# Industry/TSTF Standard Technical Specification Change Traveler

**AC Electrical Power System Completion Times (WCAP-15622)**

Classification: 1) Technical Change

**Priority: 1)High**

NUREGs Affected: ☐ 1430 ☑ 1431 ☐ 1432 ☐ 1433 ☐ 1434

**Description:**

WCAP-15622 evaluates several AC electrical power system Standard Technical Specification Completion Time changes as part of a larger program considering changes to a number of Standard Technical Specification Completion Times. Completion Time extensions are also being considered for a number of fluid systems, DC power systems, and containment isolation valves. The purpose of WCAP-15622 is to provide the technical justification for extending the Completion Times, also referred to as the allowed outage times, for the following specifications (based on the Improved Standard Technical Specifications, NUREG-1431, Rev. 2):

LCO 3.8.1, Electrical Power Systems, AC Sources - Operating; Required Actions B.3.1 or B.3.2

LCO 3.8.1, Electrical Power Systems, AC Sources - Operating; Required Action B.4

LCO 3.8.9, Electrical Power Systems, Distribution Systems - Operating; Required Action B.1

Additionally, the Bases for 3.8.1 and 3.8.9 are modified for consistency among the specifications and have LCO restoration Completion Times to provide for improved readability and understanding.

**Justification:**

## Background

Letter OG-01-039, dated June 15, 2001, transmitted WCAP-15622-P, Rev. 0 (Proprietary) and WCAP-15623-NP, Rev. 0 (Non-Proprietary), both entitled "Risk-Informed Evaluation of Extensions to AC Electrical Power System Completion Times," to the NRC for review and approval.

WCAP-15622 evaluates several AC electrical power system Standard Technical Specification Completion Time changes as part of a larger program considering changes to a number of Standard Technical Specification Completion Times. Completion Time extensions are also being considered for a number of fluid systems, DC power systems, and containment isolation valves. The purpose of WCAP-15622 is to provide the technical justification for extending the Completion Times, also referred to as the allowed outage times, for the following specifications (based on the Improved Standard Technical Specifications, NUREG-1431, Rev. 2):

LCO 3.8.1, Electrical Power Systems, AC Sources - Operating; Required Actions B.3.1 or B.3.2

LCO 3.8.1, Electrical Power Systems, AC Sources - Operating; Required Action B.4

LCO 3.8.9, Electrical Power Systems, Distribution Systems - Operating; Required Action B.1

Additionally, the Bases for 3.8.1 and 3.8.9 are modified for consistency among the specifications and have LCO restoration Completion Times to provide for improved readability and understanding.

**Need for Change**

As discussed in Regulatory Guide 1.177 acceptable reasons for requesting Technical Specification changes fall into one or more of the following categories:

Improvement to operational safety: A change to Technical Specifications can be made due to reductions in the plant risk or a reduction in the occupational exposure of plant personnel in complying with the Technical Specification requirements.

Consistency with risk basis in regulatory requirements: Technical Specifications requirements can be changed to reflect improved design features in a plant or to reflect equipment reliability improvements that make a previous requirement unnecessarily stringent or ineffective. Technical Specifications may be changed to establish consistently based requirements across the industry or across an industry group.

Reduce unnecessary burdens: The change may be requested to reduce unnecessary burdens in complying with current Technical Specification requirements, based on operating history of the plant or industry in general. This includes extending Completion Times 1) that are too short to complete repairs when components fail with the plant at-power, 2) to complete additional maintenance activities at-power to reduce plant down time, and 3) provide increased flexibility to plant operators.

The Completion Time extensions in WCAP-15622 are requested primarily to provide an improvement to operational safety, reduce unnecessary burdens, and provide a more consistent risk basis in regulatory requirements. In addition, the assumption that shutting the plant down is the safest course of action is not always valid but, depending on the component or system of interest, it may be safer to complete component repairs at power. For example, the residual heat removal (RHR) system is important for shutdown cooling in MODES 5 and 6, and the switch from auxiliary feedwater (AFW) for decay heat removal to RHR cooling in MODE 4 represents an increased risk level due to system alignment changes that could lead to loss of inventory events. Potential risks associated with plant shutdown need to be considered when determining an appropriate course of action. Extended Completion Times enable this shutdown risk to be averted.

With regard to the regulatory basis consistency, a number of plants have modified their operating practices and improved mitigation system capabilities, and these changes have not yet been reflected in the Technical Specification requirements related to the time equipment can be out of service. For example, some utilities have implemented cross connects between support systems at dual unit sites and others have implemented backup reactor coolant pump (RCP) seal cooling systems. In addition, more realistic RCP seal LOCA models currently being developed provide a more realistic assessment of the risk associated with RCP seal LOCAs. Furthermore, plant operating experience has shown that initiating event frequencies are now significantly lower than in the past. These improvements in plant operation and PRA modeling can be credited to provide more realistic or extended Completion Times while maintaining plant safety.

These Completion Time extensions are requested since the current Completion Times are not always adequate to complete preventive and corrective maintenance activities while at power. Utilities are interested in extending certain Completion Times to allow them to complete preventive maintenance activities, that are currently performed during shutdown, during power operation. Often the risk of completing these activities while shutdown is nearly equal to or greater than the risk of completing these activities while at-power. In other cases extended Completion Times are required in order to complete repair activities while at-power to avoid a plant shutdown and the accompanying mode change or shutdown risk if the repair is not completed within the Completion

Time. Finally, the extended Completion Times are expected to improve operational safety with regard to allowing more time to complete troubleshooting activities prior to switching buses to alternate power sources.

**Proposed Change**

WCAP-15622 provides the justification for extending the initial Completion Times specified in the Improved Standard Technical Specifications for Westinghouse Plants (NUREG-1431, Rev. 2) for the Required Actions specified above. Additionally, the second Completion Times in LCO 3.8.1 and 3.8.9 are revised based on extending the initial Completion Times. Provided below is a summary of these changes.

LCO 3.8.1, Electrical Power Systems, AC Sources - Operating; Condition A, One offsite circuit inoperable

Required Actions, Restore offsite circuit to OPERABLE status.

- Increases the Completion Time from "72 hours AND 6 days from discovery of failure to meet LCO" to "72 hours AND [10] days from discovery of failure to meet LCO"

LCO 3.8.1, Electrical Power Systems, AC Sources - Operating Condition B, One (required) DG inoperable

Required Actions B.3.1 or B.3.2, Determine OPERABLE DG(s) is not inoperable due to common cause failure or perform SR 3.8.1.2 for OPERABLE DG(s)

- Increases the Completion Time from "24 hours" to "72 hours"

LCO 3.8.1, Electrical Power Systems, AC Sources - Operating Condition B, One (required) DG inoperable

Required Action B.4, Restore (required) DG to OPERABLE status

- Increases the Completion Time from "72 hours AND 6 days from discovery of failure to meet LCO" to "7 days AND 10 days from discovery of failure to meet LCO"

LCO 3.8.9, Electrical Power Systems, Distribution Systems - Operating Condition B, One AC vital bus inoperable

Required Action A.1, Restore AC electrical power distribution subsystem(s) to OPERABLE status

- Increases the Completion Time from "8 hours AND 16 hours from discovery of failure to meet LCO" to "8 hours AND 34 hours from discovery of failure to meet LCO"

LCO 3.8.9, Electrical Power Systems, Distribution Systems - Operating Condition B, One AC vital bus inoperable

Required Action B.1, Restore AC vital bus subsystem to OPERABLE status

- Increases the Completion Time from "2 hours AND 16 hours from discovery of failure to meet LCO" to "24 hours AND 34 hours from discovery of failure to meet LCO'

LCO 3.8.9, Electrical Power Systems, Distribution Systems - Operating Condition B, One AC vital bus inoperable

Required Action C.1, Restore AC vital bus subsystem to OPERABLE status

- Increases the Completion Time from "2 hours AND 16 hours from discovery of failure to meet LCO" to "2 hours AND 34 hours from discovery of failure to meet LCO'

Additionally, the Bases for 3.8.1 and 3.8.9 are modified for consistency among the specifications and have LCO restoration Completion Times to provide for improved readability and understanding.

**Justification**

The approach used in WCAP-15622 is consistent with the Nuclear Regulatory Commission's (NRC) approach for using probabilistic risk assessment in risk-informed decisions on plant-specific changes to the current licensing basis. This approach is discussed in Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," and Regulatory Guide 1.177, "An Approach for Plant-Specific, Risk-Informed Decisionmaking: Technical Specifications." The approach addresses, as documented in WCAP-15622, the impact on defense-in-depth and the impact on safety margins, as well as an evaluation of the impact on risk. The risk evaluation considers the three-tiered approach as presented by the NRC in Regulatory Guide 1.177. Tier 1, PRA Capability and Insights, assessed the impact of the proposed Completion Time change on core damage frequency (CDF), incremental conditional core damage probability (ICCDP), large early release frequency (LERF), and incremental conditional large early release probability (ICLERP). Tier 2, Avoidance of Risk-Significant Plant Configurations, considered potential risk-significant plant operating configurations. Tier 3, Risk-Informed Plant Configuration Control and Management, will be addressed on a plant specific basis when the Technical Specification Completion Time change is implemented by each utility consistent with their Maintenance Rule program.

As part of this program, each utility interested in a specific Completion Time change evaluated the impact of the change on plant risk following a method developed as part of this program. Plant specific calculations are required due to the differences between plant designs, component and system reliabilities, and operating experience. Due to these differences generic analyses are not possible. The strength of the approach used in these evaluations lies in calculating, on a consistent basis with other plants, the impact of the Completion Time changes on plant risk for each plant and in the ensuing cross comparisons between the plant specific results and design. The cross comparisons are required to understand the differences in the results and provides assurance that the results are reasonable and conclusions valid. Utilities not evaluating these Completion Time changes at this time can do so at a later time. This will require those utilities to follow the same approach developed for this program and complete cross comparisons of their information with that provided for the utilities included in WCAP-15622, and to submit a License Amendment Request.

Plants participating in these evaluations with results included in this WCAP follow. The requested change for each utility is also listed.

- Callaway Plant : LCO 3.8.1, Required Action B.4
- Catawba Nuclear Station : LCO 3.8.1, Required Action B.4; LCO 3.8.1, Required Action B.3.1 or B.3.2; LCO 3.8.9, Required Action B.1
- Comanche Peak Steam Electric Station : LCO 3.8.1, Required Action B.4
- R. E. Ginna Nuclear Power Plant : LCO 3.8.1, Required Action B.3.1 or B.3.2; LCO 3.8.9, Required Action B.1
- McGuire Nuclear Station : LCO 3.8.1, Required Action B.4; LCO 3.8.1, Required Action B.3.1 or B.3.2; LCO 3.8.9, Required Action B.1
- Sequoyah Nuclear Plant : LCO 3.8.1, Required Action B.3.1 or B.3.2; LCO 3.8.9, Required Action B.1
- Shearon Harris Nuclear Power Plant : LCO 3.8.1, Required Action B.4; LCO 3.8.1, Required Action B.3.1 or B.3.2
- V. C. Summer Nuclear Station : LCO 3.8.1, Required Action B.4; LCO 3.8.9, Required Action B.1

The following presents the conclusions of this study based on the analysis and results discussed in the WCAP:

- The overall results indicate that increasing the DG CT to 7 days (14 days for Comanche Peak), from 72 hours, has a relatively small impact on CDF and that the ICCDP values are reasonable, except possibly for the Summer Base Case. The CDF with one DG out of service for all the plants are within a factor of two of 1E-04/yr, except for the Summer Base Case. These conditional CDFs are generally an increase of about a factor of 3 over the CDF with nominal equipment unavailabilities. This is not be considered a high risk configuration. The Summer results, when crediting the alternate AC power source and an improved DG mission time, are also acceptable.

- Moving DG test and maintenance activities to at-power operation provides a risk reduction during shutdown. A reduction will be realized that can be traded off against the at-power risk increase further reducing the small at-power risk increase. ICCDPs were calculated for completing these activities during shutdown and at-power operation. The results indicate that the incremental risk associated with completing these activities at-power is significantly smaller than the incremental risk for completing these activities while shutdown which indicates it is lower overall risk to complete these activities while at-power. This is based on a 14 day DG outage time for Comanche Peak..

- The overall results indicate that increasing the CT to determine the operable DG is not inoperable due to common cause failure to 72 hours, from 24 hours, has a relatively small impact on CDF for all the plants. In addition, the ICCDP values are reasonable. The CDF with one DG out of service for all the plants are within a factor of three of 1E-04/yr. These conditional CDFs are generally an increase of about a factor of 3 over the CDF with nominal equipment unavailabilities. This is not considered a high risk configuration

- The overall results indicate that the loss of a vital AC bus is not a large contributor to plant risk. As indicated by these results, increasing the CT for an inoperable vital bus to 24 hours, from 2 hours, has a relatively small impact on CDF. In addition, the ICCDP values are reasonable for a 24 hour period. Finally, the CCDF values indicate that operating the plant with a 120 VAC vital bus unavailable does not represent an unacceptable risk configuration, except for the Ginna repair configuration on the highest importance bus. But if common cause issues are ruled out, then this conclusion is also applicable to Ginna.

- The impact of these CT changes on containment risk metrics is not important in the decision process. LERF is typically dominated by containment bypass events which are, for the most part, not impacted by these changes since a coincident loss of offsite power with a containment bypass event is a very low frequency event. In addition, unavailability of AC systems does not impact containment systems independent of systems used to prevent core damage. Therefore, CDF and ICCDP are the appropriate risk metrics.

- The impact of these CT increases on defense-in-depth was evaluated. It was concluded that this change will have no impact on defense-in-depth including maintaining a reasonable balance between prevention of core damage, prevention of containment failure, and consequence mitigation; no over reliance on programmatic activities will be required; system redundancy, independence, and diversity will be maintained; independence of barriers will not be degraded; and defenses against common cause failures and human errors will be maintained.

- The impact of the CT increases on safety margins was assessed and it was concluded that the safety analysis acceptance criteria as stated in the FSAR is not impacted by this change.

Based on these conclusions, the previously listed CT increases for the specified plants are recommended.

## Determination of No Significant Hazards Considerations

The proposed changes to the Improved Standard Technical Specifications (ISTS) will revise Technical Specifications 3.8.1 and 3.8.9 to extend selected Completion Times.

In accordance with the criteria set forth in 10 CFR 50.92, the proposed changes to NUREG-1431 have been evaluated and determined they do not represent a significant hazards consideration. The following is provided in support of this conclusion:

**Standard I - Involves a Significant Increase in the Probability or Consequences of an Accident Previously Evaluated**

The proposed changes to the Completion Times do not change the response of the plant to any accidents and have an insignificant impact on the reliability of the electrical power sources and distribution systems. The electrical power sources and distribution subsystems will remain highly reliable and the proposed changes will not result in a significant increase in the risk of plant operation. This is demonstrated by showing that the impact on plant safety as measured by core damage frequency (CDF) and large early release frequency (LERF) is acceptable. In addition, for the Completion Time change, the incremental conditional core damage probabilities (ICCDP) and incremental conditional large early release probabilities (ICLERP) are also acceptable. These changes are consistent with the acceptance criteria in Regulatory Guides 1.174 and 1.177. Therefore, since the electrical sources and distribution subsystems will continue to perform their functions with high reliability as originally assumed, and the increase in risk as measured by CDF, LERF, ICCDP, ICLERP is acceptable, there will not be a significant increase in the consequences of any accidents.

The proposed changes do not adversely affect accident initiators or precursors nor alter the design assumptions, conditions, or configuration of the facility or the manner in which the plant is operated and maintained. The proposed changes do not alter or prevent the ability of structures, systems, and components (SSCs) from performing their intended function to mitigate the consequences of an initiating event within the assumed acceptance limits. The proposed changes do not affect the source term, containment isolation, or radiological release assumptions used in evaluating the radiological consequences of an accident previously evaluated. Further, the proposed changes do not increase the types or amounts of radioactive effluent that may be released offsite, nor significantly increase individual or cumulative occupational/public radiation exposures. The proposed changes are consistent with the safety analysis assumptions and resultant consequences.

Therefore, this change does not increase the probability or consequences of an accident previously evaluated.

**Standard II - Create the Possibility of a New or Different Kind of Accident from any Previously Evaluated**

The proposed changes do not result in a change in the manner in which the electrical distribution subsystems provide plant protection. There are no design changes associated with the proposed changes. The changes to Completion Times do not change any existing accident scenarios, nor create any new or different accident scenarios.

The changes do not involve a physical alteration of the plant (i.e., no new or different type of equipment will be installed) or a change in the methods governing normal plant operation. In addition, the changes do not impose any new or different requirements or eliminate any existing requirements.

The changes do not alter assumptions made in the safety analysis. The proposed changes are consistent with the safety analysis assumptions and current plant operating practice.

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

**Standard III - Involve a Significant Reduction in the Margin of Safety**

The proposed changes do not alter the manner in which safety limits, limiting safety system settings or limiting conditions for operation are determined. The safety analysis acceptance criteria are not impacted by these changes. The proposed changes will not result in plant operation in a configuration outside the design basis. The calculated impact on risk is insignificant and is consistent with the acceptance criteria contained in Regulatory Guides 1.174 and 1.177.

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


| | | | |
|---|---|---|---|
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## Revision History

**OG Revision 0** **Revision Status: Active** **Next Action: NRC**

Revision Proposed by: WOG

Revision Description:
Original Issue

### Owners Group Review Information

Date Originated by OG: 18-Jul-01

Owners Group Comments:
(No Comments)

Owners Group Resolution: Approved Date: 18-Jul-01

### TSTF Review Information

TSTF Received Date: 22-Aug-01 Date Distributed for Review: 22-Aug-01

OG Review Completed: ☑ BWOG ☑ WOG ☑ CEOG ☑ BWROG

TSTF Comments:
WOG only

TSTF Resolution: Approved Date: 22-Aug-01

### NRC Review Information

NRC Received Date: 31-Aug-01

NRC Comments:

**OG Revision 0** **Revision Status: Active** **Next Action: NRC**

(No Comments)

Final Resolution: NRC Action Pending Final Resolution Date:

## Incorporation Into the NUREGs

File to BBS/LAN Date: TSTF Informed Date: TSTF Approved Date:

NUREG Rev Incorporated:

## Affected Technical Specifications

| | |
|---|---|
| SR 3.8.1 Bases | AC Sources - Operating |
| Ref. 3.8.1 Bases | AC Sources - Operating |
| Action 3.8.1.A | AC Sources - Operating |
| Action 3.8.1.A Bases | AC Sources - Operating |
| Action 3.8.1.B | AC Sources - Operating |
| Action 3.8.1.B Bases | AC Sources - Operating |
| SR 3.8.1.5 Bases | AC Sources - Operating |
| SR 3.8.1.6 Bases | AC Sources - Operating |
| SR 3.8.1.9 Bases | AC Sources - Operating |
| SR 3.8.1.10 Bases | AC Sources - Operating |
| SR 3.8.1.11 Bases | AC Sources - Operating |
| SR 3.8.1.14 Bases | AC Sources - Operating |
| SR 3.8.1.16 Bases | AC Sources - Operating |
| SR 3.8.1.17 Bases | AC Sources - Operating |
| SR 3.8.1.18 Bases | AC Sources - Operating |
| SR 3.8.1.20 Bases | AC Sources - Operating |
| Ref. 3.8.9 Bases | Distribution Systems - Operating |
| Action 3.8.9.A | Distribution Systems - Operating |
| Action 3.8.9.A Bases | Distribution Systems - Operating |
| Action 3.8.9.B | Distribution Systems - Operating |

*8/26/2001*

| | |
|---|---|
| Action 3.8.9.B Bases | Distribution Systems - Operating |
| Action 3.8.9.C | Distribution Systems - Operating |
| Action 3.8.9.C Bases | Distribution Systems - Operating |

ACTIONS (continued)

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| | A.3 | Restore [required] offsite circuit to OPERABLE status. | 72 hours<br><br>AND<br>[10] days from discovery of failure to meet LCO |
| B. One [required] DG inoperable. | B.1 | Perform SR 3.8.1.1 for the [required] offsite circuit(s). | 1 hour<br><br>AND<br><br>Once per 8 hours thereafter |
| | AND | | |
| | B.2 | Declare required feature(s) supported by the inoperable DG inoperable when its required redundant feature(s) is inoperable. | 4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s) |
| | AND | | 72 |
| | B.3.1 | Determine OPERABLE DG(s) is not inoperable due to common cause failure. | [24] hours |
| | OR | | 72 |
| | B.3.2 | Perform SR 3.8.1.2 for OPERABLE DG(s). | [24] hours |
| | AND | | |

ACTIONS (continued)

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| | B.4 | Restore [required] DG to OPERABLE status. | ~~72 hours~~ 7 days<br>AND<br>~~5~~ [10] days from discovery of failure to meet LCO |
| C. Two [required] offsite circuits inoperable. | C.1 | Declare required feature(s) inoperable when its redundant required feature(s) is inoperable. | 12 hours from discovery of Condition C concurrent with inoperability of redundant required features |
| | AND | | |
| | C.2 | Restore one [required] offsite circuit to OPERABLE status. | 24 hours |
| D. One [required] offsite circuit inoperable.<br>AND<br>One [required] DG inoperable. | | **- NOTE -**<br>Enter applicable Conditions and Required Actions of LCO 3.8.9, "Distribution Systems - Operating," when Condition D is entered with no AC power source to any train. | |
| | D.1 | Restore [required] offsite circuit to OPERABLE status. | 12 hours |
| | OR | | |
| | D.2 | Restore [required] DG to OPERABLE status. | 12 hours |

## 3.8 ELECTRICAL POWER SYSTEMS

### 3.8.9 Distribution Systems - Operating

LCO 3.8.9 Train A and Train B AC, DC, and AC vital bus electrical power distribution subsystems shall be OPERABLE.

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

ACTIONS

| CONDITION | REQUIRED ACTION | | COMPLETION TIME |
|---|---|---|---|
| A. One or more AC electrical power distribution subsystems inoperable. | | **- NOTE -**<br>Enter applicable Conditions and Required Actions of LCO 3.8.4, "DC Sources - Operating," for DC trains made inoperable by inoperable power distribution subsystems. | |
| | A.1 | Restore AC electrical power distribution subsystem(s) to OPERABLE status. | 8 hours<br>AND<br>[34]<br>~~16~~ hours from discovery of failure to meet LCO |
| B. One [or more] AC vital buses inoperable. | B.1 | Restore AC vital bus subsystem(s) to OPERABLE status. | ~~2~~ hours [24]<br>AND<br>[34]<br>~~16~~ hours from discovery of failure to meet LCO |

ACTIONS (continued)

| CONDITION | REQUIRED ACTION | COMPLETION TIME |
|---|---|---|
| C. One or more DC electrical power distribution subsystems inoperable. | C.1 Restore DC electrical power distribution subsystem(s) to OPERABLE status. | 2 hours<br>AND [34]<br>~~16~~ hours from discovery of failure to meet LCO |
| D. Required Action and associated Completion Time not met. | D.1 Be in MODE 3.<br>AND<br>D.2 Be in MODE 5. | 6 hours<br>36 hours |
| E. Two or more electrical power distribution subsystems inoperable that result in a loss of safety function. | E.1 Enter LCO 3.0.3. | Immediately |

SURVEILLANCE REQUIREMENTS

| SURVEILLANCE | | FREQUENCY |
|---|---|---|
| SR 3.8.9.1 | Verify correct breaker alignments and voltage to [required] AC, DC, and AC vital bus electrical power distribution subsystems. | 7 days |

BASES

ACTIONS (continued)

reasonable time for repairs, and the low probability of a DBA occurring during this period.

A.3

According to Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition A for a period that should not exceed 72 hours. With one offsite circuit inoperable, the reliability of the offsite system is degraded, and the potential for a loss of offsite power is increased, with attendant potential for a challenge to the unit safety systems. In this Condition, however, the remaining OPERABLE offsite circuit and DGs are adequate to supply electrical power to the onsite Class 1E Distribution System.

The 72 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period.

also

The second Completion Time for Required Action A.3 establishes a limit on the maximum time allowed for any combination of required AC power sources to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition A is entered while, for instance, a DG is inoperable and that DG is subsequently returned OPERABLE, the LCO may already have been not met for up to ~~72 hours~~. This could lead to a total of ~~144 hours~~, since initial failure to meet the LCO, to restore the offsite circuit. At this time, a DG could again become inoperable, ~~the circuit restored OPERABLE~~, and an additional ~~72 hours (for a total of 9 days)~~ allowed prior to complete restoration of the LCO. The ~~6~~ day Completion Time provides a limit on the time allowed in a specified condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and B are entered concurrently. The "AND" connector between the 72 hour and ~~6~~ day Completion Times means that both Completion Times apply simultaneously, and the more restrictive Completion Time must be met.

[10 days]

[7 days]

[7 days]

[10]

This could continue indefinitely if not limited.

[10]

This limits the time the plant can alternate between Conditions A, B, and D (see Completion Time Example 1.3-3).

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

INSERT 1

B.1

To ensure a highly reliable power source remains with an inoperable DG, it is necessary to verify the availability of the offsite circuits on a more

INSERT 1

Tracking the [10] day Completion Time is a requirement for beginning the Completion Time "clock" that is in addition to the normal Completion Time requirements. With respect to the [10] day Completion Time, the "time zero" is specified as beginning at the time LCO 3.8.1 was initially not met, instead of at the time Condition A was entered. This results in the requirement, when in this Condition, to track the time elapsed from both the Condition A "time zero," and the "time zero" when LCO 3.8.1 was initially not met. Refer to Section 1.3, "Completion Times," for a more detailed discussion of the purpose of the "from discovery of failure to meet the LCO" portion of the Completion Time.

BASES

ACTIONS (continued)

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

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

B.3.1 and B.3.2

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

In the event the inoperable DG is restored to OPERABLE status prior to completing either B.3.1 or B.3.2, the [plant corrective action program] will continue to evaluate the common cause possibility. This continued evaluation, however, is no longer under the ~~24~~ [72] hour constraint imposed while in Condition B.

~~According to Generic Letter 84-15 (Ref. 7), [24]~~ The [72] hours ~~is reasonable~~ allowed to confirm that the OPERABLE DG(s) is not affected by the same problem as the inoperable DG.

INSERT 2

INSERT 2

is justified in WCAP-15622 (Ref. 8).

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Reviewer's Note

Plant specific calculations using the plant specific Probabilistic Risk Assessment (PRA) model and the methodology contained in WCAP-15622, "Risk-Informed Evaluation of Extensions to AC Electrical Power System Completion Times," are required to justify extending the Completion Times for Required Actions B.3.1 and B.3.2 to 72 hours.

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BASES

ACTIONS (continued)

B.4

According to Regulatory Guide 1.93 (Ref. 6), operation may continue in Condition B for a period that should not exceed 72 hours. INSERT 3

In Condition B, the remaining OPERABLE DG and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System. The 72 hour Completion Time takes into account the capacity and capability of the remaining AC sources, a reasonable time for repairs, and the low probability of a DBA occurring during this period. [7day]

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

also

[10] days

[10]

[7day]

If the offsite circuit is restored to OPERABLE status within the required 72 hours,

restore compliance with the LCO, (i.e., restore the DG).

This could occur indefinitely if not limited.

[10]

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

INSERT 4

C.1 and C.2

This limits the time the plant can alternate between Conditions A, B, and D (see Completion Time Example 1.3-3).

Required Action C.1, which applies when two offsite circuits are inoperable, is intended to provide assurance that an event with a coincident single failure will not result in a complete loss of redundant required safety functions. The Completion Time for this failure of redundant required features is reduced to 12 hours from that allowed for one train without offsite power (Required Action A.2). The rationale for the reduction to 12 hours is that Regulatory Guide 1.93 (Ref. 6) allows a Completion Time of 24 hours for two required offsite circuits inoperable,

INSERT 3

The [7] days provided for operation to continue while in Condition B is justified in WCAP-15622 (Ref. 8).

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Reviewer's Note

Plant specific calculations using the plant specific PRA model and the methodology contained in WCAP-15622, "Risk-Informed Evaluation of Extensions to AC Electrical Power System Completion Times," are required to justify extending the Completion Time for Required Action B.4 to 7 days, also associated with increasing the second Completion Time for Required Actions A.3 and B.4 to 10 days.

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INSERT 4

Tracking the [10] day Completion Time is a requirement for beginning the Completion Time "clock" that is in addition to the normal Completion Time requirements. With respect to the [10] day Completion Time, the "time zero" is specified as beginning at the time LCO 3.8.1 was initially not met, instead of at the time Condition B was entered. This results in the requirement, when in this Condition, to track the time elapsed from both the Condition B "time zero," and the "time zero" when LCO 3.8.1 was initially not met. Refer to Section 1.3, "Completion Times," for a more detailed discussion of the purpose of the "from discovery of failure to meet the LCO" portion of the Completion Time.

BASES

ACTIONS (continued)

G.1 and G.2

If the inoperable AC electric power sources cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems.

H.1

Condition H corresponds to a level of degradation in which all redundancy in the AC electrical power supplies has been lost. At this severely degraded level, any further losses in the AC electrical power system will cause a loss of function. Therefore, no additional time is justified for continued operation. The unit is required by LCO 3.0.3 to commence a controlled shutdown.

SURVEILLANCE REQUIREMENTS

The AC sources are designed to permit inspection andtesting of all important areas and features, especially those that have a standby function, in accordance with 10 CFR 50, Appendix A, GDC 18 (Ref. 8). Periodic component tests are supplemented by extensive functional tests during refueling outages (under simulated accident conditions). The SRs for demonstrating the OPERABILITY of the DGs are in accordance with the recommendations of Regulatory Guide 1.9 (Ref. 3), Regulatory Guide 1.108 (Ref. 9), and Regulatory Guide 1.137 (Ref. 10), as addressed in the FSAR.

Where the SRs discussed herein specify voltage and frequency tolerances, the following is applicable. The minimum steady state output voltage of [3740] V is 90% of the nominal 4160 V output voltage. This value, which is specified in ANSI C84.1 (Ref. 11), allows for voltage drop to the terminals of 4000 V motors whose minimum operating voltage is specified as 90% or 3600 V. It also allows for voltage drops to motors and other equipment down through the 120 V level where minimum operating voltage is also usually specified as 90% of name plate rating. The specified maximum steady state output voltage of [4756] V is equal to the maximum operating voltage specified for 4000 V motors. It ensures that for a lightly loaded distribution system, the voltage at the terminals of 4000 V motors is no more than the maximum rated operating voltages. The specified minimum and maximum frequencies of the DG

BASES

SURVEILLANCE REQUIREMENTS (continued)

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

SR 3.8.1.4

This SR provides verification that the level of fuel oil in the day tank [and engine mounted tank] is at or above the level at which fuel oil is automatically added. The level is expressed as an equivalent volume in gallons, and is selected to ensure adequate fuel oil for a minimum of 1 hour of DG operation at full load plus 10%.

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

SR 3.8.1.5

Microbiological fouling is a major cause of fuel oil degradation. There are numerous bacteria that can grow in fuel oil and cause fouling, but all must have a water environment in order to survive. Removal of water from the fuel oil day [and engine mounted] tanks once every [31] days eliminates the necessary environment for bacterial survival. This is the most effective means of controlling microbiological fouling. In addition, it eliminates the potential for water entrainment in the fuel oil during DG operation. Water may come from any of several sources, including condensation, ground water, rain water, contaminated fuel oil, and breakdown of the fuel oil by bacteria. Frequent checking for and removal of accumulated water minimizes fouling and provides data regarding the watertight integrity of the fuel oil system. The Surveillance Frequencies are established by Regulatory Guide 1.137 (Ref. 11). This SR is for preventative maintenance. The presence of water does not necessarily represent failure of this SR, provided the accumulated water is removed during the performance of this Surveillance.

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.6

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

[ The Frequency for this SR is variable, depending on individual system design, with up to a [92] day interval. The [92] day Frequency corresponds to the testing requirements for pumps as contained in the ASME Code, Section XI (Ref. 11); however, the design of fuel transfer systems is such that pumps operate automatically or must be started manually in order to maintain an adequate volume of fuel oil in the day [and engine mounted] tanks during or following DG testing. In such a case, a 31 day Frequency is appropriate. Since proper operation of fuel transfer systems is an inherent part of DG OPERABILITY, the Frequency of this SR should be modified to reflect individual designs. ]

(12)

SR 3.8.1.7

See SR 3.8.1.2.

[ SR 3.8.1.8

Transfer of each [4.16 kV ESF bus] power supply from the normal offsite circuit to the alternate offsite circuit demonstrates the OPERABILITY of the alternate circuit distribution network to power the shutdown loads. The [18 month] Frequency of the Surveillance is based on engineering judgment, taking into consideration the unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths. Operating experience has shown that these components usually pass the SR when performed at the [18 month] Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

This SR is modified by a Note. The reason for the Note is that, during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, unit safety systems. This restriction from normally performing the Surveillance in

BASES

SURVEILLANCE REQUIREMENTS (continued)

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

SR 3.8.1.9

Each DG is provided with an engine overspeed trip to prevent damage to the engine. Recovery from the transient caused by the loss of a large load could cause diesel engine overspeed, which, if excessive, might result in a trip of the engine. This Surveillance demonstrates the DG load response characteristics and capability to reject the largest single load without exceeding predetermined voltage and frequency and while maintaining a specified margin to the overspeed trip. [For this unit, the single load for each DG and its horsepower rating is as follows:] This Surveillance may be accomplished by either:

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

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

As required by IEEE-308 (Ref. ~~12~~ 13), the load rejection test is acceptable if the increase in diesel speed does not exceed 75% of the difference between synchronous speed and the overspeed trip setpoint, or 15% above synchronous speed, whichever is lower.

The time, voltage, and frequency tolerances specified in this SR are derived from Regulatory Guide 1.9 (Ref. 3) recommendations for response during load sequence intervals. The 3 seconds specified is

BASES

SURVEILLANCE REQUIREMENTS (continued)

equal to 60% of a typical 5 second load sequence interval associated with sequencing of the largest load. The voltage and frequency specified are consistent with the design range of the equipment powered by the DG. SR 3.8.1.9.a corresponds to the maximum frequency excursion, while SR 3.8.1.9.b and SR 3.8.1.9.c are steady state voltage and frequency values to which the system must recover following load rejection. The [18 month] Frequency is consistent with the recommendation of Regulatory Guide 1.108 (Ref. 8, 10).

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

Note 2 ensures that the DG is tested under load conditions that are as close to design basis conditions as possible. When synchronized with offsite power, testing should be performed at a power factor of $\leq$ [0.9]. This power factor is representative of the actual inductive loading a DG would see under design basis accident conditions. Under certain conditions, however, Note 2 allows the surveillance to be conducted at a power factor other than $\leq$ [0.9]. These conditions occur when grid voltage is high, and the additional field excitation needed to get the power factor to $\leq$ [0.9] results in voltages on the emergency busses that are too high. Under these conditions, the power factor should be maintained as close as practicable to [0.9] while still maintaining acceptable voltage limits on the emergency busses. In other circumstances, the grid voltage may be such that the DG excitation levels needed to obtain a power factor of [0.9] may not cause unacceptable voltages on the emergency

BASES

SURVEILLANCE REQUIREMENTS (continued)

busses, but the excitation levels are in excess of those recommended for the DG. In such cases, the power factor shall be maintained as close as practicable to [0.9] without exceeding the DG excitation limits.

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**- REVIEWER'S NOTE -**

The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:

a. Performance of the SR will not render any safety system or component inoperable,

b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems, and

c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.

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SR 3.8.1.10

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

The [18 month] Frequency is consistent with the recommendation of Regulatory Guide 1.108 (Ref. 9) and is intended to be consistent with expected fuel cycle lengths. (10)

This SR has been modified by two Notes. The reason for Note 1 is that during operation with the reactor critical, performance of this SR could cause perturbation to the electrical distribution systems that could

BASES

SURVEILLANCE REQUIREMENTS (continued)

b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems, and

c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.

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SR 3.8.1.11

(10)

As required by Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(1), this Surveillance demonstrates the as designed operation of the standby power sources during loss of the offsite source. This test verifies all actions encountered from the loss of offsite power, including shedding of the nonessential loads and energization of the emergency buses and respective loads from the DG. It further demonstrates the capability of the DG to automatically achieve the required voltage and frequency within the specified time.

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

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

(10)

The Frequency of [18 months] is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(1), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

BASES

SURVEILLANCE REQUIREMENTS (continued)

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**- REVIEWER'S NOTE -**

The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:

a. Performance of the SR will not render any safety system or component inoperable,

b. Performance of the SR will not cause perturbations to any of the electrical distribution systems that could result in a challenge to steady state operation or to plant safety systems, and

c. Performance of the SR, or failure of the SR, will not cause, or result in, an AOO with attendant challenge to plant safety systems.

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SR 3.8.1.14

(10)

Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(3), requires demonstration once per 18 months that the DGs can start and run continuously at full load capability for an interval of not less than 24 hours, ≥ [2] hours of which is at a load equivalent to 110% of the continuous duty rating and the remainder of the time at a load equivalent to the continuous duty rating of the DG. The DG starts for this Surveillance can be performed either from standby or hot conditions. The provisions for prelubricating and warmup, discussed in SR 3.8.1.2, and for gradual loading, discussed in SR 3.8.1.3, are applicable to this SR.

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

(10) The [18 month] Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(3), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This Surveillance is modified by three Notes. Note 1 states that momentary transients due to changing bus loads do not invalidate this test. Similarly, momentary power factor transients above the power factor limit will not invalidate the test. The reason for Note 2 is that during

BASES

SURVEILLANCE REQUIREMENTS (continued)

The [18 month] Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(5). (10)

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

SR 3.8.1.16

As required by Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(6), this Surveillance ensures that the manual synchronization and automatic load transfer from the DG to the offsite source can be made and the DG can be returned to ready to load status when offsite power is restored. It also ensures that the autostart logic is reset to allow the DG to reload if a subsequent loss of offsite power occurs. The DG is considered to be in ready to load status when the DG is at rated speed and voltage, the output breaker is open and can receive an autoclose signal on bus undervoltage, and the load sequence timers are reset. (10)

The Frequency of [18 months] is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(6), and takes into consideration unit conditions required to perform the Surveillance. (10)

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g. post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed Surveillance, a successful Surveillance, and a perturbation of the offsite

BASES

SURVEILLANCE REQUIREMENTS (continued)

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

[ SR 3.8.1.17

Demonstration of the test mode override ensures that the DG availability under accident conditions will not be compromised as the result of testing and the DG will automatically reset to ready to load operation if a LOCA actuation signal is received during operation in the test mode. Ready to load operation is defined as the DG running at rated speed and voltage with the DG output breaker open. These provisions for automatic switchover are required by IEEE-308 (Ref. 13), paragraph 6.2.6(2).

The requirement to automatically energize the emergency loads with offsite power is essentially identical to that of SR 3.8.1.12. The intent in the requirement associated with SR 3.8.1.17.b is to show that the emergency loading was not affected by the DG operation in test mode. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the emergency loads to perform these functions is acceptable.

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

(10) The [18 month] Frequency is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(8), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. This restriction from normally performing the Surveillance in MODE 1 or 2 is further amplified to allow portions of the Surveillance to be performed for the purpose of reestablishing OPERABILITY (e.g. post work testing following corrective maintenance, corrective modification, deficient or incomplete surveillance testing, and other unanticipated OPERABILITY concerns) provided an assessment determines plant

BASES

SURVEILLANCE REQUIREMENTS (continued)

safety is maintained or enhanced. This assessment shall, as a minimum, consider the potential outcomes and transients associated with a failed partial Surveillance, a successful partial Surveillance, and a perturbation of the offsite or onsite system when they are tied together or operated independently for the partial Surveillance; as well as the operator procedures available to cope with these outcomes. These shall be measured against the avoided risk of a plant shutdown and startup to determine that plant safety is maintained or enhanced when portions of the Surveillance are performed in MODE 1 or 2. Risk insights or deterministic methods may be used for the assessment. ]

SR 3.8.1.18

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

(10) The Frequency of [18 months] is consistent with the recommendations of Regulatory Guide 1.108 (Ref. 3), paragraph 2.a.(2), takes into consideration unit conditions required to perform the Surveillance, and is intended to be consistent with expected fuel cycle lengths.

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems.

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**- REVIEWER'S NOTE -**

The above MODE restrictions may be deleted if it can be demonstrated to the staff, on a plant specific basis, that performing the SR with the reactor in any of the restricted MODES can satisfy the following criteria, as applicable:

a. Performance of the SR will not render any safety system or component inoperable,

BASES

SURVEILLANCE REQUIREMENTS (continued)

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

SR 3.8.1.20

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

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

10

This SR is modified by a Note. The reason for the Note is to minimize wear on the DG during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil continuously circulated and temperature maintained consistent with manufacturer recommendations.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.
2. FSAR, Chapter [8].
3. Regulatory Guide 1.9, Rev. 3.
4. FSAR, Chapter [6].
5. FSAR, Chapter [15].
6. Regulatory Guide 1.93, Rev. 0, December 1974.
7. Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," July 2, 1984.
8. WCAP-15622, Rev. 0, May 2001.
9. 10 CFR 50, Appendix A, GDC 18.
10. Regulatory Guide 1.108, Rev. 1, August 1977.

BASES

REFERENCES (continued)

11. ~~10.~~ Regulatory Guide 1.137, Rev. [ ], [date].

12. ~~11.~~ ASME, Boiler and Pressure Vessel Code, Section XI.

13. ~~12.~~ IEEE Standard 308-1978.

BASES

ACTIONS (continued)

buses, load centers, motor control centers, and distribution panels must be restored to OPERABLE status within 8 hours.

Condition A worst scenario is one train without AC power (i.e., no offsite power to the train and the associated DG inoperable). In this Condition, the unit is more vulnerable to a complete loss of AC power. It is, therefore, imperative that the unit operator's attention be focused on minimizing the potential for loss of power to the remaining train by stabilizing the unit, and on restoring power to the affected train. The 8 hour time limit before requiring a unit shutdown in this Condition is acceptable because of:

a. The potential for decreased safety if the unit operator's attention is diverted from the evaluations and actions necessary to restore power to the affected train, to the actions associated with taking the unit to shutdown within this time limit and

b. The potential for an event in conjunction with a single failure of a redundant component in the train with AC power.

also

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 2 hours. This could lead to a total of 10 hours, since initial failure of the LCO, to restore the AC distribution system. At this time, a DC circuit could again become inoperable, and AC distribution restored OPERABLE. This could continue indefinitely.

(Condition C)

vital bus

INSERT 5

if not limited

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 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

INSERT 6

Required Action A.1 is modified by a Note that requires the applicable Conditions and Required Actions of LCO 3.8.4, "DC Sources - Operating," to be entered for DC trains made inoperable by inoperable power distribution subsystems. This is an exception to LCO 3.0.6 and ensures the proper actions are taken for these components. Inoperability

INSERT 5

and an additional [24] hours allowed prior to complete restoration of the LCO, for a total of [34] hours.

INSERT 6

The [34] hour Completion Time provides a limit on the time allowed in a specified condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A, B, and C are entered concurrently. The "AND" connector between the 8 hour and [34] hour Completion Times means that both Completion Times apply simultaneously, and the more restrictive Completion Time must be met.

Tracking the [34] hour Completion Time is a requirement for beginning the Completion Time "clock" that is in addition to the normal Completion Time requirements. With respect to the [34] hour Completion Time, the "time zero" is specified as beginning at the time LCO 3.8.9 was initially not met, instead of at the time Condition A was entered. This results in the requirement, when in this Condition, to track the time elapsed from both the Condition A "time zero," and the "time zero" when LCO 3.8.9 was initially not met. Refer to Section 1.3, "Completion Times," for more detailed discussion of the purpose of the "from discovery of failure to meet the LCO" portion of the Completion Time.

BASES

ACTIONS (continued)

of a distribution system can result in loss of charging power to batteries and eventual loss of DC power. This Note ensures that the appropriate attention is given to restoring charging power to batteries, if necessary, after loss of distribution systems.

B.1

With one or more AC vital buses inoperable, and a loss of function has not yet occurred, the remaining OPERABLE AC vital 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 required AC vital bus must be restored to OPERABLE status within [24] 2 hours by powering the bus from the associated [inverter via inverted DC, inverter using internal AC source, or Class 1E constant voltage transformer].

Condition B represents one or more AC 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 noninterruptible 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 vital buses and restoring power to the affected vital bus.

[24] This 2 hour limit is more conservative than Completion Times allowed for some components that are without adequate vital AC power. Taking exception to LCO 3.0.2 for components without adequate vital AC power, that would have the Required Action Completion Times shorter than [24] 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,

b. The potential for decreased safety by requiring entry into numerous Applicable Conditions and Required Actions for components without adequate vital 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

BASES

ACTIONS (continued)

c. The potential for an event in conjunction with a single failure of a redundant component.

The [24] hour Completion Time takes into account the importance to safety of restoring the AC vital bus to OPERABLE status, the redundant capability afforded by the other OPERABLE vital buses, and the low probability of a DBA occurring during this period.

INSERT 7

The second Completion Time for Required Action B.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 B is entered while, for instance, an AC bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of [16] hours, since initial failure of the LCO, to restore the vital bus distribution system. At this time, an AC train could again become inoperable and vital bus distribution restored OPERABLE. This could continue indefinitely.

INSERT 8

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.

C.1

With one or more DC buses or distribution panels inoperable, and a loss of function has not yet occurred, 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 [required] DC buses and distribution panels must be restored to OPERABLE status within 2 hours by powering the bus from the associated battery or charger.

Condition C represents one or more DC buses or distribution panels 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

INSERT 7

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Reviewer's Note

Plant specific calculations using the plant specific Probabilistic Risk Assessment (PRA) model and the methodology contained in WCAP-15622, "Risk-Informed Evaluation of Extensions to AC Electrical Power System Completion Times," are required to justify extending the Completion Times for Required Action B.1 to 24 hours, also associated with increasing the second Completion Time for Required Actions A.1, B.1, and C.1 to 34hours. For Condition B, WCAP-15622 modeled only one inoperable AC vital bus. The Completion Time of 24 hours applies only to the first inoperable AC vital bus. Additional plant specific calculations using the plant specific PRA model and the methodology contained in WCAP-15622 are required to justify more than one inoperable AC vital bus to extend the Completion Time of additional inoperable AC vital buses beyond 2 hours.

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INSERT 8

The [34] hour Completion Time provides a limit on the time allowed in a specified condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A, B, and C are entered concurrently. The "AND" connector between the [24] hour and [34] hour Completion Times means that both Completion Times apply simultaneously, and the more restrictive Completion Time must be met.

Tracking the [34] hour Completion Time is a requirement for beginning the Completion Time "clock" that is in addition to the normal Completion Time requirements. With respect to the [34] hour Completion Time, the "time zero" is specified as beginning at the time LCO 3.8.9 was initially not met, instead of at the time Condition B was entered. This results in the requirement, when in this Condition, to track the time elapsed from both the Condition B "time zero," and the "time zero" when LCO 3.8.9 was initially not met. Refer to Section 1.3, "Completion Times," for more detailed discussion of the purpose of the "from discovery of failure to meet the LCO" portion of the Completion Time.

BASES

ACTIONS (continued)

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 trains and restoring power to the affected train.

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 train, 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. 3). The second Completion Time for Required Action C.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 C is entered while, for instance, an AC bus is inoperable and subsequently returned OPERABLE, the LCO may already have been not met for up to 8 hours. This could lead to a total of 10 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 C was entered. The 16 hour Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely.

also

4

(Condition A)

INSERT 9

a vital bus

INSERT 9

and an additional [24] hours allowed prior to complete restoration of the LCO, for a total of [34] hours. This could continue indefinitely if not limited.

The [34] hour Completion Time provides a limit on the time allowed in a specified condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A, B, and C are entered concurrently. The "AND" connector between the 2 hour and [34] hour Completion Times means that both Completion Times apply simultaneously, and the more restrictive Completion Time must be met.

Tracking the [34] hour Completion Time is a requirement for beginning the Completion Time "clock" that is in addition to the normal Completion Time requirements. With respect to the [34] hour Completion Time, the "time zero" is specified as beginning at the time LCO 3.8.9 was initially not met, instead of at the time Condition C was entered. This results in the requirement, when in this Condition, to track the time elapsed from both the Condition C "time zero," and the "time zero" when LCO 3.8.9 was initially not met. Refer to Section 1.3, "Completion Times," for more detailed discussion of the purpose of the "from discovery of failure to meet the LCO" portion of the Completion Time.

BASES

ACTIONS (continued)

D.1 and D.2

If the inoperable distribution subsystem cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit must be brought to at least MODE 3 within 6 hours and to MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging plant systems.

E.1

Condition E corresponds to a level of degradation in the electrical power distribution system that causes a required safety function to be lost. When more than one inoperable electrical power distribution subsystem results in the loss of a required function, the plant is in a condition outside the accident analysis. Therefore, no additional time is justified for continued operation. LCO 3.0.3 must be entered immediately to commence a controlled shutdown.

SURVEILLANCE REQUIREMENTS

SR 3.8.9.1

This Surveillance verifies that the [required] AC, DC, and AC vital bus electrical power distribution systems are functioning properly, with the correct circuit breaker alignment. The correct breaker alignment ensures the appropriate separation and independence of the electrical divisions is maintained, and the appropriate voltage is available to each required bus. 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 AC, DC, and AC vital bus electrical power distribution subsystems, and other indications available in the control room that alert the operator to subsystem malfunctions.

REFERENCES

1. FSAR, Chapter [6].
2. FSAR, Chapter [15].
3. Regulatory Guide 1.93, December 1974.

4. WCAP-15622, Rev. 0, May 2001.