst case single failure.

The Class 1E AC and DC electrical power distribution system satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

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LCO

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The required power distribution subsystems listed in Table B 3.8.5-1 ensure the availability of Class 1E AC and DC electrical power for the systems required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA. The Division A, B, C, and D Class 1E AC and DC electrical power distribution subsystems are required to be OPERABLE.

Maintaining the Division A, B, C, and D AC and DC electrical power distribution subsystems OPERABLE ensures that the redundancy incorporated into the design of the ESFs is not defeated. Three of the four Class 1E AC and DC power distribution subsystems are capable of providing the necessary electrical power to the associated ESF components. Therefore, a single failure within any subsystem or within the electrical power distribution subsystems will not prevent safe shutdown of the reactor.

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BASES

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## LCO (continued)

OPERABLE Class 1E DC electric power distribution subsystems require the associated buses, motor control centers, and electrical circuits to be energized to their proper voltage from either the associated battery bank or charger. The spare battery bank and/or chargers may be used by one subsystem for OPERABILITY. OPERABLE Class 1E AC electrical power distribution subsystems require the associated buses to be energized to their proper voltages and frequencies from the associated inverter or regulating transformer.

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APPLICABILITY

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The Class 1E AC **instrument and control** and DC electrical power distribution subsystems 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 Class 1E AC **instrument and control** and DC electrical power distribution subsystem requirements for MODES 5 and 6 are covered in the Bases for Specification 3.8.6, "Class 1E Distribution Systems - Shutdown."

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ACTIONS

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A.1

With one ~~division of the~~ Class 1E AC instrument and control ~~division~~**bus** inoperable **(for Division B or C, either one or both required distribution panels inoperable can cause that division to be inoperable)** the remaining Class 1E AC instrument and control ~~buses~~**divisions** have the capacity to support a safe shutdown and to mitigate all DBAs, based on conservative analysis.

Because of the passive system design and the use of fail-safe components, the remaining Class 1E AC instrument and control ~~divisions~~**buses** have the capacity to support a safe shutdown and to

## BASES

## ACTIONS (continued)

mitigate most design basis accidents following a subsequent worst case single failure. The 6 hour Completion Time is reasonable based on engineering judgement balancing the risks of operation without one AC instrument and control ~~divisionbus~~ against the risks of a forced shutdown. Additionally, the Completion Time reflects a reasonable time to assess plant status; attempt to repair or replace, thus avoiding an unnecessary shutdown; and, if necessary, prepare and effect an orderly and safe shutdown.

This 6 hour limit is shorter than Completion Times allowed for most supported systems which would be without power. Taking exception to LCO 3.0.2 for components without adequate DC ~~p~~Power, which would have Required Action Completion Times shorter than 6 hours, is acceptable because of:

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

The 6 hour Completion Time takes into account the importance to safety of restoring the Class 1E AC instrument and control ~~divisionbus~~ to OPERABLE status, the passive design of the ESF systems, the redundant capability afforded by the other OPERABLE Class 1E AC instrument and control ~~divisionsbuses~~, and the low probability of a DBA occurring during this period which requires more than two OPERABLE AC instrument and control ~~divisionsbuses~~.

The 6 hour Completion Time is also consistent with the time specified for restoration of one (of four) Protection and Safety Monitoring System ~~actuation~~ division (LCO 3.3.152, **Engineered Safety Feature Actuation System (ESFAS)**~~ESFAS Instrumentation Actuation Logic - Operating~~).

## BASES

## ACTIONS (continued)

Depending on the nature of the AC instrument and control inoperability, one supported division of instrumentation could be considered inoperable. Inoperability of a PMS division is similar to loss of one ~~division~~ AC instrument and control ~~division~~ bus. In both cases, actuation of the safety functions associated with one of the four subsystems/divisions may no longer be available.

~~The second Completion Time for Required Action A.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition A is entered while, for instance, a DC bus is inoperable and subsequently restored OPERABLE, the LCO may already have been not met for up to 6 hours. This could lead to a total of 12 hours, since initial failure of the LCO, to restore the AC instrument and control distribution system. At this time, a DC circuit could again become inoperable, and AC instrument and control distribution restored OPERABLE. This could continue indefinitely.~~

~~The Completion Time allows for an exception to the normal “time zero” for beginning the allowed outage time “clock.” This will result in establishing the “time zero” at the time the LCO was initially not met, instead of the time Condition A was entered. The 12 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.~~

B.1

With one ~~dDivision of the~~ Class 1E DC electrical power distribution subsystem inoperable **(for Division B or C, either one or more required buses or distribution panels inoperable can cause that division to be inoperable)**, the remaining ~~dDivisions~~ have the capacity to support a safe shutdown and to mitigate all DBAs, based on conservative analysis.

Because of the passive system design and the use of fail-safe components, the remaining ~~dDivisions~~ have the capacity to support a safe shutdown and to mitigate most design basis accidents following a subsequent worst case single failure. The 6 hour Completion Time is reasonable based on engineering judgement balancing the risks of operation without one ~~dDivision~~ against the risks of a forced shutdown.



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BASES

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## ACTIONS (continued)

Additionally, the completion time reflects a reasonable time to assess plant status; attempt to repair or replace, thus avoiding an unnecessary shutdown; and, if necessary, prepare and effect an orderly and safe shutdown.

The 6 hour Completion Time is also consistent with the time specified for restoration of one (of four) Protection and Safety Monitoring System division (LCO 3.3.152, **Engineered Safety Feature Actuation System (ESFAS)**~~ESFAS Instrumentation Actuation Logic - Operating~~).

Depending on the nature of the DC electrical power distribution subsystem inoperability, one supported division of instrumentation could be considered inoperable. Inoperability of a PMS division is similar to loss of one DC electrical power distribution subsystem. In both cases, actuation of the safety functions associated with one of the four subsystems/divisions may no longer be available.

This 6 hour limit is shorter than Completion Times allowed for most supported systems which would be without power. Taking exception to LCO 3.0.2 for components without adequate DC power, which would have Required Action Completion Times shorter than 6 hours, is acceptable because of:

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

~~The second Completion Time for Required Action B.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition B is entered while, for instance, an AC instrument and control bus is inoperable and subsequently returned~~

## BASES

## ACTIONS (continued)

~~OPERABLE, the LCO may already have been not met for up to 6 hours. This could lead to a total of 6 hours, since initial failure of the LCO, to restore the DC distribution system. At this time, an AC train could again become inoperable, and DC distribution restored OPERABLE. This could continue indefinitely.~~

~~This Completion Time allows for an exception to the normal “time zero” for beginning the allowed outage time “clock.” This will result in establishing the “time zero” at the time the LCO was initially not met, instead of the time Condition B was entered. The 12 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.~~

C.1

With two divisions of AC instrument and control ~~buses~~ inoperable, the remaining OPERABLE ~~divisions~~~~buses~~ are capable of supporting the minimum safety functions necessary to shut down the unit and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum required ESF functions not being supported. Therefore, ~~the one~~ required ~~division~~s of AC instrument and control ~~buses~~ must be restored to OPERABLE status within 2 hours by powering the ~~division~~~~bus~~ from the associated inverter via inverted DC, inverter using internal AC source, or Class 1E constant voltage transformer.

Condition C represents two divisions of AC instrument and control ~~vital buses~~ without power; potentially both the DC source and the associated AC source are nonfunctioning. In this situation, the unit is significantly more vulnerable to a complete loss of all noninterruptable power. It is, therefore, imperative that the operator’s attention focus on stabilizing the unit, minimizing the potential for loss of power to the remaining buses and restoring power to ~~one~~~~the~~ affected ~~division~~~~buses~~.

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

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BASES

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## ACTIONS (continued)

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

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

~~The second Completion Time for Required Action C.1 establishes a limit on the maximum allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition C is entered while, for instance, a DC bus is inoperable and subsequently returned to OPERABLE, the LCO may already have been not met for up to 12 hours. This could lead to a total of 14 hours, since initial failure of the LCO, to restore the bus distribution system. At this time, a DC train could again become inoperable, and AC bus distribution restored to OPERABLE. This could continue indefinitely.~~

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

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BASES

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## ACTIONS (continued)

D.1

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

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

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

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

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BASES

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## ACTIONS (continued)

The 2 hour Completion Time for DC buses is consistent with Regulatory Guide 1.93 (Ref. 4).

~~The second Completion Time for Required Action D.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition D is entered while, for instance, an AC instrument and control bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 12 hours. This could lead to a total of 14 hours, since initial failure of the LCO, to restore the DC distribution system. At this time, an AC train could again become inoperable, and DC distribution restored to OPERABLE. This could continue indefinitely.~~

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

E.1 and E.2

If the inoperable distribution ~~division(s)~~**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.

F.1

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

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BASES

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SURVEILLANCE  
REQUIREMENTSSR 3.8.5.1

This Surveillance verifies that the Class 1E AC and DC electrical power distribution subsystems are functioning properly, with the required circuit breakers and switches properly aligned. The verification of proper voltage availability on the buses ensures that the required voltage is readily available for motive as well as control functions for critical system loads connected to these buses. The 7 day Frequency takes into account the redundant capability of the Class 1E AC and DC electrical power distribution subsystems, and other indications available in the control room that alert the operator to subsystem malfunctions.

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REFERENCES

1. Section 8.3.2, “DC Power Systems.”
  2. Chapter 6, “Engineering Safety Features.”
  3. Chapter 15, “Accident Analyses.”
  4. Regulatory Guide 1.93, “Availability of Electric Power Sources,” U.S. Nuclear Regulatory Commission, December 1974.
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Table B 3.8.5-1 (page 1 of 1)  
Class 1E AC and DC Electrical Power Distribution System

TYPE	VOLTAGE	DIVISION A*	DIVISION B*	DIVISION C*	DIVISION D*
DC Buses	250 Vdc	IDSA-DS-1	IDSB-DS-1 IDSB-DS-2	IDSC-DS-1 IDSC-DS-2	IDSD-DS-1
DC Distribution Panels	250 Vdc	IDSA-DD-1 IDSA-DK-1	IDSB-DD-1 IDSB-DK-1	IDSC-DD-1 IDSC-DK-1	IDSD-DD-1 IDSD-DK-1
AC Instrumentation and Control Buses	120 Vac	IDSA-EA-1	IDSB-EA-1 IDSB-EA-3	IDSC-EA-1 IDSC-EA-3	IDSD-EA-1

\* Each Division of the AC and DC electrical power distribution systems is a subsystem.

**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

## 3.8.5 Distribution Systems – Operating

LCO 3.8.5 The following Division A, B, C, and D electrical power distribution subsystems shall be OPERABLE:

- a. DC; and
- b. AC instrument and control.

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

## ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One AC instrument and control division inoperable.	A.1 Restore AC instrument and control division to OPERABLE status.	6 hours
B. One DC division inoperable.	B.1 Restore DC division to OPERABLE status.	6 hours
C. Two AC instrument and control divisions inoperable	C.1 Restore one AC instrument and control division to OPERABLE status.	2 hours
D. Two DC divisions inoperable.	D.1 Restore one DC division to OPERABLE status.	2 hours
E. Required Action and associated Completion Time of Condition A, B, C, or D not met.	E.1 Be in MODE 3.	6 hours
	<u>AND</u> E.2 Be in MODE 5.	36 hours

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Two inoperable divisions that result in a loss of safety function.	F.1 Enter LCO 3.0.3	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
3.8.5.1	Verify correct breaker and switch alignments and voltage to required DC and AC instrument and control electrical power distribution subsystems.	7 days

## B 3.8 ELECTRICAL POWER SYSTEMS

### B 3.8.5 Distribution Systems – Operating

#### BASES

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**BACKGROUND** The onsite Class 1E and DC and UPS electrical power distribution system is divided by division into four independent AC and DC electrical power distribution subsystems (Divisions A, B, C, and D).

The Class 1E AC distribution Divisions A and D each consists of one 208/120 V bus. The Class 1E AC distribution Divisions B and C each consists of two 208/120 V buses. The buses are normally powered from separate inverters which are connected to the respective Division Class 1E battery banks. The backup source provided for each Division for the Class 1E AC instrument and control buses is a Class 1E regulating transformer providing regulated output to the Class 1E AC instrument and control buses through a static transfer switch and a manual bypass switch. Power to the transformer is provided by the nonsafety related Main AC Power System. Additional description of this system may be found in the Bases for Specification 3.8.3, "Inverters - Operating."

The Class 1E DC distribution Divisions A and D each consists of one 250 VDC bus. The Class 1E DC distribution Divisions B and C each consists of two 250 VDC buses. The buses for the four Divisions are normally powered from their associated Division battery chargers. The backup source for each Class 1E DC bus is its associated Class 1E battery bank. Additionally, there is one installed spare Class 1E battery bank and one installed spare Class 1E battery charger, which can provide backup power to a Class 1E DC bus in the event that one of the battery banks or one of the chargers is out of service. Additional description of this system may be found in the Bases for Specification 3.8.1, "DC Sources Operating."

The list of all required distribution buses is presented in Table B 3.8.5-1 and shown in Section 8.3.2 (Ref. 1).

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BASES

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APPLICABLE  
SAFETY  
ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in Chapter 6 (Ref. 2) and Chapter 15 (Ref. 3), assume engineered safety features (ESFs) are OPERABLE. The Class 1E AC and DC electrical power distribution systems are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to the ESFs 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 Class 1E AC and DC electrical power distribution systems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining at least three of the four Divisions of Class 1E AC and DC power distribution systems OPERABLE during accident conditions in the event of:

- a. An assumed loss of all offsite and onsite AC power sources; and
- b. A worst case single failure.

The Class 1E AC and DC electrical power distribution system satisfy Criterion 3 of 10 CFR 50.36(c)(2)(ii).

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LCO

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The required power distribution subsystems listed in Table B 3.8.5-1 ensure the availability of Class 1E AC and DC electrical power for the systems required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA. The Division A, B, C, and D Class 1E AC and DC electrical power distribution subsystems are required to be OPERABLE.

Maintaining the Division A, B, C, and D AC and DC electrical power distribution subsystems OPERABLE ensures that the redundancy incorporated into the design of the ESFs is not defeated. Three of the four Class 1E AC and DC power distribution subsystems are capable of providing the necessary electrical power to the associated ESF components. Therefore, a single failure within any subsystem or within the electrical power distribution subsystems will not prevent safe shutdown of the reactor.

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BASES

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## LCO (continued)

OPERABLE Class 1E DC electric power distribution subsystems require the associated buses, motor control centers, and electrical circuits to be energized to their proper voltage from either the associated battery bank or charger. The spare battery bank and/or chargers may be used by one subsystem for OPERABILITY. OPERABLE Class 1E AC electrical power distribution subsystems require the associated buses to be energized to their proper voltages and frequencies from the associated inverter or regulating transformer.

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APPLICABILITY

The Class 1E AC instrument and control and DC electrical power distribution subsystems 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 Class 1E AC instrument and control and DC electrical power distribution subsystem requirements for MODES 5 and 6 are covered in the Bases for Specification 3.8.6, "Class 1E Distribution Systems - Shutdown."

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ACTIONSA.1

With one Class 1E AC instrument and control division inoperable (for Division B or C, either one or both required distribution panels inoperable can cause that division to be inoperable) the remaining Class 1E AC instrument and control divisions have the capacity to support a safe shutdown and to mitigate all DBAs, based on conservative analysis.

Because of the passive system design and the use of fail-safe components, the remaining Class 1E AC instrument and control divisions have the capacity to support a safe shutdown and to mitigate most design basis accidents following a subsequent worst case single failure.

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BASES

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## ACTIONS (continued)

The 6 hour Completion Time is reasonable based on engineering judgement balancing the risks of operation without one AC instrument and control division against the risks of a forced shutdown. Additionally, the Completion Time reflects a reasonable time to assess plant status; attempt to repair or replace, thus avoiding an unnecessary shutdown; and, if necessary, prepare and effect an orderly and safe shutdown.

This 6 hour limit is shorter than Completion Times allowed for most supported systems which would be without power. Taking exception to LCO 3.0.2 for components without adequate DC power, which would have Required Action Completion Times shorter than 6 hours, is acceptable because of:

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

The 6 hour Completion Time takes into account the importance to safety of restoring the Class 1E AC instrument and control division to OPERABLE status, the passive design of the ESF systems, the redundant capability afforded by the other OPERABLE Class 1E AC instrument and control divisions, and the low probability of a DBA occurring during this period which requires more than two OPERABLE AC instrument and control divisions.

The 6 hour Completion Time is also consistent with the time specified for restoration of one (of four) Protection and Safety Monitoring System actuation division (LCO 3.3.15, Engineered Safety Feature Actuation System (ESFAS) Actuation Logic - Operating). Depending on the nature of the AC instrument and control inoperability, one supported division of instrumentation could be considered inoperable. Inoperability of a PMS division is similar to loss of one AC instrument and control division. In both cases, actuation of the safety functions associated with one of the four subsystems/divisions may no longer be available.

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BASES

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## ACTIONS (continued)

B.1

With one Class 1E DC electrical power distribution subsystem inoperable (for Division B or C, either one or more required buses or distribution panels inoperable can cause that division to be inoperable), the remaining divisions have the capacity to support a safe shutdown and to mitigate all DBAs, based on conservative analysis.

Because of the passive system design and the use of fail-safe components, the remaining divisions have the capacity to support a safe shutdown and to mitigate most design basis accidents following a subsequent worst case single failure. The 6 hour Completion Time is reasonable based on engineering judgement balancing the risks of operation without one division against the risks of a forced shutdown. Additionally, the completion time reflects a reasonable time to assess plant status; attempt to repair or replace, thus avoiding an unnecessary shutdown; and, if necessary, prepare and effect an orderly and safe shutdown.

The 6 hour Completion Time is also consistent with the time specified for restoration of one (of four) Protection and Safety Monitoring System division (LCO 3.3.15, Engineered Safety Feature Actuation System (ESFAS) Actuation Logic - Operating). Depending on the nature of the DC electrical power distribution subsystem inoperability, one supported division of instrumentation could be considered inoperable. Inoperability of a PMS division is similar to loss of one DC electrical power distribution subsystem. In both cases, actuation of the safety functions associated with one of the four subsystems/divisions may no longer be available.

This 6 hour limit is shorter than Completion Times allowed for most supported systems which would be without power. Taking exception to LCO 3.0.2 for components without adequate DC power, which would have Required Action Completion Times shorter than 6 hours, is acceptable because of:

- a. The potential for decreased safety by requiring a change in unit conditions (i.e., requiring a shutdown) while allowing stable operations to continue;

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BASES

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## ACTIONS (continued)

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

C.1

With two divisions of AC instrument and control inoperable, the remaining OPERABLE divisions are capable of supporting the minimum safety functions necessary to shut down the unit and maintain it in the safe shutdown condition. Overall reliability is reduced, however, since an additional single failure could result in the minimum required ESF functions not being supported. Therefore, one required division of AC instrument and control must be restored to OPERABLE status within 2 hours by powering the division from the associated inverter via inverted DC, inverter using internal AC source, or Class 1E constant voltage transformer.

Condition C represents two divisions of AC instrument and control without power; potentially both the DC source and the associated AC source are nonfunctioning. In this situation, the unit is significantly more vulnerable to a complete loss of all noninterruptable power. It is, therefore, imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for loss of power to the remaining buses and restoring power to one affected division.

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

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



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BASES

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## ACTIONS (continued)

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

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

D.1

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

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

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BASES

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## ACTIONS (continued)

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

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

The 2 hour Completion Time for DC buses is consistent with Regulatory Guide 1.93 (Ref. 4).

E.1 and E.2

If the inoperable distribution division(s) 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.

F.1

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

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BASES

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SURVEILLANCE  
REQUIREMENTSSR 3.8.5.1

This Surveillance verifies that the Class 1E AC and DC electrical power distribution subsystems are functioning properly, with the required circuit breakers and switches properly aligned. The verification of proper voltage availability on the buses ensures that the required voltage is readily available for motive as well as control functions for critical system loads connected to these buses. The 7 day Frequency takes into account the redundant capability of the Class 1E AC and DC electrical power distribution subsystems, and other indications available in the control room that alert the operator to subsystem malfunctions.

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REFERENCES

1. Section 8.3.2, “DC Power Systems.”
  2. Chapter 6, “Engineering Safety Features.”
  3. Chapter 15, “Accident Analyses.”
  4. Regulatory Guide 1.93, “Availability of Electric Power Sources,” U.S. Nuclear Regulatory Commission, December 1974.
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Table B 3.8.5-1 (page 1 of 1)  
Class 1E AC and DC Electrical Power Distribution System

TYPE	VOLTAGE	DIVISION A*	DIVISION B*	DIVISION C*	DIVISION D*
DC Buses	250 Vdc	IDSA-DS-1	IDSB-DS-1 IDSB-DS-2	IDSC-DS-1 IDSC-DS-2	IDSD-DS-1
DC Distribution Panels	250 Vdc	IDSA-DD-1 IDSA-DK-1	IDSB-DD-1 IDSB-DK-1	IDSC-DD-1 IDSC-DK-1	IDSD-DD-1 IDSD-DK-1
AC Instrumentation and Control Buses	120 Vac	IDSA-EA-1	IDSB-EA-1 IDSB-EA-3	IDSC-EA-1 IDSC-EA-3	IDSD-EA-1

\* Each Division of the AC and DC electrical power distribution systems is a subsystem.