

U.S. Nuclear Regulatory Commission
August 29, 1996

Attachment 2
Page 1

Revised Marked-up Technical
Specification Pages and Justification

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- 2) Verifying the fuel level in the fuel storage tank,
- 3) Verifying the fuel transfer pump starts and transfers fuel from the storage system to the day tank, *Standby (prelude)*
- 4) Verifying the diesel starts from ~~ambient condition and accelerates to at least 488 rpm in less than or equal to 11 seconds*~~. The generator voltage and frequency shall be ~~at least 4160 volts and 57 Hz within 11 seconds after the start signal.~~ The diesel generator shall be started for this test by using one of the following signals: *Insert #5*
- a) Manual, or
 - b) Simulated loss-of-offsite power by itself, or
 - c) Simulated loss-of-offsite power in conjunction with an ESF Actuation test signal, or
 - d) An ESF Actuation test signal by itself.
- 5) Verifying the generator is synchronized, loaded ~~to greater than or equal to 3000 kW in less than or equal to 60 seconds, and to 4000 kW within 10 minutes and operates for at least 60 minutes, and~~ *at 3000-4000 kW****
- 6) Verifying the diesel generator is aligned to provide standby power to the associated emergency busses.
- b. By removing accumulated water:
- 1) From the day tank at least once per 31 days and after each occasion when the diesel is operated for greater than 1 hour, and
 - 2) From the storage tank at least once per 31 days.
- c. By sampling new fuel oil in accordance with ASTM D4057-81 prior to addition to the storage tanks and:
- 1) By verifying in accordance with the tests specified in ASTM D975-81 prior to addition to the storage tanks that the sample has:
 - a) An API Gravity of within 0.3 degrees at 60°F or a specific gravity of within 0.0016 at 60/60°F, when compared to the supplier's certificate or an absolute specific gravity at 60/60°F of greater than or equal to 0.83 but less than or equal to 0.89 or an API gravity at 60°F of greater than or equal to 27 degrees but less than or equal to 39 degrees.

*The diesel generator start (11 sec) from ambient conditions shall be performed at least once per 184 days in these surveillance tests. All other engine starts for the purpose of this surveillance testing may be preceded by an engine pre-lube period and/or other warmup procedures recommended by the manufacturer so that mechanical stress and wear on the diesel engine is minimized.

Insert #6 *G4*

McGUIRE - UNITS 1 and 2

3/4 8-3

Amendment No. 11 (Unit 1)
Amendment No. 52 (Unit 2)

Insert #7 *H3* *H1*

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Attachment 2a

Insert #5:

maintains the steady-state generator voltage and frequency at 4160 ± 420 volts and 60 ± 1.2 Hz, respectively.

Insert #6:

** Once per 184 days, start the engine from standby (prelube) condition, and verify generator reaches ≥ 3740 volts and ≥ 57 Hz in ≤ 11 seconds.

Insert #7:

*** Diesel generator loadings may be done in accordance with the manufacturer's recommendations. The purpose of the load range is to prevent overloading the engine, and momentary excursions outside of the load range shall not invalidate the test.

Insert #7a: (Not Used)

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- b) A kinematic viscosity at 40°C of greater than or equal to 1.9 centistokes, but less than or equal to 4.1 centistokes (alternatively, Saybolt viscosity, SUS at 100°F of greater than or equal to 32.6, but less than or equal to 40.1), if gravity was not determined by comparison with the supplier's certification.
- c) A flash point equal to or greater than 125°F, and
- d) A clear and bright appearance with proper color when tested in accordance with ASTM D4176-82.
- 2) By verifying within 31 days of obtaining the sample that the other properties specified in Table 1 of ASTM D975-81 are met when tested in accordance with ASTM D975-81 except that the analysis for sulfur may be performed in accordance with ASTM D1552-79 or ASTM D2622-82.
- d. At least once every 31 days by obtaining a sample of fuel oil from the storage tanks in accordance with ASTM D2276-78, and verifying that total particulate contamination is less than 10 mg/liter when checked in accordance with ASTM D2276-78, Method A.
- e. At least once per 18 months, by:
 - 1) Subjecting the diesel to an inspection, during shutdown, in accordance with procedures prepared in conjunction with its manufacturer's recommendations for this class of standby service;
 - 2) Verifying, during shutdown, the generator capability to reject a load of greater than or equal to 576 kW while maintaining voltage at 4160 ± 420 volts and frequency at 60 ± 1.2 Hz;
 - 3) Verifying, during shutdown, the generator capability to reject a load of 4000 kW without tripping. The generator voltage shall not exceed 4784 volts during and following the load rejection;
 - 4) Simulating a loss-of-offsite power by itself, during shutdown, and:
 - a) Verifying deenergization of the emergency busses and load shedding from the emergency busses, and
 - b) Verifying the diesel starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 11 seconds, energizes the auto-connected blackout loads through the load sequencer and operates for greater than or equal to 5 minutes while the generator is loaded with the blackout loads. After energization, the steady-state voltage and frequency of the emergency busses shall be maintained at 4160 ± 420 volts and 60 ± 1.2 Hz during this test.

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Attachment 2a

Insert #7b: (Not Used)

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ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- (Deleted) P1
- 9) ~~Verifying that the auto-connected loads to each diesel generator do not exceed the 2-hour rating of 4400 kW;~~
- 10) Verifying, during shutdown, the diesel generator's capability to:
- a) Synchronize with the offsite power source while the generator is loaded with its emergency loads upon a simulated restoration of offsite power,
 - b) Transfer its loads to the offsite power source, and
 - c) Be restored to its standby status.
- 11) Verifying, during shutdown, that with the diesel generator operating in a test mode, connected to its bus, a simulated Safety Injection signal overrides the test mode by: (1) returning the diesel generator to standby operation, and (2) automatically energizing the emergency loads with offsite power;
- 12) Verifying that the fuel transfer pump transfers fuel from each fuel storage tank to the day tank of each diesel via the installed cross-connection lines;
- 13) Verifying that the automatic load sequence timer is OPERABLE with the interval between each load block are within the tolerances shown in Table 4.8-2; #
- 14) Verifying, during shutdown, that the following diesel generator lockout features prevent diesel generator starting only when required:
- a) Turning gear engaged, or
 - b) Emergency stop. Q1
- 15) Verifying, during shutdown, that with all diesel generator air start receivers pressurized to less than or equal to 220 psig and the compressors secured, the diesel generator starts at least 2 times from ~~ambient~~ conditions and accelerates to at least 488 rpm in less than or equal to 11 seconds. # Q5 57 Hz standby (prelube) Q3

This Surveillance Requirement may be performed in conjunction with periodic preplanned preventative maintenance activity that causes the diesel generator to be inoperable provided that performance of the surveillance requirement does not increase the time the diesel generator would be inoperable for the PM activity alone.

*** Diesel generator loadings for the purpose of this surveillance may be in accordance with ~~vendor~~ the manufacturer's recommendations. The purpose of the load range is to prevent overloading the engine and momentary excursions outside of the range shall not invalidate the test. done

*** If there is a test failure during the 24-hour test run, the hot restart test can be performed prior to completing the 24-hour test provided the diesel generator had operated for at least 2 hours loaded between 3800 and 4000 kW. ***

ELECTRICAL POWER SYSTEMS

BASES

Some of the Surveillance Requirements for demonstrating the operability of the diesel generators are modified by a footnote. The Specifications state the Surveillance Requirements are to be performed during shutdown, with the unit in mode 3 or higher. The footnote allows the particular surveillance to be performed during preplanned Preventative Maintenance (PM) activities that would result in the diesel generator being inoperable. The surveillance can be performed at that time as long as it does not increase the time the diesel generator is inoperable for the PM activity that is being performed. The footnote is only applicable at that time. The provision of the footnote shall not be utilized for operational convenience.

Insert # 11

W4

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Attachment 2a

Insert #10: (Not Used)

Insert #11:

Since the McGuire emergency diesel generator manufacturer (Nordberg) is no longer in business, McGuire engineering is the designer of record. Therefore, in the absence of manufacturer recommendations, McGuire engineering will determine what is the appropriate actions required for the nuclear class diesel service taking into account McGuire diesel generator maintenance and operating history and industry experience where applicable.

ADMINISTRATIVE CONTROLS

PROCEDURES AND PROGRAMS (Continued)

toring program and modeling of environmental exposure pathways. The program shall (1) be contained in FSAR Chapter 16, (2) conform to the guidance of Appendix I to 10 CFR Part 50, and (3) include the following:

- 1) Monitoring, sampling, analysis, and reporting of radiation and radionuclides in the environment in accordance with the methodology and parameters in the ODCM,
- 2) A Land Use Census to ensure that changes in the use of areas at and beyond the SITE BOUNDARY are identified and that modifications to the monitoring program are made if required by the results of this census, and
- 3) Participation in an Interlaboratory Comparison Program to ensure that independent checks on the precision and accuracy of the measurements of radioactive materials in environmental sample matrices are performed as part of the quality assurance program for environmental monitoring.

6.9 REPORTING REQUIREMENTS

ROUTINE REPORTS

6.9.1 In addition to the applicable reporting requirements of Title 10, Code of Federal Regulations, the following reports shall be submitted to the Regional Administrator of the NRC Regional Office unless otherwise noted.

STARTUP REPORT

6.9.1.1 A summary report of plant STARTUP and power escalation testing shall be submitted following: (1) receipt of an Operating License, (2) amendment to the License involving a planned increase in power level, (3) installation of fuel that has a different design or has been manufactured by a different fuel supplier, and (4) modifications that may have significantly altered the nuclear, thermal, or hydraulic performance of the plant.

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Attachment 2a

Insert #12: (Not Used)

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- c) Simulated loss of offsite power in conjunction with an ESF Actuation test signal, or
- d) An ESF Actuation test signal by itself.
- 5) Verifying the generator is synchronized, loaded to greater than or equal to 5600 kW but less than or equal to 5750 kW in less than or equal to 60 seconds, and operates for at least 60 minutes, and HI
↑ at 5600-5750 kW ***
- 6) Verifying the diesel generator is aligned to provide standby power to the associated emergency busses. H2
- b. At least once per 31 days and after each operation of the diesel where the period of operation was greater than or equal to 1 hour by checking for and removing accumulated water from the day tank;
- c. At least once per 31 days by checking for and removing accumulated water from the fuel oil storage tanks;
- d. By verifying that the Cathodic Protection System is OPERABLE by verifying:
 - 1) At least once per 60 days that cathodic protection rectifiers are OPERABLE and have been inspected in accordance with the manufacturer's inspection procedures, and
 - 2) At least once per 12 months that adequate protection from corrosion is provided in accordance with manufacturer's inspection procedures.
- e. By sampling new fuel oil in accordance with ASTM-D4057 prior to addition to storage tanks and:
 - 1) By verifying in accordance with the tests specified in ASTM-D975-81 prior to addition to the storage tanks that the sample has:
 - a) An API Gravity of within 0.3 degrees at 60°F, or a specific gravity of within 0.0016 at 60/60°F, when compared to the supplier's certificate, or an absolute specific gravity at 60/60°F of greater than or equal to 0.83 but less than or equal to 0.89, or an API gravity of greater than or equal to 27 degrees but less than or equal to 39 degrees;
 - b) A kinematic viscosity at 40°C of greater than or equal to 1.9 centistokes, but less than or equal to 4.1 centistokes (alternatively, Saybolt viscosity, SUS at 100°F of greater than or equal to 32.6, but less than or equal to 40.1), if gravity was not determined by comparison with the supplier's certification;
 - c) A flash point equal to or greater than 125°F; and
 - d) A clear and bright appearance with proper color when tested in accordance with ASTM-D4176-82.
 - 2) By verifying within 30 days of obtaining the sample that the other properties specified in Table 1 of ASTM-D975-81 are met when tested in accordance with ASTM-D975-81 except that the

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Attachment 2b

Insert #9a: (Not Used)

Insert #10:

*** Diesel generator loadings may be done in accordance with the manufacturer's recommendations. The purpose of the load range is to prevent overloading the engine, and momentary excursions outside of the load range shall not invalidate the test.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

analysis for sulfur may be performed in accordance with ASTM-D1552-79 or ASTM-D2622-82.

- f. At least once every 31 days by obtaining a sample of fuel oil in accordance with ASTM-D2276-78, and verifying that total particulate contamination is less than 10 mg/liter when checked in accordance with ASTM-D2276-78, Method A;
- g. At least once per 18 months by:
- 1) Subjecting the diesel to an inspection, during shutdown, in accordance with procedures prepared in conjunction with its manufacturer's recommendations for this class of standby service;***
 - 2) Verifying the generator capability to reject a load of greater than or equal to 825 kW while maintaining voltage at 4160 ± 420 volts and frequency at 60 ± 1.2 Hz;
 - 3) Verifying the generator capability to reject a load of greater than or equal to 5600 kW but less than or equal to 5750 kW without tripping. The generator speed shall not exceed 500 rpm during and following the load rejection;
 - 4) Simulating a loss-of-offsite power by itself,** during shutdown, and:
 - a) Verifying deenergization of the emergency busses and load shedding from the emergency busses, and
 - b) Verifying the diesel starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 11 seconds, energizes the auto-connected emergency (accident) loads through the load sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the emergency loads. After energization, the steady-state voltage and frequency of the emergency busses shall be maintained at 4160 ± 420 volts and 60 ± 1.2 Hz during this test.
 - 5) Verifying that on an ESF Actuation test signal, without loss-of-offsite power, the diesel generator starts on the auto-start signal and operates on standby for greater than or equal to 5 minutes. The generator voltage and frequency shall be at 4160 ± 420 volts and 60 ± 1.2 Hz within 11 seconds after the auto-start signal; the steady-state generator voltage and frequency shall be maintained within these limits during this test;
 - 6) Simulating a loss-of-offsite power in conjunction with an ESF Actuation test signal, during shutdown, and

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**This surveillance need not be performed until prior to entering HOT SHUTDOWN following the Unit 1 first refueling.

***This surveillance need not be performed on Unit 2 until prior to entering HOT SHUTDOWN following the Unit 2 first refueling.

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Attachment 2b

Insert #10a: (Not Used)

ADMINISTRATIVE CONTROLS

g. Radiological Environmental Monitoring Program (Continued)

- 3) Participation in a Interlaboratory Comparison Program to ensure that independent checks on the precision and accuracy of the measurements of radioactive materials in the environmental sample matrices are performed as part of the quality assurance program for environmental monitoring.

6.9 REPORTING REQUIREMENTS

ROUTINE REPORTS

6.9.1 In addition to the applicable reporting requirements of Title 10, Code of Federal Regulations, the following reports shall be submitted to NRC in accordance with 10 CFR 50.4.

STARTUP REPORT

6.9.1.1 A summary report of plant startup and power escalation testing shall be submitted following (1) receipt of an Operating License, (2) amendment to the license involving a planned increase in power level, (3) installation of fuel that has a different design or has been manufactured by a different fuel supplier, and (4) modifications that may have significantly altered the nuclear, thermal, or hydraulic performance of the unit.

6.9.1.2 The Startup Report shall address each of the tests identified in the Final Safety Analysis Report and shall include a description of the measured values of the operating conditions or characteristics obtained during the test program and a comparison of these values with design predictions and specifications. Any corrective actions that were required to obtain satisfactory operation shall also be described. Any additional specific details required in license conditions based on other commitments shall be included in this report.

6.9.1.3 Startup Reports shall be submitted within: (1) 90 days following completion of the Startup Test Program, (2) 90 days following resumption or commencement of commercial power operation, or (3) 9 months following initial criticality, whichever is earliest. If the Startup Report does not cover all three events (i.e., initial criticality, completion of Startup Test Program, and resumption or commencement of commercial operation), supplementary reports shall be submitted at least every 3 months until all three events have been completed.

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Attachment 2b

Insert #13: (Not Used)

NUREG-1431, LESS STRINGENT	PROPOSED CHANGE (ATTACH. 3)	MNS SPEC (ATTACH. 2a)	CNS SPEC (ATTACH. 2b)	NEW STS
Allow slow start of DG	G2	4.8.1.1.2.a.4	4.8.1.1.2.a.4	3.8.1.2
Allow a steady- state voltage and frequency to be verified instead of a minimum voltage and frequency within 11 seconds	G3 (MNS only)	4.8.1.1.2.a.4	4.8.1.1.2.a.4	3.8.1.2
Allow a power range instead of an absolute power for testing DG	H2 (MNS only) O1 (MNS only)	4.8.1.1.2.a.5 4.8.1.1.2.e.8	4.8.1.1.2.a.5 4.8.1.1.2.g.7 4.8.1.1.2.g.15	3.8.1.3 3.8.1.14
Allow momentary excursions outside of the required load range without invalidating the DG test	H3	4.8.1.1.2.a.5	4.8.1.1.2.a.5	3.8.1.3 Note 2
Allow a minimum voltage instead of the nominal voltage to be verified within 11 seconds of an ESF actuation test signal	M1 (MNS only) O3 (MNS only)	4.8.1.1.2.e.5 4.8.1.1.2.e.8	4.8.1.1.2.g.5 4.8.1.1.2.g.7 4.8.1.1.2.g.15	3.8.1.12 3.8.1.14
Allow deletion of verification during RFO of auto-connected loads to each DG do not exceed 2- hour rating	P1	4.8.1.1.2.e.9	4.8.1.1.2.g.8	NONE

OTHER (TECHNICAL)	PROPOSED CHANGE (ATTACH. 3)	MNS SPEC (ATTACH. 2a)	CNS SPEC (ATTACH. 2b)	NEW STS
Allow air start testing to be done during PM activities	Q1 (MNS only)	4.8.1.1.2.e.15	NONE	NONE
Allow "manufacturer's recommendations" to be "McGuire Engineering's recommendations"	W4 (MNS only)	B 3/4.8.1,2,3	B 3/4.8.1,2,3	

ADMINISTRATIVE	PROPOSED CHANGE (ATTACH. 3)	MNS SPEC (ATTACH. 2a)	CNS SPEC (ATTACH. 2b)	NEW STS
Changes due to deletion of DG testing when one or two offsite circuits are inoperable	A2	3.8.1.1 Action a	3.8.1.1. Action a	3.8.1 Action A
Change "A.C. Source" to "required offsite circuit"	B4	3.8.1.1 Action b	3.8.1.1 Action b	3.8.1 Action D
Delete footnote concerning definition of operability for DG	B5 (MNS only) C5 (MNS only) E1 (MNS only)	3.8.1.1 Action b 3.8.1.1 Action d 3.8.1.1 Action f	3.8.1.1 Action b 3.8.1.1 Action c 3.8.1.1 Action e	3.8.1 Action D 3.8.1 Action B 3.8.1 Action E
Refine Mode change requirement statement	B6 (CNS only) D2 (CNS only) E2 (CNS only)	3.8.1.1 Action b 3.8.1.1 Action e 3.8.1.1 Action f	3.8.1.1 Action b 3.8.1.1 Action d 3.8.1.1 Action e	3.8.1 Action D 3.8.1 Action C 3.8.1 Action E
Delete footnote concerning explanation of STAGGERED TEST BASIS	F3 (CNS only)	4.8.1.1.2.a	4.8.1.1.2.a	3.8.1.2 3.8.1.3 3.8.1.4 3.8.1.6 3.8.1.7
Change "ambient" to "standby (prelube)"	G1 Q3 (MNS only)	4.8.1.1.2.a.4 4.8.1.1.2.e.15	4.8.1.1.2.a.4 NONE	3.8.1.3 3.8.1.7 NONE

3. Add footnote *** to allow for loading "in accordance with the manufacturer's recommendations" and "momentary excursions outside of the required load range without invalidating the test." (NUREG-1431, less stringent)

H/ Technical Justification:

1. NUREG-1366 states that fast loading (zero to full load in 120 seconds or less) during surveillance testing is the most significant cause of accelerated degradation of diesel generators. NUREG-1366 recommends that the loading of diesel generators be in accordance with the manufacturer's recommendations, except for the refueling outage loss of offsite power (LOOP) tests, which can be 30 minutes or more to reach full load. Generic Letter 93-05 and NUREG-1431 SR 3.8.1.3 NOTE 1 reflect this proposed change.
2. NUREG-1431 SR 3.8.1.3 reflects the 90-100% of the maximum load range. Allowing a load range will prevent testing the diesel generator in an overloaded condition as is currently required at McGuire to maintain 4000 kW.
3. NUREG-1431 SR 3.8.1.3 NOTE 2 reflects this footnote.

I/ (Not used)

J/ (Not Used)

K/ (Not used)

L/ (Not Used)

M/ Proposed Revision to TS 4.8.1.1.2.e.5 (McGuire):

1. Change the minimum voltage from "4160 volts" to "3740 volts". (NUREG-1431, less stringent)

M/ Technical Justification:

1. The minimum voltage, as opposed to the nominal voltage, is verified whenever fast loading (within 11 seconds) is verified. The "3740 volts" minimum value is used in NUREG-1431.

N/ Proposed Revision to TS 4.8.1.1.2.e.6.c (McGuire):

1. Change "generator time overcurrent" to "generator voltage-controlled overcurrent". (ADMIN.)

loads to each DG do not exceed the 2-hour rating of 4400 kW (McGuire) and 5750 kW (Catawba).

Q/ Proposed Revision to TS 4.8.1.1.2.e.15 (McGuire):

1. Add superscript # to "shutdown" to refer to the footnote # regarding performing this surveillance during DG periodic preplanned preventative maintenance activity. (OTHER)
2. (Not Used)
3. Change "ambient" to "standby (prelube)". (ADMIN.)
4. (Not Used)
5. Change "488 rpm" to "57 Hz". (ADMIN.)

Q/ Technical Justification:

1. To allow the performance of this surveillance in conjunction with DG periodic preplanned preventative maintenance activity.
2. (Not Used)
3. This change is consistent with change G/1.
4. (Not Used)

5. NUREG-1431 surveillances reflect the frequency in Hz. 488 rpm corresponds to 57 Hz. Existing diesel speed indicator is in Hz.

R/ Proposed Revision to TS 4.8.1.1.2.f (McGuire):

1. Change "488 rpm" to "57 Hz". (ADMIN.)

R/ Technical Justification:

1. NUREG-1431 surveillances reflect the frequency in Hz. 488 rpm corresponds to 57 Hz. Existing diesel speed indicator is in Hz.

S/ Catawba only: Proposed Revision to TS 4.8.1.1.2.g.1,
4.8.1.1.2.g.4, 4.8.1.1.2.g.6.a, 4.8.1.1.2.g.6.b,
4.8.1.1.2.g.8, 4.8.1.1.2.g.9 and 4.8.1.1.2.g.10:

1. Delete superscripts ** and *** and associated footnotes concerning the applicability of these surveillances prior to entering HOT SHUTDOWN following the Catawba Units 1 and 2 first refuelings. (ADMIN.)

S/ Technical Justification:

1. This is purely an administrative change. Catawba's first refuelings have passed.

T/ Proposed Revision to TS 4.8.1.1.2.g.15 (Catawba):

1. Change from "Within 5 minutes after completing this test, perform Specification 4.8.1.1.2g.6)b)" to "Within 5 minutes after shutting down the diesel generator, restart the diesel generator and verify that the generator voltage and frequency reaches at least 3740 volts and 57 Hz within 11 seconds". (GL 93-05)

T/ Technical Justification:

1. This change is consistent with McGuire TS 4.8.1.1.2.e.8. GL 93-05 and NUREG-1431 SR 3.8.1.15 reflect this change.

U/ Proposed Revision to TS 4.8.1.1.3:

1. Specify that this requirement, "Reports", is not used. (GL 94-01)

U/ Technical Justification:

1. GL 94-01 allows the deletion of the special TS reporting requirements for DGs provided that the Maintenance Rule for DGs is implemented. (McGuire and Catawba will continue to comply with the provisions of 10 CFR 50.72 and 50.73 to notify NRC and report other DG failures). Diesel generators (including support systems) are included within the scope of the maintenance rule.

V/ Proposed Revision to TS 4.8.1.2:

1. Delete the reference to TS 4.8.1.1.3. (ADMIN.)

V/ Technical Justification:

1. This deletion is due to the proposed deletion U/1 above.

W/ Proposed Revision to TS Bases 3/4.8.1, 3/4.8.2 and 3/4.8.3:

1. Delete the reference to potential diesel generator degradation due to excessive testing. (ADMIN.)
2. Add the reference to Generic Letters 93-05 and 94-01. (ADMIN.)
3. (Not Used)
4. McGuire only: Add an explanation regarding "manufacturer's recommendations" vs. "McGuire Engineering's recommendations". (OTHER)

W/ Technical Justification:

1. With the implementation of the recommendations and guidance in NUREG-1366 and GL 93-05 (as applicable to DGs), the concern of potential diesel generator degradation due to excessive testing is resolved.
2. This proposed change is to reflect the implementation of these GLs.
3. (Not Used)

4. McGuire only: Since the McGuire emergency diesel generator manufacturer (Nordberg) is no longer in business, McGuire engineering is the designer of record. Therefore, the term "manufacturer's (or vendor) recommendations" is taken to mean recommendations as determined by McGuire engineering (with specific industry Nordberg input as available) that were intended for nuclear class diesel service taking into account McGuire diesel generator maintenance and operating history and industry experience where applicable.

X/ (Not Used)

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Attachment 3
Page 1

Final Technical Specification Pages

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3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

OPERATING

LIMITING CONDITION FOR OPERATION

3.8.1.1 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

- a. Two physically independent circuits between the offsite transmission network and the Onsite Essential Auxiliary Power System, and
- b. Two separate and independent diesel generators, each with:
 - 1) A separate day tank containing a minimum volume of 120 gallons of fuel,
 - 2) A separate Fuel Storage System containing a minimum volume of 39,500 gallons of fuel,
 - 3) A separate fuel transfer pump.

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

ACTION:

- a. With an offsite circuit of the above required A.C. electrical power sources inoperable:
 1. Demonstrate the OPERABILITY of the remaining required offsite circuit by performing Surveillance Requirement 4.8.1.1.1a. within 1 hour and at least once per 8 hours thereafter; and
 2. Restore the required offsite circuit to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b. With one offsite circuit and one diesel generator of the above required A.C. electrical power sources inoperable: (also refer to ACTION c)
 1. Demonstrate the OPERABILITY of the remaining required offsite circuit by performing Surveillance Requirement 4.8.1.1.1a. within 1 hour and at least once per 8 hours thereafter; and

ELECTRICAL POWER SYSTEMS

LIMITING CONDITION FOR OPERATION

ACTION: (Continued)

2. Demonstrate* the operability of the remaining diesel generator by:
 - a. Performing Surveillance Requirements 4.8.1.1.2a.4 and 4.8.1.1.2a.5 within 8 hours, or
 - b. Verifying within 8 hours that no potential common mode failure for the remaining diesel exists;
3. Restore at least one of the inoperable sources to OPERABLE status within 12 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours; with the diesel generator restored to OPERABLE status, follow ACTION a; with the offsite circuit restored to OPERABLE status, follow ACTION d.
- c. With one diesel generator inoperable in addition to ACTION b or d, verify that:
 1. All required systems, subsystems, trains, components and devices that depend on the remaining OPERABLE diesel generator as a source of emergency power are also OPERABLE, and
 2. When in MODE 1, 2, or 3 with a steam pressure greater than 900 psig, the steam-driven auxiliary feedwater pump is OPERABLE.

If these conditions are not satisfied within 2 hours be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- d. With a diesel generator of the above required A.C. electrical power sources inoperable: (also refer to ACTION c)
 1. Demonstrate the OPERABILITY of the A.C. offsite sources by performing Surveillance Requirement 4.8.1.1.1a within 1 hour and at least once per 8 hours thereafter; and
 2. Demonstrate* the OPERABILITY of the remaining diesel generator by:

* This action is not required if the inoperability of the diesel was due to an inoperable support system, an independently testable component, or preplanned testing or maintenance. If required, this action is to be completed regardless of when the inoperable diesel generator is restored to OPERABLE status. The provisions of Specification 3.0.2 are not applicable.

ELECTRICAL POWER SYSTEMS

LIMITING CONDITION FOR OPERATION

ACTION: (Continued)

- a. Performing Surveillance Requirements 4.8.1.1.2a.4) and 4.8.1.1.2a.5) within 24 hours, or
- b. Verifying within 24 hours that no potential common mode failure for the remaining diesel exists;
3. Restore diesel generators to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- e. With two of the above required offsite A.C. circuits inoperable, restore at least one of the inoperable offsite sources to OPERABLE status within 24 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. With only one offsite source restored, follow ACTION a.
- f. With two of the above required diesel generators inoperable:
 1. Demonstrate the OPERABILITY of two offsite A.C. circuits by performing Surveillance Requirement 4.8.1.1.1a. within 1 hour and at least once per 8 hours thereafter; and
 2. Restore at least one of the inoperable diesel generators to OPERABLE status within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. With one diesel generator restored, follow ACTION d.

SURVEILLANCE REQUIREMENTS

4.8.1.1.1 Each of the above required independent circuits between the offsite transmission network and the onsite Essential Auxiliary Power System shall be:

- a. Determined OPERABLE at least once per 7 days by verifying correct breaker alignments, indicated power availability, and
- b. Demonstrated OPERABLE at least once per 18 months during shutdown by transferring (manually and automatically) unit power supply from the normal circuit to the alternate circuit.

4.8.1.1.2 Each diesel generator shall be demonstrated OPERABLE:

- a. At least once per 31 days on a STAGGERED TEST BASIS by:
 - 1) Verifying the fuel level in the day tank,
 - 2) Verifying the fuel level in the fuel storage tank,

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- 3) Verifying the fuel transfer pump starts and transfers fuel from the storage system to the day tank,
 - 4) Verifying** the diesel starts from standby (prelube) condition and maintains the steady-state generator voltage and frequency at 4160 ± 420 volts and 60 ± 1.2 Hz, respectively. The diesel generator shall be started for this test by using one of the following signals:
 - a) Manual, or
 - b) Simulated loss-of-offsite power by itself, or
 - c) Simulated loss-of-offsite power in conjunction with an ESF Actuation test signal, or
 - d) An ESF Actuation test signal by itself.
 - 5) Verifying the generator is synchronized, loaded and operates at 3600 - 4000 kW*** for at least 60 minutes, and
 - 6) Verifying the diesel generator is aligned to provide standby power to the associated emergency busses.
- b. By removing accumulated water:
- 1) From the day tank at least once per 31 days and after each occasion when the diesel is operated for greater than 1 hour, and
 - 2) From the storage tank at least once per 31 days.
- c. By sampling new fuel oil in accordance with ASTM D4057-81 prior to addition to the storage tanks and:
- 1) By verifying in accordance with the tests specified in ASTM D975-81 prior to addition to the storage tanks that the sample has:

** Once per 184 days, start the engine from standby (prelube) condition, and verify generator reaches ≥ 3740 volts and ≥ 57 Hz in ≤ 11 seconds.

*** Diesel generator loadings may be done in accordance with the manufacturer's recommendations. The purpose of the load range is to prevent overloading the engine, and momentary excursions outside of the load range shall not invalidate the test.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- a) An API Gravity of within 0.3 degrees at 60°F or a specific gravity of within 0.0016 at 60/60°F, when compared to the supplier's certificate or an absolute specific gravity at 60/60°F of greater than or equal to 0.83 but less than or equal to 0.89 or an API gravity at 60°F of greater than or equal to 27 degrees but less than or equal to 39 degrees.
 - b) A kinematic viscosity at 40°C of greater than or equal to 1.9 centistokes, but less than or equal to 4.1 centistokes (alternatively, Saybolt viscosity, SUS at 100°F of greater than or equal to 32.6, but less than or equal to 40.1), if gravity was not determined by comparison with the supplier's certification.
 - c) A flash point equal to or greater than 125°F, and
 - d) A clear and bright appearance with proper color when tested in accordance with ASTM D4176-82.
- 2) By verifying within 31 days of obtaining the sample that the other properties specified in Table 1 of ASTM D975-81 are met when tested in accordance with ASTM D975-81 except that the analysis for sulfur may be performed in accordance with ASTM D1552-79 or ASTM D2622-82.
- d. At least once every 31 days by obtaining a sample of fuel oil from the storage tanks in accordance with ASTM D2276-78, and verifying that total particulate contamination is less than 10 mg/liter when checked in accordance with ASTM D2276-78, Method A.
- e. At least once per 18 months, by:
- 1) Subjecting the diesel to an inspection, during shutdown, in accordance with procedures prepared in conjunction with its manufacturer's recommendations for this class of standby service;
 - 2) Verifying, during shutdown, the generator capability to reject a load of greater than or equal to 576 kW while maintaining voltage at 4160 ± 420 volts and frequency at 60 ± 1.2 Hz;
 - 3) Verifying, during shutdown, the generator capability to reject a load of 4000 kW without tripping. The generator voltage shall not exceed 4784 volts during and following the load rejection;
 - 4) Simulating a loss-of-offsite power by itself, during shutdown, and:
 - a) Verifying deenergization of the emergency busses and load shedding from the emergency busses, and

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- b) Verifying the diesel starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 11 seconds, energizes the auto-connected blackout loads through the load sequencer and operates for greater than or equal to 5 minutes while the generator is loaded with the blackout loads. After energization, the steady-state voltage and frequency of the emergency busses shall be maintained at 4160 ± 420 volts and 60 ± 1.2 Hz during this test.
- 5) Verifying that on an ESF actuation test signal, without loss-of-offsite power, the diesel generator starts on the auto-start signal and operates on standby for greater than or equal to 5 minutes. The generator voltage and frequency shall be at least 3740 volts and 57 Hz within 11 seconds after the auto-start signal; the steady-state generator voltage and frequency shall be maintained within 4160 ± 420 volts and 60 ± 1.2 Hz during this test;
- 6) Simulating a loss-of-offsite power in conjunction with an ESF actuation test signal, and
 - a) Verifying, during shutdown, deenergization of the emergency busses and load shedding from the emergency busses;
 - b) Verifying, during shutdown, the diesel starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 11 seconds, energizes the auto-connected emergency (accident) loads through the load sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the emergency loads. After energization, the steady-state voltage and frequency of the emergency busses shall be maintained at 4160 ± 420 volts and 60 ± 1.2 Hz during this test; and
 - c) Verifying, during shutdown[#], that all automatic diesel generator trips, except engine overspeed, lube oil pressure, generator voltage-controlled overcurrent, and generator differential are automatically bypassed upon loss of voltage on the emergency bus concurrent with a Safety Injection Actuation signal.
- 7) [Deleted, Left Blank]

[#] This Surveillance Requirement may be performed in conjunction with periodic preplanned preventative maintenance activity that causes the diesel generator to be inoperable provided that performance of the surveillance requirement does not increase the time the diesel generator would be inoperable for the PM activity alone.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- 8) Verifying, during shutdown, the diesel generator operates for at least 24 hours. During the first 2 hours of this test, the diesel generator shall be loaded between 4200 kW and 4400 kW*** and during the remaining 22 hours of this test, the diesel generator shall be loaded between 3600 kW and 4000 kW***. The generator voltage and frequency shall be at least 3740 volts and 57 Hz within 11 seconds after the start signal. The steady-state generator voltage and frequency shall be maintained within 4160 ± 420 volts and 60 ± 1.2 Hz during this test. Within 5 minutes of shutting down the diesel generator, restart the diesel generator and verify that the generator voltage and frequency reaches at least 3740 volts and 57 Hz within 11 seconds##.
- 9) (Deleted)
- 10) Verifying, during shutdown, the diesel generator's capability to:
 - a) Synchronize with the offsite power source while the generator is loaded with its emergency loads upon a simulated restoration of offsite power,
 - b) Transfer its loads to the offsite power source, and
 - c) Be restored to its standby status.
- 11) Verifying, during shutdown, that with the diesel generator operating in a test mode, connected to its bus, a simulated Safety Injection signal overrides the test mode by: (1) returning the diesel generator to standby operation, and (2) automatically energizing the emergency loads with offsite power;

*** Diesel generator loadings may be done in accordance with the manufacturer's recommendations. The purpose of the load range is to prevent overloading the engine, and momentary excursions outside of the load range shall not invalidate the test.

If the hot restart is not satisfactorily completed, it is not necessary to repeat the preceding 24-hour test. Instead, the diesel generator may be operated at 3600 - 4000 kW*** for 2 hours or until operating temperature has stabilized.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- 12) Verifying that the fuel transfer pump transfers fuel from each fuel storage tank to the day tank of each diesel via the installed cross-connection lines;
 - 13) Verifying that the automatic load sequence timer is OPERABLE with the interval between each load block are within the tolerances shown in Table 4.8-2;
 - 14) Verifying, during shutdown[#], that the following diesel generator lockout features prevent diesel generator starting only when required:
 - a) Turning gear engaged, or
 - b) Emergency stop.
 - 15) Verifying, during shutdown[#], that with all diesel generator air start receivers pressurized to less than or equal to 220 psig and the compressors secured, the diesel generator starts at least 2 times from standby (prelube) conditions and accelerates to at least 57 Hz in less than or equal to 11 seconds.
- f. At least once per 10 years or after any modifications which could affect diesel generator interdependence by starting both diesel generators simultaneously, during shutdown, and verifying that both diesel generators accelerate to at least 57 Hz in less than or equal to 11 seconds; and
- g. At least once per 10 years by:
- 1) Draining each fuel oil storage tank, removing the accumulated sediment and cleaning the tank using a sodium hypochlorite solution, and
 - 2) Performing a pressure test of those portions of the diesel fuel oil system designed to Section III, subsection ND of the ASME Code at a test pressure equal to 110% of the system design pressure.

[#] This Surveillance Requirement may be performed in conjunction with periodic preplanned preventative maintenance activity that causes the diesel generator to be inoperable provided that performance of the surveillance requirement does not increase the time the diesel generator would be inoperable for the PM activity alone.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

4.8.1.1.3 Reports - (Not Used)

4.8.1.1.4 Diesel Generator Batteries - Each diesel generator 125-volt battery bank and charger shall be demonstrated OPERABLE:

- a. At least once per 7 days by verifying that:
 - 1) The electrolyte level of each battery is above the plates, and
 - 2) The overall battery voltage is greater than or equal to 125 volts under a float charge.
- b. At least once per 18 months by verifying that:
 - 1) The batteries, cell plates and battery racks show no visual indication of physical damage or abnormal deterioration;
 - 2) The battery-to-battery and terminal connections are clear, tight, free of corrosion and coated with anti-corrosion material; and
 - 3) The battery capacity is adequate to supply and maintain in OPERABLE status its emergency loads when subjected to a battery service test.

TABLE 4.8-1 - DIESEL GENERATOR TEST SCHEDULE (Not Used)

ELECTRICAL POWER SYSTEMS

A.C. SOURCES

SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.1.2 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

- a. One circuit between the offsite transmission network and the Onsite Essential Auxiliary Power System, and
- b. One diesel generator with:
 - 1) A day tank containing a minimum volume of 120 gallons of fuel,
 - 2) A Fuel Storage System containing a minimum volume of 28,000 gallons of fuel, and
 - 3) A fuel transfer pump.

APPLICABILITY: MODES 5 and 6.

ACTION:

With less than the above minimum required A.C. electrical power sources OPERABLE, immediately suspend all operations involving CORE ALTERATIONS, positive reactivity changes, movement of irradiated fuel, or crane operation with loads over the fuel storage pool, and within 8 hours, depressurize and vent the Reactor Coolant System through a greater than or equal to 4.5 square inch vent. In addition, when in MODE 5 with the reactor coolant loops not filled, or in MODE 6 with the water level less than 23 feet above the reactor vessel flange, immediately initiate corrective action to restore the required sources to OPERABLE status as soon as possible.

SURVEILLANCE REQUIREMENTS

4.8.1.2 The above required A.C. electrical power sources shall be demonstrated OPERABLE by the performance of each of the requirements of Specifications 4.8.1.1.1, 4.8.1.1.2 (except for Specification 4.8.1.1.2a.5), and 4.8.1.1.4.

3/4.8 ELECTRICAL POWER SYSTEMS

BASES

3/4.8.1, 3/4.8.2 AND 3/4.8.3 A.C. SOURCES, D.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS

The OPERABILITY of the A.C. and D.C. power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety-related equipment required for: (1) the safe shutdown of the facility, and (2) the mitigation and control of accident conditions within the facility. The minimum specified independent and redundant A.C. and D.C. power sources and distribution systems satisfy the requirements of General Design Criterion 17 of Appendix A to 10 CFR 50.

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the safety analyses and are based upon maintaining at least one redundant set of onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss-of-offsite power and single failure of the other onsite A.C. source. The A.C. and D.C. source allowable out-of-service times are based on Regulatory Guide 1.93, "Availability of Electrical Power Sources", December 1974. When one diesel generator is inoperable, there is an additional ACTION requirement to verify that all required systems, subsystems, trains, components and devices, that depend on the remaining OPERABLE diesel generator as a source of emergency power, are also OPERABLE, and that the steam-driven auxiliary feedwater pump is OPERABLE. This requirement is intended to provide assurance that a loss-of-offsite power event will not result in a complete loss of safety function of critical systems during the period one of the diesel generators is inoperable. The term verify as used in this context means to administratively check by examining logs or other information to determine if certain components are out-of-service for maintenance or other reasons. It does not mean to perform the Surveillance Requirements needed to demonstrate the OPERABILITY of the component.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that: (1) the facility can be maintained in the shutdown or refueling condition for extended time periods, and (2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status.

The Surveillance Requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guides 1.9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," March 10, 1971, 1.108, "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants," Revision 1, August 1977, and 1.137, "Fuel-Oil Systems for Standby Diesel Generators," Revision 1, October 1979; Generic Letter 84-15, which modified the testing frequencies specified in Regulatory Guide 1.108; Generic Letter 93-05, which reduced the surveillance requirements for testing of Diesel Generators during power operation; also, Generic Letter 94-01, which removed the accelerated testing and special reporting requirements for Emergency Diesel Generators.

ELECTRICAL POWER SYSTEMS

BASES

A.C. SOURCES, D.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS (Continued)

Some of the Surveillance Requirements for demonstrating the operability of the diesel generators are modified by a footnote. The Specifications state the Surveillance Requirements are to be performed during shutdown, with the unit in mode 3 or higher. The footnote allows the particular surveillance to be performed during preplanned Preventative Maintenance (PM) activities that would result in the diesel generator being inoperable. The surveillance can be performed at that time as long as it does not increase the time the diesel generator is inoperable for the PM activity that is being performed. The footnote is only applicable at that time. The provision of the footnote shall not be utilized for operational convenience.

Since the McGuire emergency diesel generator manufacturer (Nordberg) is no longer in business, McGuire engineering is the designer of record. Therefore, in the absence of manufacturer recommendations, McGuire engineering will determine the appropriate actions required for nuclear class diesel service taking into account McGuire diesel generator maintenance and operating history and industry experience where applicable.

The Surveillance Requirement for demonstrating the OPERABILITY of the station batteries are based on the recommendations of Regulatory Guide 1.129, "Maintenance Testing and Replacement of Large Lead Storage Batteries for Nuclear Power Plants," February 1978, and IEEE Std 450-1980, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations."

Verifying average electrolyte temperature above the minimum for which the battery was sized, total battery terminal voltage onfloat charge, connection resistance values and the performance of battery service and discharge tests ensures the effectiveness of the charging system, the ability to handle high discharge rates and compares the battery capacity at that time with the rated capacity.

Table 4.8-3 specifies the normal limits for each designated pilot cell and each connected cell for electrolyte level, float voltage and specific gravity. The limits for the designated pilot cells float voltage and specific gravity, greater than 2.13 volts and 0.015 below the manufacturer's full charge specific gravity or a battery charger current that had stabilized at a low value, is characteristic of a charged cell with adequate capacity. The normal limits for each connected cell for float voltage and specific gravity, greater than 2.13

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3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

OPERATING

LIMITING CONDITION FOR OPERATION

3.8.1.1 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

- a. Two physically independent circuits between the offsite transmission network and the Onsite Essential Auxiliary Power System, and
- b. Two separate and independent diesel generators, each with:
 - 1) A separate day tank containing a minimum volume of 120 gallons of fuel,
 - 2) A separate Fuel Storage System containing a minimum volume of 39,500 gallons of fuel,
 - 3) A separate fuel transfer pump.

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

ACTION:

- a. With an offsite circuit of the above required A.C. electrical power sources inoperable:
 - 1. Demonstrate the OPERABILITY of the remaining required offsite circuit by performing Surveillance Requirement 4.8.1.1.1a. within 1 hour and at least once per 8 hours thereafter; and
 - 2. Restore the required offsite circuit to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b. With one offsite circuit and one diesel generator of the above required A.C. electrical power sources inoperable: (also refer to ACTION c)
 - 1. Demonstrate the OPERABILITY of the remaining required offsite circuit by performing Surveillance Requirement 4.8.1.1.1a. within 1 hour and at least once per 8 hours thereafter; and

ELECTRICAL POWER SYSTEMS

LIMITING CONDITION FOR OPERATION

ACTION: (Continued)

2. Demonstrate* the operability of the remaining diesel generator by:
 - a. Performing Surveillance Requirements 4.8.1.1.2a.4 and 4.8.1.1.2a.5 within 8 hours, or
 - b. Verifying within 8 hours that no potential common mode failure for the remaining diesel exists;
3. Restore at least one of the inoperable sources to OPERABLE status within 12 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours; with the diesel generator restored to OPERABLE status, follow ACTION a; with the offsite circuit restored to OPERABLE status, follow ACTION d.
- c. With one diesel generator inoperable in addition to ACTION b or d, verify that:
 1. All required systems, subsystems, trains, components and devices that depend on the remaining OPERABLE diesel generator as a source of emergency power are also OPERABLE, and
 2. When in MODE 1, 2, or 3 with a steam pressure greater than 900 psig, the steam-driven auxiliary feedwater pump is OPERABLE.

If these conditions are not satisfied within 2 hours be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- d. With a diesel generator of the above required A.C. electrical power sources inoperable: (also refer to ACTION c)
 1. Demonstrate the OPERABILITY of the A.C. offsite sources by performing Surveillance Requirement 4.8.1.1.1a within 1 hour and at least once per 8 hours thereafter; and
 2. Demonstrate* the OPERABILITY of the remaining diesel generator by:

* This action is not required if the inoperability of the diesel was due to an inoperable support system, an independently testable component, or preplanned testing or maintenance. If required, this action is to be completed regardless of when the inoperable diesel generator is restored to OPERABLE status. The provisions of Specification 3.0.2 are not applicable.

ELECTRICAL POWER SYSTEMS

LIMITING CONDITION FOR OPERATION

ACTION: (Continued)

- a. Performing Surveillance Requirements 4.8.1.1.2a.4) and 4.8.1.1.2a.5) within 24 hours, or
- b. Verifying within 24 hours that no potential common mode failure for the remaining diesel exists;
3. Restore diesel generators to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- e. With two of the above required offsite A.C. circuits inoperable, restore at least one of the inoperable offsite sources to OPERABLE status within 24 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. With only one offsite source restored, follow ACTION a.
- f. With two of the above required diesel generators inoperable:
 1. Demonstrate the OPERABILITY of two offsite A.C. circuits by performing Surveillance Requirement 4.8.1.1.1a. within 1 hour and at least once per 8 hours thereafter; and
 2. Restore at least one of the inoperable diesel generators to OPERABLE status within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. With one diesel generator restored, follow ACTION d.

SURVEILLANCE REQUIREMENTS

4.8.1.1.1 Each of the above required independent circuits between the offsite transmission network and the onsite Essential Auxiliary Power System shall be:

- a. Determined OPERABLE at least once per 7 days by verifying correct breaker alignments, indicated power availability, and
- b. Demonstrated OPERABLE at least once per 18 months during shutdown by transferring (manually and automatically) unit power supply from the normal circuit to the alternate circuit.

4.8.1.1.2 Each diesel generator shall be demonstrated OPERABLE:

- a. At least once per 31 days on a STAGGERED TEST BASIS by:
 - 1) Verifying the fuel level in the day tank,
 - 2) Verifying the fuel level in the fuel storage tank,

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- 3) Verifying the fuel transfer pump starts and transfers fuel from the storage system to the day tank,
 - 4) Verifying** the diesel starts from standby (prelube) condition and maintains the steady-state generator voltage and frequency at 4160 ± 420 volts and 60 ± 1.2 Hz, respectively. The diesel generator shall be started for this test by using one of the following signals:
 - a) Manual, or
 - b) Simulated loss-of-offsite power by itself, or
 - c) Simulated loss-of-offsite power in conjunction with an ESF Actuation test signal, or
 - d) An ESF Actuation test signal by itself.
 - 5) Verifying the generator is synchronized, loaded and operates at 3600 - 4000 kW*** for at least 60 minutes, and
 - 6) Verifying the diesel generator is aligned to provide standby power to the associated emergency busses.
- b. By removing accumulated water:
- 1) From the day tank at least once per 31 days and after each occasion when the diesel is operated for greater than 1 hour, and
 - 2) From the storage tank at least once per 31 days.
- c. By sampling new fuel oil in accordance with ASTM D4057-81 prior to addition to the storage tanks and:
- 1) By verifying in accordance with the tests specified in ASTM D975-81 prior to addition to the storage tanks that the sample has:

** Once per 184 days, start the engine from standby (prelube) condition, and verify generator reaches ≥ 3740 volts and ≥ 57 Hz in ≤ 11 seconds.

*** Diesel generator loadings may be done in accordance with the manufacturer's recommendations. The purpose of the load range is to prevent overloading the engine, and momentary excursions outside of the load range shall not invalidate the test.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- a) An API Gravity of within 0.3 degrees at 60°F or a specific gravity of within 0.0016 at 60/60°F, when compared to the supplier's certificate or an absolute specific gravity at 60/60°F of greater than or equal to 0.83 but less than or equal to 0.89 or an API gravity at 60°F of greater than or equal to 27 degrees but less than or equal to 39 degrees.
 - b) A kinematic viscosity at 40°C of greater than or equal to 1.9 centistokes, but less than or equal to 4.1 centistokes (alternatively, Saybolt viscosity, SUS at 100°F of greater than or equal to 32.6, but less than or equal to 40.1), if gravity was not determined by comparison with the supplier's certification.
 - c) A flash point equal to or greater than 125°F, and
 - d) A clear and bright appearance with proper color when tested in accordance with ASTM D4176-82.
- 2) By verifying within 31 days of obtaining the sample that the other properties specified in Table 1 of ASTM D975-81 are met when tested in accordance with ASTM D975-81 except that the analysis for sulfur may be performed in accordance with ASTM D1552-79 or ASTM D2622-82.
- d. At least once every 31 days by obtaining a sample of fuel oil from the storage tanks in accordance with ASTM D2276-78, and verifying that total particulate contamination is less than 10 mg/liter when checked in accordance with ASTM D2276-78, Method A.
- e. At least once per 18 months, by:
- 1) Subjecting the diesel to an inspection, during shutdown, in accordance with procedures prepared in conjunction with its manufacturer's recommendations for this class of standby service;
 - 2) Verifying, during shutdown, the generator capability to reject a load of greater than or equal to 576 kW while maintaining voltage at 4160 ± 420 volts and frequency at 60 ± 1.2 Hz;
 - 3) Verifying, during shutdown, the generator capability to reject a load of 4000 kW without tripping. The generator voltage shall not exceed 4784 volts during and following the load rejection;
 - 4) Simulating a loss-of-offsite power by itself, during shutdown, and:
 - a) Verifying deenergization of the emergency busses and load shedding from the emergency busses, and

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- b) Verifying the diesel starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 11 seconds, energizes the auto-connected blackout loads through the load sequencer and operates for greater than or equal to 5 minutes while the generator is loaded with the blackout loads. After energization, the steady-state voltage and frequency of the emergency busses shall be maintained at 4160 ± 420 volts and 60 ± 1.2 Hz during this test.
- 5) Verifying that on an ESF actuation test signal, without loss-of-offsite power, the diesel generator starts on the auto-start signal and operates on standby for greater than or equal to 5 minutes. The generator voltage and frequency shall be at least 3740 volts and 57 Hz within 11 seconds after the auto-start signal; the steady-state generator voltage and frequency shall be maintained within 4160 ± 420 volts and 60 ± 1.2 Hz during this test;
- 6) Simulating a loss-of-offsite power in conjunction with an ESF actuation test signal, and
 - a) Verifying, during shutdown, deenergization of the emergency busses and load shedding from the emergency busses;
 - b) Verifying, during shutdown, the diesel starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 11 seconds, energizes the auto-connected emergency (accident) loads through the load sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the emergency loads. After energization, the steady-state voltage and frequency of the emergency busses shall be maintained at 4160 ± 420 volts and 60 ± 1.2 Hz during this test; and
 - c) Verifying, during shutdown[#], that all automatic diesel generator trips, except engine overspeed, lube oil pressure, generator voltage-controlled overcurrent, and generator differential are automatically bypassed upon loss of voltage on the emergency bus concurrent with a Safety Injection Actuation signal.
- 7) [Deleted, Left Blank]

[#] This Surveillance Requirement may be performed in conjunction with periodic preplanned preventative maintenance activity that causes the diesel generator to be inoperable provided that performance of the surveillance requirement does not increase the time the diesel generator would be inoperable for the PM activity alone.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- 8) Verifying, during shutdown, the diesel generator operates for at least 24 hours. During the first 2 hours of this test, the diesel generator shall be loaded between 4200 kW and 4400 kW^{**} and during the remaining 22 hours of this test, the diesel generator shall be loaded between 3600 kW and 4000 kW^{***}. The generator voltage and frequency shall be at least 3740 volts and 57 Hz within 11 seconds after the start signal. The steady-state generator voltage and frequency shall be maintained within 4160 ± 420 volts and 60 ± 1.2 Hz during this test. Within 5 minutes of shutting down the diesel generator, restart the diesel generator and verify that the generator voltage and frequency reaches at least 3740 volts and 57 Hz within 11 seconds^{##}.
- 9) (Deleted)
- 10) Verifying, during shutdown, the diesel generator's capability to:
 - a) Synchronize with the offsite power source while the generator is loaded with its emergency loads upon a simulated restoration of offsite power,
 - b) Transfer its loads to the offsite power source, and
 - c) Be restored to its standby status.
- 11) Verifying, during shutdown, that with the diesel generator operating in a test mode, connected to its bus, a simulated Safety Injection signal overrides the test mode by: (1) returning the diesel generator to standby operation, and (2) automatically energizing the emergency loads with offsite power;

*** Diesel generator loadings may be done in accordance with the manufacturer's recommendations. The purpose of the load range is to prevent overloading the engine, and momentary excursions outside of the load range shall not invalidate the test.

If the hot restart is not satisfactorily completed, it is not necessary to repeat the preceding 24-hour test. Instead, the diesel generator may be operated at 3600 - 4000 kW^{***} for 2 hours or until operating temperature has stabilized.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- 12) Verifying that the fuel transfer pump transfers fuel from each fuel storage tank to the day tank of each diesel via the installed cross-connection lines;
 - 13) Verifying that the automatic load sequence timer is OPERABLE with the interval between each load block are within the tolerances shown in Table 4.8-2;
 - 14) Verifying, during shutdown[#], that the following diesel generator lockout features prevent diesel generator starting only when required:
 - a) Turning gear engaged, or
 - b) Emergency stop.
 - 15) Verifying, during shutdown[#], that with all diesel generator air start receivers pressurized to less than or equal to 220 psig and the compressors secured, the diesel generator starts at least 2 times from standby (prelube) conditions and accelerates to at least 57 Hz in less than or equal to 11 seconds.
- f. At least once per 10 years or after any modifications which could affect diesel generator interdependence by starting both diesel generators simultaneously, during shutdown, and verifying that both diesel generators accelerate to at least 57 Hz in less than or equal to 11 seconds; and
- g. At least once per 10 years by:
- 1) Draining each fuel oil storage tank, removing the accumulated sediment and cleaning the tank using a sodium hypochlorite solution, and
 - 2) Performing a pressure test of those portions of the diesel fuel oil system designed to Section III, subsection ND of the ASME Code at a test pressure equal to 110% of the system design pressure.

[#] This Surveillance Requirement may be performed in conjunction with periodic preplanned preventative maintenance activity that causes the diesel generator to be inoperable provided that performance of the surveillance requirement does not increase the time the diesel generator would be inoperable for the PM activity alone.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

4.8.1.1.3 Reports - (Not Used)

4.8.1.1.4 Diesel Generator Batteries - Each diesel generator 125-volt battery bank and charger shall be demonstrated OPERABLE:

- a. At least once per 7 days by verifying that:
 - 1) The electrolyte level of each battery is above the plates, and
 - 2) The overall battery voltage is greater than or equal to 125 volts under a float charge.
- b. At least once per 18 months by verifying that:
 - 1) The batteries, cell plates and battery racks show no visual indication of physical damage or abnormal deterioration;
 - 2) The battery-to-battery and terminal connections are clear, tight, free of corrosion and coated with anti-corrosion material; and
 - 3) The battery capacity is adequate to supply and maintain in OPERABLE status its emergency loads when subjected to a battery service test.

TABLE 4.8-1 - DIESEL GENERATOR TEST SCHEDULE (Not Used)

ELECTRICAL POWER SYSTEMS

A.C. SOURCES

SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.1.2 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

- a. One circuit between the offsite transmission network and the Onsite Essential Auxiliary Power System, and
- b. One diesel generator with:
 - 1) A day tank containing a minimum volume of 120 gallons of fuel,
 - 2) A Fuel Storage System containing a minimum volume of 28,000 gallons of fuel, and
 - 3) A fuel transfer pump.

APPLICABILITY: MODES 5 and 6.

ACTION:

With less than the above minimum required A.C. electrical power sources OPERABLE, immediately suspend all operations involving CORE ALTERATIONS, positive reactivity changes, movement of irradiated fuel, or crane operation with loads over the fuel storage pool, and within 8 hours, depressurize and vent the Reactor Coolant System through a greater than or equal to 4.5 square inch vent. In addition, when in MODE 5 with the reactor coolant loops not filled, or in MODE 6 with the water level less than 23 feet above the reactor vessel flange, immediately initiate corrective action to restore the required sources to OPERABLE status as soon as possible.

SURVEILLANCE REQUIREMENTS

4.8.1.2 The above required A.C. electrical power sources shall be demonstrated OPERABLE by the performance of each of the requirements of Specifications 4.8.1.1.1, 4.8.1.1.2 (except for Specification 4.8.1.1.2a.5), and 4.8.1.1.4. |

3/4.8 ELECTRICAL POWER SYSTEMS

BASES

3/4.8.1, 3/4.8.2 AND 3/4.8.3 A.C. SOURCES, D.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS

The OPERABILITY of the A.C. and D.C power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety-related equipment required for: (1) the safe shutdown of the facility, and (2) the mitigation and control of accident conditions within the facility. The minimum specified independent and redundant A.C. and D.C. power sources and distribution systems satisfy the requirements of General Design Criterion 17 of Appendix A to 10 CFR 50.

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the safety analyses and are based upon maintaining at least one redundant set of onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss-of-offsite power and single failure of the other onsite A.C. source. The A.C. and D.C. source allowable out-of-service times are based on Regulatory Guide 1.93, "Availability of Electrical Power Sources", December 1974. When one diesel generator is inoperable, there is an additional ACTION requirement to verify that all required systems, subsystems, trains, components and devices, that depend on the remaining OPERABLE diesel generator as a source of emergency power, are also OPERABLE, and that the steam-driven auxiliary feedwater pump is OPERABLE. This requirement is intended to provide assurance that a loss-of-offsite power event will not result in a complete loss of safety function of critical systems during the period one of the diesel generators is inoperable. The term verify as used in this context means to administratively check by examining logs or other information to determine if certain components are out-of-service for maintenance or other reasons. It does not mean to perform the Surveillance Requirements needed to demonstrate the OPERABILITY of the component.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that: (1) the facility can be maintained in the shutdown or refueling condition for extended time periods, and (2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status.

The Surveillance Requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guides 1.9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," March 10, 1971, 1.108, "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants," Revision 1, August 1977, and 1.137, "Fuel-Oil Systems for Standby Diesel Generators," Revision 1, October 1979; Generic Letter 84-15, which modified the testing frequencies specified in Regulatory Guide 1.108; Generic Letter 93-05, which reduced the surveillance requirements for testing of Diesel Generators during power operation; also, Generic Letter 94-01, which removed the accelerated testing and special reporting requirements for Emergency Diesel Generators.

ELECTRICAL POWER SYSTEMS

BASES

A.C. SOURCES, D.C. SOURCES AND ONSITE POWER DISTRIBUTION SYSTEMS (Continued)

Some of the Surveillance Requirements for demonstrating the operability of the diesel generators are modified by a footnote. The Specifications state the Surveillance Requirements are to be performed during shutdown, with the unit in mode 3 or higher. The footnote allows the particular surveillance to be performed during preplanned Preventative Maintenance (PM) activities that would result in the diesel generator being inoperable. The surveillance can be performed at that time as long as it does not increase the time the diesel generator is inoperable for the PM activity that is being performed. The footnote is only applicable at that time. The provision of the footnote shall not be utilized for operational convenience.

Since the McGuire emergency diesel generator manufacturer (Nordberg) is no longer in business, McGuire engineering is the designer of record. Therefore, in the absence of manufacturer recommendations, McGuire engineering will determine the appropriate actions required for nuclear class diesel service taking into account McGuire diesel generator maintenance and operating history and industry experience where applicable.

The Surveillance Requirement for demonstrating the OPERABILITY of the station batteries are based on the recommendations of Regulatory Guide 1.129, "Maintenance Testing and Replacement of Large Lead Storage Batteries for Nuclear Power Plants," February 1978, and IEEE Std 450-1980, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations."

Verifying average electrolyte temperature above the minimum for which the battery was sized, total battery terminal voltage onfloat charge, connection resistance values and the performance of battery service and discharge tests ensures the effectiveness of the charging system, the ability to handle high discharge rates and compares the battery capacity at that time with the rated capacity.

Table 4.8-3 specifies the normal limits for each designated pilot cell and each connected cell for electrolyte level, float voltage and specific gravity. The limits for the designated pilot cells float voltage and specific gravity, greater than 2.13 volts and 0.015 below the manufacturer's full charge specific gravity or a battery charger current that had stabilized at a low value, is characteristic of a charged cell with adequate capacity. The normal limits for each connected cell for float voltage and specific gravity, greater than 2.13

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

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3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

OPERATING

LIMITING CONDITION FOR OPERATION

3.8.1.1 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

- a. Two physically independent circuits between the offsite transmission network and the Onsite Essential Auxiliary Power System, and
- b. Two separate and independent diesel generators, each with:
 - 1) A separate day tank containing a minimum volume of 470 gallons of fuel,
 - 2) A separate Fuel Storage System containing a minimum volume of 77,100 gallons of fuel,
 - 3) A separate fuel transfer valve, and
 - 4) A separate 125 VDC battery and charger connected to the diesel generator control loads.

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

ACTION:

- a. With an offsite circuit of the above required A.C. electrical power sources inoperable:
 1. Demonstrate the OPERABILITY of the remaining required offsite circuit by performing Specification 4.8.1.1.1a. within 1 hour and at least once per 8 hours thereafter; and
 2. Restore the offsite circuit to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

ELECTRICAL POWER SYSTEMS

LIMITING CONDITION FOR OPERATION

ACTION (Continued)

- b. With one offsite circuit and one diesel generator of the above required A.C. electrical power sources inoperable: (also refer to ACTION c)
 - 1. Demonstrate the OPERABILITY of the remaining required offsite circuit by performing Specification 4.8.1.1.1a. within 1 hour and at least once per 8 hours thereafter; and
 - 2. Demonstrate* the OPERABILITY of the remaining diesel generator by either:
 - a. Performing Surveillance Requirements 4.8.1.1.2a.4 and 4.8.1.1.2a.5 within 8 hours, or
 - b. Verifying within 8 hours that no potential common mode failure for the remaining diesel exists;
 - 3. Restore at least one of the inoperable sources to OPERABLE status within 12 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours; with the diesel generator restored to OPERABLE status, follow ACTION a; with the offsite circuit restored to OPERABLE status, follow ACTION d.
- c. With one diesel generator inoperable in addition to ACTION b or d, verify that:
 - 1. All required systems, subsystems, trains, components and devices that depend on the remaining OPERABLE diesel generator as a source of emergency power are also OPERABLE, and
 - 2. When in MODE 1, 2, or 3 with a steam pressure greater than 900 psig, the steam-driven auxiliary feedwater pump is OPERABLE.

If these conditions are not satisfied within 2 hours be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

* This action is not required if the inoperability of the diesel was due to an inoperable support system, an independently testable component, or preplanned testing or maintenance. If required, this action is to be completed regardless of when the inoperable diesel generator is restored to OPERABLE status. The provisions of Specification 3.0.2 are not applicable.

ELECTRICAL POWER SYSTEMS

LIMITING CONDITION FOR OPERATION

ACTION (Continued)

- d. With a diesel generator of the above required A.C. electrical power sources inoperable: (also refer to ACTION c)
 - 1. Demonstrate the OPERABILITY of the A.C. offsite sources by performing Surveillance Requirement 4.8.1.1.1a within 1 hour and at least once per 8 hours thereafter; and
 - 2. Demonstrate* the OPERABILITY of the remaining diesel generator by either:
 - a. Performing Surveillance Requirements 4.8.1.1.2a.4 and 4.8.1.1.2a.5 within 24 hours, or
 - b. Verifying within 24 hours that no potential common mode failure for the remaining diesel exists;
 - 3. Restore diesel generators to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- e. With both of the above required offsite A.C. circuits inoperable, restore at least one of the inoperable offsite sources to OPERABLE status within 24 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. With only one offsite source restored, follow ACTION a.
- f. With both of the above required diesel generators inoperable:
 - 1. Demonstrate the OPERABILITY of two offsite A.C. circuits by performing Specification 4.8.1.1.1a. within 1 hour and at least once per 8 hours thereafter; and
 - 2. Restore at least one of the inoperable diesel generators to OPERABLE status within 2 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. With one diesel generator restored, follow ACTION d.

* This action is not required if the inoperability of the diesel was due to an inoperable support system, an independently testable component, or preplanned testing or maintenance. If required, this action is to be completed regardless of when the inoperable diesel generator is restored to OPERABLE status. The provisions of Specification 3.0.2 are not applicable.

ELECTRICAL POWER SYSTEMS

LIMITING CONDITION FOR OPERATION

- g. With a diesel generator operating at greater than 5750 kW, within 1 hour reduce the diesel generator output to less than or equal to 5750 kW.
- h. With the Cathodic Protection System inoperable, restore the System to OPERABLE status within 10 days or prepare and submit a Special Report pursuant to Specification 6.9.2 outlining the cause of the inoperability and the plans for restoring the System to OPERABLE.

SURVEILLANCE REQUIREMENTS

4.8.1.1.1 Each of the above required independent circuits between the offsite transmission network and the Onsite Essential Auxiliary Power System shall be:

- a. Determined OPERABLE at least once per 7 days by verifying correct breaker alignments, indicated power availability, and
- b. Demonstrated OPERABLE at least once per 18 months by transferring (manually and automatically) unit power supply from the normal circuit to the alternate circuit.

4.8.1.1.2 Each diesel generator shall be demonstrated OPERABLE:

- a. At least once per 31 days on a STAGGERED TEST BASIS by:
 - 1) Verifying the fuel level in the day tank,
 - 2) Verifying the fuel level in the fuel storage tank,
 - 3) Verifying the fuel transfer valve can be operated to allow fuel to be transferred from the storage system to the day tank,
 - 4) Verifying** the diesel starts from standby (prelube) condition and maintains the steady-state generator voltage and frequency at 4160 ± 420 volts and 60 ± 1.2 Hz, respectively. The diesel generator shall be started for this test by using one of the following signals:
 - a) Manual, or
 - b) Simulated loss of offsite power by itself, or
 - c) Simulated loss of offsite power in conjunction with an ESF Actuation test signal, or
 - d) An ESF Actuation test signal by itself.

** Once per 184 days, start the engine from standby (prelube) condition, and verify generator reaches ≥ 3740 volts and ≥ 57 Hz in ≤ 11 seconds.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- 5) Verifying the generator is synchronized, loaded and operates at 5600 - 5750 kW*** for at least 60 minutes, and
 - 6) Verifying the diesel generator is aligned to provide standby power to the associated emergency busses.
- b. At least once per 31 days and after each operation of the diesel where the period of operation was greater than or equal to 1 hour by checking for and removing accumulated water from the day tank;
 - c. At least once per 31 days by checking for and removing accumulated water from the fuel oil storage tanks;
 - d. By verifying that the Cathodic Protection System is OPERABLE by verifying:
 - 1) At least once per 60 days that cathodic protection rectifiers are OPERABLE and have been inspected in accordance with the manufacturer's inspection procedures, and
 - 2) At least once per 12 months that adequate protection from corrosion is provided in accordance with manufacturer's inspection procedures.
 - e. By sampling new fuel oil in accordance with ASTM-D4057 prior to addition to storage tanks and:
 - 1) By verifying in accordance with the tests specified in ASTM-D975-81 prior to addition to the storage tanks that the sample has:
 - a) An API Gravity of within 0.3 degrees at 60°F, or a specific gravity of within 0.0016 at 60/60°F, when compared to the supplier's certificate, or an absolute specific gravity at 60/60°F of greater than or equal to 0.83 but less than or equal to 0.89, or an API gravity of greater than or equal to 27 degrees but less than or equal to 39 degrees;
 - b) A kinematic viscosity at 40°C of greater than or equal to 1.9 centistokes, but less than or equal to 4.1 centistokes (alternatively, Saybolt viscosity, SUS at 100°F of greater than or equal to 32.6, but less than or equal to 40.1), if gravity was not determined by comparison with the supplier's certification;

*** Diesel generator loadings may be done in accordance with the manufacturer's recommendations. The purpose of the load range is to prevent overloading the engine, and momentary excursions outside of the load range shall not invalidate the test.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- c) A flash point equal to or greater than 125°F; and
- d) A clear and bright appearance with proper color when tested in accordance with ASTM-D4176-82.
- 2) By verifying within 30 days of obtaining the sample that the other properties specified in Table 1 of ASTM-D975-81 are met when tested in accordance with ASTM-D975-81 except that the analysis for sulfur may be performed in accordance with ASTM-D1552-79 or ASTM-D2622-82.
- f. At least once every 31 days by obtaining a sample of fuel oil in accordance with ASTM-D2276-78, and verifying that total particulate contamination is less than 10 mg/liter when checked in accordance with ASTM-D2276-78, Method A;
- g. At least once per 18 months by:
 - 1) Subjecting the diesel to an inspection, during shutdown, in accordance with procedures prepared in conjunction with its manufacturer's recommendations for this class of standby service;
 - 2) Verifying the generator capability to reject a load of greater than or equal to 825 kW while maintaining voltage at 4160 ± 420 volts and frequency at 60 ± 1.2 Hz;
 - 3) Verifying the generator capability to reject a load of greater than or equal to 5600 kW but less than or equal to 5750 kW without tripping. The generator speed shall not exceed 500 rpm during and following the load rejection;
 - 4) Simulating a loss-of-offsite power by itself, during shutdown, and:
 - a) Verifying deenergization of the emergency busses and load shedding from the emergency busses, and
 - b) Verifying the diesel starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 11 seconds, energizes the auto-connected emergency (accident) loads through the load sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the emergency loads. After energization, the steady-state voltage and frequency of the emergency busses shall be maintained at 4160 ± 420 volts and 60 ± 1.2 Hz during this test.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- 5) Verifying that on an ESF Actuation test signal, without loss-of-offsite power, the diesel generator starts on the auto-start signal and operates on standby for greater than or equal to 5 minutes. The generator voltage and frequency shall be at 4160 ± 420 volts and 60 ± 1.2 Hz within 11 seconds after the auto-start signal; the steady-state generator voltage and frequency shall be maintained within these limits during this test;
- 6) Simulating a loss-of-offsite power in conjunction with an ESF Actuation test signal, during shutdown, and
 - a) Verifying deenergization of the emergency busses and load shedding from the emergency busses;
 - b) Verifying the diesel starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 11 seconds, energizes the auto-connected emergency (accident) loads through the load sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the emergency loads. After energization, the steady-state voltage and frequency of the emergency busses shall be maintained at 4160 ± 420 volts and 60 ± 1.2 Hz during this test; and
 - c) Verifying that all automatic diesel generator trips, except engine overspeed, low-low lube oil pressure, generator differential, and the 2 out of 3 voltage controlled overcurrent relay scheme, are automatically bypassed upon loss of voltage on the emergency bus concurrent with a Safety Injection Actuation signal.
- 7) Verifying, during shutdown, the diesel generator operates for at least 24 hours. The diesel generator shall be loaded to greater than or equal to 5600 kW but less than or equal to 5750 kW. The generator voltage and frequency shall be 4160 ± 420 volts and 60 ± 1.2 Hz within 11 seconds after the start signal; the steady-state generator voltage and frequency shall be maintained within these limits during this test.
- 8) (Deleted)

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- 9) Verifying, during shutdown, the diesel generator's capability to:
 - a) Synchronize with the offsite power source while the generator is loaded with its emergency loads upon a simulated restoration of offsite power,
 - b) Transfer its loads to the offsite power source, and
 - c) Be restored to its standby status.
 - 10) Verifying, during shutdown, that with the diesel generator operating in a test mode, connected to its bus, a simulated Safety Injection signal overrides the test mode by: (1) returning the diesel generator to standby operation, and (2) automatically energizing the emergency loads with offsite power;
 - 11) Verifying that the fuel transfer valve transfers fuel from each fuel storage tank to the day tank of each diesel via the installed cross-connection lines;
 - 12) Verifying that the automatic load sequence timer is OPERABLE with the interval between each load block within the tolerances given in Table 4.8-2;
 - 13) Verifying that the voltage and diesel speed tolerances for the accelerated sequencer permissives are $92.5 \pm 1\%$ and $98 \pm 1\%$, respectively, with a time delay of 2 ± 0.2 s;
 - 14) Verifying that the following diesel generator lockout features prevent diesel generator starting only when required:
 - a) Turning gear engaged, or
 - b) Maintenance mode; and
 - 15) Operating at greater than or equal to 5600 KW but less than or equal to 5750 KW for one hour or until operating temperature has stabilized. Within 5 minutes after shutting down the diesel generator, restart the diesel generator and verify that the generator voltage and frequency reaches at least 3740 volts and 57 Hz within 11 seconds.
- h. At least once per 10 years or after any modifications which could affect diesel generator interdependence by starting both diesel generators simultaneously, during shutdown, and verifying that both diesel generators accelerate to at least 441 rpm in less than or equal to 11 seconds; and

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- i. At least once per 10 years by:
 - 1) Draining each fuel oil storage tank, removing the accumulated sediment and cleaning the tank using a sodium hypochlorite solution or its equivalent, and
 - 2) Performing a pressure test of those portions of the diesel fuel oil system designed to Section III, subsection ND of the ASME Code at a test pressure equal to 110% of the system design pressure.
 - 3) Performing tank wall thickness measurements. The resulting data shall be evaluated and any abnormal degradation will be justified or corrected. Any abnormal degradation will be documented in a report to the Commission.

4.8.1.1.3 Reports - (Not Used)

4.8.1.1.4 Diesel Generator Batteries - Each diesel generator 125-volt battery bank and charger shall be demonstrated OPERABLE:

- a. At least once per 7 days by verifying that:
 - 1) The electrolyte level of each battery is at or above the low mark and at or below the high mark,
 - 2) The overall battery voltage is greater than or equal to 125 volts on float charge, and
 - 3) The individual cell voltage is greater than or equal to 1.36 volts on float charge.*
- b. At least once per 92 days and within 7 days after a battery discharge with battery terminal voltage below 110 volts, or battery overcharge with battery terminal voltage above 150 volts, by verifying that:
 - 1) There is no visible corrosion at either terminals or connectors, and
 - 2) The average electrolyte temperature of six connected cells is above 60°F.

* Two different cells shall be tested each month.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- c. At least once per 18 months by verifying that:
 - 1) The batteries, cell plates and battery racks show no visual indication of physical damage or abnormal deterioration,
 - 2) The cell-to-cell and terminal connections are clean, tight, free of corrosion and coated with anticorrosion material in accordance with manufacturer's recommendations,
 - 3) The cell-to-cell pole screws torque setting is 14.5 ± 0.5 ft-lbs,
 - 4) The battery charger will supply at least 75 amperes at a minimum of 125 volts for at least 8 hours, and
 - 5) The battery capacity is adequate to supply and maintain in OPERABLE status its emergency loads when subjected to a battery service test. The battery shall supply a current of greater than or equal to 171.6 amps for the first minute and a current of greater than or equal to 42.5 amps for the remaining 119 minutes, while maintaining a terminal voltage of greater than or equal to 105 volts.
- d. At least once per 60 months, during shutdown, by verifying that the battery capacity is at least 80% of the manufacturer's rating when subjected to a performance discharge test. Once per 60 month interval, this performance discharge test may be performed in lieu of the battery service test.
- e. At least once per 18 months, during shutdown, by giving performance discharge tests of battery capacity to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% of rated capacity from its average on previous performance tests, or is below 90% of the manufacturer's rating.

TABLE 4.8-1 - DIESEL GENERATOR TEST SCHEDULE - (Not Used)

ELECTRICAL POWER SYSTEMS

A.C. SOURCES

SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.1.2 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

- a. One circuit between the offsite transmission network and the Onsite Essential Auxiliary Power System, and
- b. One diesel generator with:
 - 1) A day tank containing a minimum volume of 470 gallons of fuel,
 - 2) A fuel storage system containing a minimum volume of 77,100 gallons of fuel,
 - 3) A fuel transfer valve, and
 - 4) A 125 VDC battery and charger connected to the diesel generator control loads.

APPLICABILITY: MODES 5 and 6.

ACTION:

With less than the above minimum required A.C. electrical power sources OPERABLE, immediately suspend all operations involving CORE ALTERATIONS, positive reactivity changes, movement of irradiated fuel, or crane operation with loads over the fuel storage pool, and within 8 hours, depressurize and vent the Reactor Coolant System through at least a 4.5 square inch vent. In addition, when in MODE 5 with the Reactor Coolant loops not filled, or in MODE 6 with the water level less than 23 feet above the reactor vessel flange, immediately initiate corrective action to restore the required sources to OPERABLE status as soon as possible.

SURVEILLANCE REQUIREMENTS

4.8.1.2 The above required A.C. electrical power sources shall be demonstrated OPERABLE by the performance of each of the requirements of Specifications 4.8.1.1.1, 4.8.1.1.2 (except for Specification 4.8.1.1.2a.5), and 4.8.1.1.4.

3/4.8 ELECTRICAL POWER SYSTEMS

BASES

3/4.8.1, 3/4.8.2 and 3/4.8.3 A.C. SOURCES, D.C. SOURCES, and ONSITE POWER DISTRIBUTION

The OPERABILITY of the A.C. and D.C power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety-related equipment required for: (1) the safe shutdown of the facility, and (2) the mitigation and control of accident conditions within the facility. The minimum specified independent and redundant A.C. and D.C. power sources and distribution systems satisfy the requirements of General Design Criterion 17 of Appendix A to 10 CFR Part 50.

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the safety analyses and are based upon maintaining at least one redundant set of onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss-of-offsite power and single failure of the other onsite A.C. source. The A.C. and D.C. source allowable out-of-service times are based on Regulatory Guide 1.93, "Availability of Electrical Power Sources," December 1974. When one diesel generator is inoperable, there is an additional ACTION requirement to verify that all required systems, subsystems, trains, components and devices, that depend on the remaining OPERABLE diesel generator as a source of emergency power, are also OPERABLE, and that the steam-driven auxiliary feedwater pump is OPERABLE. This requirement is intended to provide assurance that a loss-of-offsite power event will not result in a complete loss of safety function of critical systems during the period one of the diesel generators is inoperable. The term, verify, as used in this context means to administratively check by examining logs or other information to determine if certain components are out-of-service for maintenance or other reasons. It does not mean to perform the Surveillance Requirements needed to demonstrate the OPERABILITY of the component.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that: (1) the facility can be maintained in the shutdown or refueling condition for extended time periods, and (2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status.

The Surveillance Requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guide 1.9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," March 10, 1971, Regulatory Guide 1.108, "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants," Revision 1, August 1977, Regulatory Guide 1.137, "Fuel-Oil Systems for Standby Diesel Generators," Revision 1, October 1979, the NRC Staff Evaluation Report concerning the Reliability of Diesel Generators at Catawba, August 14, 1984, Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," Generic Letter 93-05, "Line-Item Technical

ELECTRICAL POWER SYSTEMS

BASES

A.C. SOURCES, D.C. SOURCES, and ONSITE POWER DISTRIBUTION (Continued)

Specifications Improvements to Reduce Surveillance Requirements for Testing During Power Operation," and Generic Letter 94-01, "Removal of Accelerated Testing and Special Reporting Requirements for Emergency Diesel Generators." If any other metallic structures (building, new or modified piping systems, conduits) are placed in the ground near the Fuel Oil Storage System or if the original system is modified, the adequacy and frequency of inspections for the Cathodic Protection System shall be reevaluated and adjusted in accordance with the manufacturer's recommendations.

The Surveillance Requirements for demonstrating the OPERABILITY of the station batteries are based on the recommendations of Regulatory Guide 1.129, "Maintenance Testing and Replacement of Large Lead Storage Batteries for Nuclear Power Plants," February 1978, and IEEE Std 450-1980, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations."

Verifying average electrolyte temperature above the minimum for which the battery was sized, total battery terminal voltage on float charge, connection resistance values and the performance of battery service and discharge tests ensures the effectiveness of the charging system, the ability to handle high discharge rates and compares the battery capacity at that time with the rated capacity.

Table 4.8-3 specifies the normal limits for each designated pilot cell and each connected cell for electrolyte level, float voltage and specific gravity. The limits for the designated pilot cells float voltage and specific gravity, greater than 2.13 volts and 0.015 below the manufacturer's full charge specific gravity or a battery charger current that had stabilized at a low value, is characteristic of a charged cell with adequate capacity. The normal limits for each connected cell for float voltage and specific gravity, greater than 2.13 volts and not more than 0.020 below the manufacturer's full charge specific gravity with an average specific gravity of all the connected cells not more than 0.010 below the manufacturer's full charge specific gravity, ensures the OPERABILITY and capability of the battery.

Operation with a battery cell's parameter outside the normal limit but within the allowable value specified in Table 4.8-3 is permitted for up to 7 days. During this 7-day period: (1) the allowable values for electrolyte level ensures no physical damage to the plates with an adequate electron transfer capability; (2) the allowable value for the average specific gravity of all the cells, not more than 0.020 below the manufacturer's recommended full charge specific gravity, ensures that the decrease in rating will be less than the safety margin provided in sizing; (3) the allowable value for an individual cell's specific gravity, ensures that an individual cell's specific gravity will not be more than 0.040 below the manufacturer's full charge specific gravity and that the overall capability of the battery will be maintained within an acceptable limit; and (4) the allowable value for an individual cell's float voltage, greater than 2.07 volts, ensures the battery's capability to perform its design function.

LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS

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3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

OPERATING

LIMITING CONDITION FOR OPERATION

3.8.1.1 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

- a. Two physically independent circuits between the offsite transmission network and the Onsite Essential Auxiliary Power System, and
- b. Two separate and independent diesel generators, each with:
 - 1) A separate day tank containing a minimum volume of 470 gallons of fuel,
 - 2) A separate Fuel Storage System containing a minimum volume of 77,100 gallons of fuel,
 - 3) A separate fuel transfer valve, and
 - 4) A separate 125 VDC battery and charger connected to the diesel generator control loads.

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

ACTION:

- a. With an offsite circuit of the above required A.C. electrical power sources inoperable:
 - 1. Demonstrate the OPERABILITY of the remaining required offsite circuit by performing Specification 4.8.1.1.1a. within 1 hour and at least once per 8 hours thereafter; and
 - 2. Restore the offsite circuit to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

ELECTRICAL POWER SYSTEMS

LIMITING CONDITION FOR OPERATION

ACTION (Continued)

- b. With one offsite circuit and one diesel generator of the above required A.C. electrical power sources inoperable: (also refer to ACTION c)
 - 1. Demonstrate the OPERABILITY of the remaining required offsite circuit by performing Specification 4.8.1.1.1a. within 1 hour and at least once per 8 hours thereafter; and
 - 2. Demonstrate* the OPERABILITY of the remaining diesel generator by either:
 - a. Performing Surveillance Requirements 4.8.1.1.2a.4 and 4.8.1.1.2a.5 within 8 hours, or
 - b. Verifying within 8 hours that no potential common mode failure for the remaining diesel exists;
 - 3. Restore at least one of the inoperable sources to OPERABLE status within 12 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours; with the diesel generator restored to OPERABLE status, follow ACTION a; with the offsite circuit restored to OPERABLE status, follow ACTION d.
- c. With one diesel generator inoperable in addition to ACTION b or d, verify that:
 - 1. All required systems, subsystems, trains, components and devices that depend on the remaining OPERABLE diesel generator as a source of emergency power are also OPERABLE, and
 - 2. When in MODE 1, 2, or 3 with a steam pressure greater than 900 psig, the steam-driven auxiliary feedwater pump is OPERABLE.

If these conditions are not satisfied within 2 hours be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

* This action is not required if the inoperability of the diesel was due to an inoperable support system, an independently testable component, or preplanned testing or maintenance. If required, this action is to be completed regardless of when the inoperable diesel generator is restored to OPERABLE status. The provisions of Specification 3.0.2 are not applicable.

ELECTRICAL POWER SYSTEMS

LIMITING CONDITION FOR OPERATION

ACTION (Continued)

- d. With a diesel generator of the above required A.C. electrical power sources inoperable: (also refer to ACTION c)
 - 1. Demonstrate the OPERABILITY of the A.C. offsite sources by performing Surveillance Requirement 4.8.1.1.1a within 1 hour and at least once per 8 hours thereafter; and
 - 2. Demonstrate* the OPERABILITY of the remaining diesel generator by either:
 - a. Performing Surveillance Requirements 4.8.1.1.2a.4 and 4.8.1.1.2a.5 within 24 hours, or
 - b. Verifying within 24 hours that no potential common mode failure for the remaining diesel exists;
 - 3. Restore diesel generators to OPERABLE status within 72 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- e. With both of the above required offsite A.C. circuits inoperable, restore at least one of the inoperable offsite sources to OPERABLE status within 24 hours or be in at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. With only one offsite source restored, follow ACTION a.
- f. With both of the above required diesel generators inoperable:
 - 1. Demonstrate the OPERABILITY of two offsite A.C. circuits by performing Specification 4.8.1.1.1a. within 1 hour and at least once per 8 hours thereafter; and
 - 2. Restore at least one of the inoperable diesel generators to OPERABLE status within 2 hours or be in, at least HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours. With one diesel generator restored, follow ACTION d.

* This action is not required if the inoperability of the diesel was due to an inoperable support system, an independently testable component, or preplanned testing or maintenance. If required, this action is to be completed regardless of when the inoperable diesel generator is restored to OPERABLE status. The provisions of Specification 3.0.2 are not applicable.

ELECTRICAL POWER SYSTEMS

LIMITING CONDITION FOR OPERATION

- g. With a diesel generator operating at greater than 5750 kW, within 1 hour reduce the diesel generator output to less than or equal to 5750 kW.
- h. With the Cathodic Protection System inoperable, restore the System to OPERABLE status within 10 days or prepare and submit a Special Report pursuant to Specification 6.9.2 outlining the cause of the inoperability and the plans for restoring the System to OPERABLE.

SURVEILLANCE REQUIREMENTS

4.8.1.1.1 Each of the above required independent circuits between the offsite transmission network and the Onsite Essential Auxiliary Power System shall be:

- a. Determined OPERABLE at least once per 7 days by verifying correct breaker alignments, indicated power availability, and
- b. Demonstrated OPERABLE at least once per 18 months by transferring (manually and automatically) unit power supply from the normal circuit to the alternate circuit.

4.8.1.1.2 Each diesel generator shall be demonstrated OPERABLE:

- a. At least once per 31 days on a STAGGERED TEST BASIS by:
 - 1) Verifying the fuel level in the day tank,
 - 2) Verifying the fuel level in the fuel storage tank,
 - 3) Verifying the fuel transfer valve can be operated to allow fuel to be transferred from the storage system to the day tank,
 - 4) Verifying** the diesel starts from standby (prelube) condition and maintains the steady-state generator voltage and frequency at 4160 ± 420 volts and 60 ± 1.2 Hz, respectively. The diesel generator shall be started for this test by using one of the following signals:
 - a) Manual, or
 - b) Simulated loss of offsite power by itself, or
 - c) Simulated loss of offsite power in conjunction with an ESF Actuation test signal, or
 - d) An ESF Actuation test signal by itself.

** Once per 184 days, start the engine from standby (prelube) condition, and verify generator reaches ≥ 3740 volts and ≥ 57 Hz in ≤ 11 seconds.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- 5) Verifying the generator is synchronized, loaded and operates at 5600 - 5750 kW*** for at least 60 minutes, and
- 6) Verifying the diesel generator is aligned to provide standby power to the associated emergency busses.
- b. At least once per 31 days and after each operation of the diesel where the period of operation was greater than or equal to 1 hour by checking for and removing accumulated water from the day tank;
- c. At least once per 31 days by checking for and removing accumulated water from the fuel oil storage tanks;
- d. By verifying that the Cathodic Protection System is OPERABLE by verifying:
 - 1) At least once per 60 days that cathodic protection rectifiers are OPERABLE and have been inspected in accordance with the manufacturer's inspection procedures, and
 - 2) At least once per 12 months that adequate protection from corrosion is provided in accordance with manufacturer's inspection procedures.
- e. By sampling new fuel oil in accordance with ASTM-D4057 prior to addition to storage tanks and:
 - 1) By verifying in accordance with the tests specified in ASTM-D975-81 prior to addition to the storage tanks that the sample has:
 - a) An API Gravity of within 0.3 degrees at 60°F, or a specific gravity of within 0.0016 at 60/60°F, when compared to the supplier's certificate, or an absolute specific gravity at 60/60°F of greater than or equal to 0.83 but less than or equal to 0.89, or an API gravity of greater than or equal to 27 degrees but less than or equal to 39 degrees;
 - b) A kinematic viscosity at 40°C of greater than or equal to 1.9 centistokes, but less than or equal to 4.1 centistokes (alternatively, Saybolt viscosity, SUS at 100°F of greater than or equal to 32.6, but less than or equal to 40.1), if gravity was not determined by comparison with the supplier's certification;

*** Diesel generator loadings may be done in accordance with the manufacturer's recommendations. The purpose of the load range is to prevent overloading the engine, and momentary excursions outside of the load range shall not invalidate the test.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- c) A flash point equal to or greater than 125°F; and
- d) A clear and bright appearance with proper color when tested in accordance with ASTM-D4176-82.
- 2) By verifying within 30 days of obtaining the sample that the other properties specified in Table 1 of ASTM-D975-81 are met when tested in accordance with ASTM-D975-81 except that the analysis for sulfur may be performed in accordance with ASTM-D1552-79 or ASTM-D2622-82.
- f. At least once every 31 days by obtaining a sample of fuel oil in accordance with ASTM-D2276-78, and verifying that total particulate contamination is less than 10 mg/liter when checked in accordance with ASTM-D2276-78, Method A;
- g. At least once per 18 months by:
 - 1) Subjecting the diesel to an inspection, during shutdown, in accordance with procedures prepared in conjunction with its manufacturer's recommendations for this class of standby service;
 - 2) Verifying the generator capability to reject a load of greater than or equal to 825 kW while maintaining voltage at 4160 ± 420 volts and frequency at 60 ± 1.2 Hz;
 - 3) Verifying the generator capability to reject a load of greater than or equal to 5600 kW but less than or equal to 5750 kW without tripping. The generator speed shall not exceed 500 rpm during and following the load rejection;
 - 4) Simulating a loss-of-offsite power by itself, during shutdown, and:
 - a) Verifying deenergization of the emergency busses and load shedding from the emergency busses, and
 - b) Verifying the diesel starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 11 seconds, energizes the auto-connected emergency (accident) loads through the load sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the emergency loads. After energization, the steady-state voltage and frequency of the emergency busses shall be maintained at 4160 ± 420 volts and 60 ± 1.2 Hz during this test.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- 5) Verifying that on an ESF Actuation test signal, without loss-of-offsite power, the diesel generator starts on the auto-start signal and operates on standby for greater than or equal to 5 minutes. The generator voltage and frequency shall be at 4160 ± 420 volts and 60 ± 1.2 Hz within 11 seconds after the auto-start signal; the steady-state generator voltage and frequency shall be maintained within these limits during this test;
- 6) Simulating a loss-of-offsite power in conjunction with an ESF Actuation test signal, during shutdown, and
 - a) Verifying deenergization of the emergency busses and load shedding from the emergency busses;
 - b) Verifying the diesel starts on the auto-start signal, energizes the emergency busses with permanently connected loads within 11 seconds, energizes the auto-connected emergency (accident) loads through the load sequencer and operates for greater than or equal to 5 minutes while its generator is loaded with the emergency loads. After energization, the steady-state voltage and frequency of the emergency busses shall be maintained at 4160 ± 420 volts and 60 ± 1.2 Hz during this test; and
 - c) Verifying that all automatic diesel generator trips, except engine overspeed, low-low lube oil pressure, generator differential, and the 2 out of 3 voltage controlled overcurrent relay scheme, are automatically bypassed upon loss of voltage on the emergency bus concurrent with a Safety Injection Actuation signal.
- 7) Verifying, during shutdown, the diesel generator operates for at least 24 hours. The diesel generator shall be loaded to greater than or equal to 5600 kW but less than or equal to 5750 kW. The generator voltage and frequency shall be 4160 ± 420 volts and 60 ± 1.2 Hz within 11 seconds after the start signal; the steady-state generator voltage and frequency shall be maintained within these limits during this test.
- 8) (Deleted)

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- 9) Verifying, during shutdown, the diesel generator's capability to:
 - a) Synchronize with the offsite power source while the generator is loaded with its emergency loads upon a simulated restoration of offsite power,
 - b) Transfer its loads to the offsite power source, and
 - c) Be restored to its standby status.
 - 10) Verifying, during shutdown, that with the diesel generator operating in a test mode, connected to its bus, a simulated Safety Injection signal overrides the test mode by: (1) returning the diesel generator to standby operation, and (2) automatically energizing the emergency loads with offsite power;
 - 11) Verifying that the fuel transfer valve transfers fuel from each fuel storage tank to the day tank of each diesel via the installed cross-connection lines;
 - 12) Verifying that the automatic load sequence timer is OPERABLE with the interval between each load block within the tolerances given in Table 4.8-2;
 - 13) Verifying that the voltage and diesel speed tolerances for the accelerated sequencer permissives are $92.5 \pm 1\%$ and $98 \pm 1\%$, respectively, with a time delay of 2 ± 0.2 s;
 - 14) Verifying that the following diesel generator lockout features prevent diesel generator starting only when required:
 - a) Turning gear engaged, or
 - b) Maintenance mode; and
 - 15) Operating at greater than or equal to 5600 KW but less than or equal to 5750 KW for one hour or until operating temperature has stabilized. Within 5 minutes after shutting down the diesel generator, restart the diesel generator and verify that the generator voltage and frequency reaches at least 3740 volts and 57 Hz within 11 seconds.
- h. At least once per 10 years or after any modifications which could affect diesel generator interdependence by starting both diesel generators simultaneously, during shutdown, and verifying that both diesel generators accelerate to at least 441 rpm in less than or equal to 11 seconds; and

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

i. At least once per 10 years by:

- 1) Draining each fuel oil storage tank, removing the accumulated sediment and cleaning the tank using a sodium hypochlorite solution or its equivalent, and
- 2) Performing a pressure test of those portions of the diesel fuel oil system designed to Section III, subsection ND of the ASME Code at a test pressure equal to 110% of the system design pressure.
- 3) Performing tank wall thickness measurements. The resulting data shall be evaluated and any abnormal degradation will be justified or corrected. Any abnormal degradation will be documented in a report to the Commission.

4.8.1.1.3 Reports - (Not Used)

4.8.1.1.4 Diesel Generator Batteries - Each diesel generator 125-volt battery bank and charger shall be demonstrated OPERABLE:

a. At least once per 7 days by verifying that:

- 1) The electrolyte level of each battery is at or above the low mark and at or below the high mark,
- 2) The overall battery voltage is greater than or equal to 125 volts on float charge, and
- 3) The individual cell voltage is greater than or equal to 1.36 volts on float charge.*

b. At least once per 92 days and within 7 days after a battery discharge with battery terminal voltage below 110 volts, or battery overcharge with battery terminal voltage above 150 volts, by verifying that:

- 1) There is no visible corrosion at either terminals or connectors, and
- 2) The average electrolyte temperature of six connected cells is above 60°F.

*Two different cells shall be tested each month.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

- c. At least once per 18 months by verifying that:
 - 1) The batteries, cell plates and battery racks show no visual indication of physical damage or abnormal deterioration,
 - 2) The cell-to-cell and terminal connections are clean, tight, free of corrosion and coated with anticorrosion material in accordance with manufacturer's recommendations,
 - 3) The cell-to-cell pole screws torque setting is 14.5 ± 0.5 ft-lbs,
 - 4) The battery charger will supply at least 75 amperes at a minimum of 125 volts for at least 8 hours, and
 - 5) The battery capacity is adequate to supply and maintain in OPERABLE status its emergency loads when subjected to a battery service test. The battery shall supply a current of greater than or equal to 171.6 amps for the first minute and a current of greater than or equal to 42.5 amps for the remaining 119 minutes, while maintaining a terminal voltage of greater than or equal to 105 volts.
- d. At least once per 60 months, during shutdown, by verifying that the battery capacity is at least 80% of the manufacturer's rating when subjected to a performance discharge test. Once per 60 month interval, this performance discharge test may be performed in lieu of the battery service test.
- e. At least once per 18 months, during shutdown, by giving performance discharge tests of battery capacity to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% of rated capacity from its average on previous performance tests, or is below 90% of the manufacturer's rating.

TABLE 4.8-1 - DIESEL GENERATOR TEST SCHEDULE - (Not Used)

ELECTRICAL POWER SYSTEMS

A.C. SOURCES

SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.8.1.2 As a minimum, the following A.C. electrical power sources shall be OPERABLE:

- a. One circuit between the offsite transmission network and the Onsite Essential Auxiliary Power System, and
- b. One diesel generator with:
 - 1) A day tank containing a minimum volume of 470 gallons of fuel,
 - 2) A fuel storage system containing a minimum volume of 77,100 gallons of fuel,
 - 3) A fuel transfer valve, and
 - 4) A 125 VDC battery and charger connected to the diesel generator control loads.

APPLICABILITY: MODES 5 and 6.

ACTION:

With less than the above minimum required A.C. electrical power sources OPERABLE, immediately suspend all operations involving CORE ALTERATIONS, positive reactivity changes, movement of irradiated fuel, or crane operation with loads over the fuel storage pool, and within 8 hours, depressurize and vent the Reactor Coolant System through at least a 4.5 square inch vent. In addition, when in MODE 5 with the Reactor Coolant loops not filled, or in MODE 6 with the water level less than 23 feet above the reactor vessel flange, immediately initiate corrective action to restore the required sources to OPERABLE status as soon as possible.

SURVEILLANCE REQUIREMENTS

4.8.1.2 The above required A.C. electrical power sources shall be demonstrated OPERABLE by the performance of each of the requirements of Specifications 4.8.1.1.1, 4.8.1.1.2 (except for Specification 4.8.1.1.2a.5), and 4.8.1.1.4.

3/4.8 ELECTRICAL POWER SYSTEMS

BASES

3/4.8.1, 3/4.8.2 and 3/4.8.3 A.C. SOURCES, D.C. SOURCES, and ONSITE POWER DISTRIBUTION

The OPERABILITY of the A.C. and D.C. power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety-related equipment required for: (1) the safe shutdown of the facility, and (2) the mitigation and control of accident conditions within the facility. The minimum specified independent and redundant A.C. and D.C. power sources and distribution systems satisfy the requirements of General Design Criterion 17 of Appendix A to 10 CFR Part 50.

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the safety analyses and are based upon maintaining at least one redundant set of onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss-of-offsite power and single failure of the other onsite A.C. source. The A.C. and D.C. source allowable out-of-service times are based on Regulatory Guide 1.93, "Availability of Electrical Power Sources," December 1974. When one diesel generator is inoperable, there is an additional ACTION requirement to verify that all required systems, subsystems, trains, components and devices, that depend on the remaining OPERABLE diesel generator as a source of emergency power, are also OPERABLE, and that the steam-driven auxiliary feedwater pump is OPERABLE. This requirement is intended to provide assurance that a loss-of-offsite power event will not result in a complete loss of safety function of critical systems during the period one of the diesel generators is inoperable. The term, verify, as used in this context means to administratively check by examining logs or other information to determine if certain components are out-of-service for maintenance or other reasons. It does not mean to perform the Surveillance Requirements needed to demonstrate the OPERABILITY of the component.

The OPERABILITY of the minimum specified A.C. and D.C. power sources and associated distribution systems during shutdown and refueling ensures that: (1) the facility can be maintained in the shutdown or refueling condition for extended time periods, and (2) sufficient instrumentation and control capability is available for monitoring and maintaining the unit status.

The Surveillance Requirements for demonstrating the OPERABILITY of the diesel generators are in accordance with the recommendations of Regulatory Guide 1.9, "Selection of Diesel Generator Set Capacity for Standby Power Supplies," March 10, 1971, Regulatory Guide 1.108, "Periodic Testing of Diesel Generator Units Used as Onsite Electric Power Systems at Nuclear Power Plants," Revision 1, August 1977, Regulatory Guide 1.137, "Fuel-Oil Systems for Standby Diesel Generators," Revision 1, October 1979, the NRC Staff Evaluation Report concerning the Reliability of Diesel Generators at Catawba, August 14, 1984, Generic Letter 84-15, "Proposed Staff Actions to Improve and Maintain Diesel Generator Reliability," Generic Letter 93-05, "Line-Item Technical

ELECTRICAL POWER SYSTEMS

BASES

A.C. SOURCES, D.C. SOURCES, and ONSITE POWER DISTRIBUTION (Continued)

Specifications Improvements to Reduce Surveillance Requirements for Testing During Power Operation," and Generic Letter 94-01, "Removal of Accelerated Testing and Special Reporting Requirements for Emergency Diesel Generators." If any other metallic structures (building, new or modified piping systems, conduits) are placed in the ground near the Fuel Oil Storage System or if the original system is modified, the adequacy and frequency of inspections for the Cathodic Protection System shall be reevaluated and adjusted in accordance with the manufacturer's recommendations.

The Surveillance Requirements for demonstrating the OPERABILITY of the station batteries are based on the recommendations of Regulatory Guide 1.129, "Maintenance Testing and Replacement of Large Lead Storage Batteries for Nuclear Power Plants," February 1978, and IEEE Std 450-1980, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Generating Stations and Substations."

Verifying average electrolyte temperature above the minimum for which the battery was sized, total battery terminal voltage on float charge, connection resistance values and the performance of battery service and discharge tests ensures the effectiveness of the charging system, the ability to handle high discharge rates and compares the battery capacity at that time with the rated capacity.

Table 4.8-3 specifies the normal limits for each designated pilot cell and each connected cell for electrolyte level, float voltage and specific gravity. The limits for the designated pilot cells float voltage and specific gravity, greater than 2.13 volts and 0.015 below the manufacturer's full charge specific gravity or a battery charger current that had stabilized at a low value, is characteristic of a charged cell with adequate capacity. The normal limits for each connected cell for float voltage and specific gravity, greater than 2.13 volts and not more than 0.020 below the manufacturer's full charge specific gravity with an average specific gravity of all the connected cells not more than 0.010 below the manufacturer's full charge specific gravity, ensures the OPERABILITY and capability of the battery.

Operation with a battery cell's parameter outside the normal limit but within the allowable value specified in Table 4.8-3 is permitted for up to 7 days. During this 7-day period: (1) the allowable values for electrolyte level ensures no physical damage to the plates with an adequate electron transfer capability; (2) the allowable value for the average specific gravity of all the cells, not more than 0.020 below the manufacturer's recommended full charge specific gravity, ensures that the decrease in rating will be less than the safety margin provided in sizing; (3) the allowable value for an individual cell's specific gravity, ensures that an individual cell's specific gravity will not be more than 0.040 below the manufacturer's full charge specific gravity and that the overall capability of the battery will be maintained within an acceptable limit; and (4) the allowable value for an individual cell's float voltage, greater than 2.07 volts, ensures the battery's capability to perform its design function.