Enclosure

ITS Section 3.8
ELECTRICAL POWER SYSTEMS

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ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
1	P1	LCO 3.8.1	Insert 3.8-1A adds a requirement for opposite Unit(s) DG OPERABILITY. However, the requirement includes the phrase "when (Unit 3)(Unit 1 or 2) ARE NOT in Modes 1-3. This is potentially confusing because it begs the question "what are the requirements when (Units 3)(Units 1 or 2) ARE in Modes 1-3. The opposite unit DGs are req'd. regardless of opposite unit(s) operating status.	The licensee should review Insert 3.8-1A with a view towards deleting the qualifying phrase.	The qualifying phrase was deleted.
2	P42	LCO 3.8.1	JFD P42 is confusing. The discussion concentrates on Unit 1&2, but insert 3.8-1B appears to be applicable to all 3 units. Is the common accident signal logic common to all 3 units? Or only Units 1&2.	The licensee should review the plant design, Insert 3.8-1B and JFD P42 for consistency.	P42 was revised to include Unit 3 information.
3	P51	LCO 3.8.1 Cond. A	The JFD makes a case for a change in the language of NUREG SR 3.8.1.1, but does not adequately justify eliminating the SR entirely. This SR is necessary to tie together the LCO requirements for OPERABILITY and the LCO Conditions/Req'd. Actions for an inoperable offsite source.	The licensee should consider including a SR 3.8.1.1 (aka NUREG) in the BFN ITS, albeit with revised language.	This SR is not required by CTS. The SR was deleted and the appropriate actions were incorporated into the required action statement for LCO 3.8.1 Condition A. P51 provides justification for elimination as a routine SR. Detailed descriptions of what constitutes an offsite source are included in the 3.8.1 bases.

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
4	P2	LCO 3.8.1 Cond. A	The ITS changes the NUREG Completion Time for this Condition from 72 hours and 6 days to 7 days and 14 days. The change from 72 hours to 7 days is acceptable (retains CLB). However, the change from 6 days to 14 days is not acceptable. The NUREG Completion Time is based on adding 3 days to a 72 hour Completion Time. It was not & is not intended to be a blanket endorsement to double any Completion Time, including the BFN CLB of 7 days.	The licensee should consider revising the second Completion Time from 14 days to 10 days.	The completion time of 14 days is not based on the doubling of the completion time, but on the entry of two separate conditions, one after the other. For this LCO, Required Actions A.3, B.4, C.1, and D.1 all have 7 day completion times. The 14 days allows entry into one of the associated conditions with an entry into a subsequent other associated condition and does not extend the completion time for any required action. CTS have no restrictions on the overlapping of conditions.
5	P51	LCO 3.8.1 Cond. B	See Issue #3 (i.e. adding a SR associated with offsite power OPERABILITY).	As stated in issue #3.	See response to Issue 3.
6	P2	LCO 3.8.1 Cond. B	See Issue #4, above re:7 day and 14 day Completion Time.	As stated in issue #4.	See response to Issue 4.
7	P42	Insert 3.8-3A	See issue #2, above. As noted, the JFD appears to be restricted to Units 1&2, but the proposed ITS (LCO 3.8.1, Conditions C&D) appears to be applicable to all 3 units.	The licensee should review JFD 42 to determine what changes are required to resolve the possible inconsistency with the proposed ITS.	See response to Issue 2.

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
8	P42	LCO 3.8.1 Cond. I	See previous discussions re: JFD 42. The proposed ITS indicates the common accident signal & 480V load shed logic requirements are applicable to all 3 units whereas JFD P42 seems to limit applicability to Units 1and 2.	Licensee should review JFD 42 for consistency with proposed ITS.	See response to Issue 2.
9	P51	NUREG SR 3.8.1.1	See previous comments re: including an SR for offsite power.	As stated for issue #3.	See response to Issue 3.
10	P29	ITS SR 3.8.1.1	The staff does not agree with the licensee's position as stated in JFD P29. There is nothing in the NUREG or Regulations that specifically states that successful completion of one SR can satisfy the requirements of another SR. To avoid possible confusion, the NUREG Note should be retained.	Licensee should consider retaining the Note. This is a permissive, not a requirement. (Note: the staff does not disagree that any action can satisfy the requirements of an SR if the acceptance criteria are met-- the staff disagrees that this is an "understood permissive.")	The NUREG Note has been returned to SR 3.8.1.1 to allow performance of SR 3.8.1.4 to satisfy this SR.

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
11	P30	ITS SR 3.8.1.1	Deletion of NUREG Note 2 is acceptable. However, the licensee should note that this is a permissive, not a requirement. If deleted now, the permissive can not be utilized unless the Note is again included by license amendment. This permissive cannot be implemented in the Bases.	The licensee should reconsider deletion of this permissive.	The NUREG Note has been returned to SR 3.8.1.1 and explanation added to bases allowing all DG starts to be preceded by an engine prelube period.
			Deletion of the wording "from standby conditions" from the body of the SR is not acceptable. This wording has a specific purpose and the licensee has not justified deleting it.	The licensee should justify deletion of this wording or retain the NUREG.	The wording "from standby conditions" has been restored to SR 3.8.1.1.
12	P32	ITS SR 3.8.1.1	The justification for the 31 day DG testing is inadequate. The provisions of GL 94-01 expired in 7/96 and are no longer applicable.	The licensee should provide a justification based on the Maintenance Rule.	P32 was revised to reflect that the 31 day requirement is based on Regulatory Guide 1.9.
13	P31	ITS SR 3.8.1.2	The proposed addition to Note 4 is acceptable in concept; however, this is not the appropriate place for the addition. Note 4 is a requirement; i.e., it must be done. The proposed addition is a permissive; i.e., it may be utilized if desired. A permissive and a requirement should not be included in the same Note. Suggest leaving this item as part of ITS SR 3.8.1.1 (per the NUREG).	The licensee should consider leaving the proposed addition to Note 4 as part of ITS SR 3.8.1.1, Note 2.	The additional wording to SR 3.8.1.2 Note 4 was deleted and added to SR 3.8.1.1 as Note 2.

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
14	B2	ITS SR 3.8.1.2	The staff does not understand why the licensee has not taken advantage of the load range provide in the NUREG for DG testing. The load range is included as a means of eliminating DG overloading and attendant degradation.	The licensee is requested to provide a rationale for this deviation from the NUREG.	SR 3.8.1.2 and bases were revised to permit loading to 90-100% of continuous rating, 2295-2550 kW. This is consistent with Reg Guide 1.9. L9 was created with an associated No Significant Hazards Determination to justify the change.
15	P22	NUREG SR 3.8.1.5	Is the intent of this JFD to state that the NUREG SR is not req'd. by BFN CTS, and the licensee does not choose to adopt the NUREG? If so, it should be plainly state in the JFD, and all extraneous material deleted.	The licensee should answer the staff's question and provide a revised JFD, as applicable.	This SR is not part of BFN current licensing basis. P22 was revised to indicate that BFN chooses not to adopt this NUREG SR since it is a preventative maintenance type requirement that will be plant controlled.
16	B2	ITS SR 3.8.1.4	The staff has accepted a revision to this SR that the licensee may want to consider. See the Watts Bar TS for details of the change to this SR.		Incorporated change based on Watts Bar revision.
17	P43	NUREG SR 3.8.1.8	The staff does not fully understand this JFD. Per discussions with the licensee, the staff is of the opinion that breakers at the Unit Board level change position in response to a LOOP (or by manual action) to transfer power to the shutdown busses and boards from the normal to the alternate source. This conflicts with this JFD. Clarification is required.	The licensee should provide clarification of the JFD per staff comments.	NRC's understanding of the transfers is correct. This SR is not part of BFN current licensing basis. Additional detail was provided in P43 concerning to why BFN chooses not to adopt this SR.

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
18	B2 B3	ITS SR 3.8.1.5	The staff has the following questions regarding the plant specific values for this SR: 1.) What is the basis for the 66.75 Hz value in part a? (this is 11% increase over 60 Hz) 2.) What is the basis for the 4800VAC value in part b? (this is 15% increase over 4160VAC) 3.) What is the justification for deleting the 3 second time in part b? 4.) What is the justification for deleting part c. of the SR?	The licensee should provide a response to the staff's questions.	1.) 66.75 Hz is nominal speed + 75% of the difference between nominal speed and the over speed trip setpoint as required by IEEE-308. 2.) Revised voltage range to ≥3940V, the degraded voltage setpoint, and ≤4400V, the overvoltage alarm setpoint. 3.) This SR is a new requirement and not in current licensing basis. There is no available test data to identify the expected duration to recover to steady state voltage. 4.) SR 3.8.1.5.c was added with no recovery time specified. This is a new requirement, which is not in current licensing basis. Since no test data is available to identify expected duration, a timing requirement is not included.
19	P44 P38 P34	ITS SR 3.8.1.6	Given the design of BFN, how is this SR conducted with the units at power without creating a safety concern and still meet the acceptance criteria. Deletion of the voltage and frequency acceptance criteria for this SR is not acceptable, as is JFD P44. Deletion of the acceptance criteria in parts d&e of the SR is not acceptable as is JFD P38.	The licensee should provide a response to the staffs question. The licensee should provide adequate justification for deleting most of the acceptance criteria for this SR. The licensee should also provide a justification for deleting "from standby conditions" from this LCO.	(a) The accident signals at BFN are generated out of the core spray logic. During core spray logic testing, the accident signal is verified through the logic to the relays that generate the DG starts. To verify DG start initiations, the accident signal is simulated by manually operating these relays which do not involve any plant equipment other than the DGs. (b) Revised P44 to more clearly delineate how the NUREG SR 3.8.1.12.a, b, and c requirements are redundant and not required. (c) Revised P38 to better explain acceptability of deletions. Added "from standby condition" and Note to SR 3.8.1.6 to clarify that DG starts may be preceded by an engine prelube period followed by a warm-up period. Added P57 and revised Bases to explain note.

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
20	B2	ITS SR 3.8.1.7	See comment #14 relating to load range for DG loading.	As in comment #14.	ITS SR 3.8.1.7 and associated bases were revised to be consistent with Reg Guide 1.9 direction. Added DOC L9 with associated No Significant Hazards Determination to justify change.
21	P39	NUREG SR 3.8.1.15	JFD 39 does not appear to be related to the proposed deletion of NUREG SR 3.8.1.15. The proposed change is, therefore, not acceptable.	The licensee should provide an appropriate JFD, or retain the NUREG SR. (Hot Restart Issue)	P39 was revised to indicate that BFN chooses not to adopt this NUREG SR because there is no CTS requirement and SR 3.8.1.4 testing adequately verifies DG start capability.
22	P40	NUREG SR 3.8.1.16	JFD 40 does not appear to be related to the proposed deletion of NUREG SR 3.8.1.16. The proposed change is, therefore, not acceptable.	The licensee should provide an appropriate JFD, or retain the NUREG SR. (Transfer to offsite issue)	P40 was revised to indicate that BFN chooses not to adopt this NUREG SR because there is no CTS requirement and the function is adequately tested under ITS SR 3.8.1.2.
23	P41	NUREG SR 3.8.1.17	The staff does not understand this JFD. If there is no test mode for the BFN DGs, how is the monthly SR conducted? How does the common accident signal factor into the lack of a "defined test mode". Pending a receipt of a better explanation, this change is not acceptable.	The licensee should expand the JFD to address the staffs concerns.	P41 was revised to better explain test mode applicability.

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
24	B1	ITS SR 3.8.1.8	The staff agrees that the SR wording needs to be changed to reflect the BFN design. However, the proposed wording is somewhat confusing, particularly the part about the "calibration tolerances" for each individual timer.	The licensee should consider revising the SR to more completely explain what is meant by "calibration tolerances".	ITS SR 3.8.1.8 and associated Bases were revised to replace "calibration tolerances" with "allowable values."
25	P32	NUREG Table 3.8.1-1	GL 94-01 is not an adequate justification for deleting this Table. The JFDs should be revised to justify the change based on the BFN implementation of the Maintenance Rule.	The licensee should provide a justification based on the BFN DG Maintenance Plan developed in accordance with the Maintenance Rule.	P32 was revised to reflect deletion based on implementation of Maintenance Rule requirements. Deleted DOC LA3. Created DOC L10 and associated No Significant Hazards Determination for deletion of CTS Table 4.9.A.

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
1	L7	4.9.A.1.a	The DOC references both RG 1.9 (Rev 3) and RG1.108. This is not acceptable. Rev 3 to RG 1.9 incorporates RG 1.108, and the two RGs can not coexist.	The licensee should review the associated changes and revise the DOC such that only 1 RG is applicable.	Deleted reference to RG 1.108 and maintained RG 1.9
2	N/A	4.9.A.5	Where is the CTS requirement captured in the ITS? 3.5.1 or 3.8.7?		CTS 4.9.A.5 is implemented by SR 3.5.1.12. It was moved there because loss of this function impacts LPCI injection capability while having no general impact on the plant electrical system.
3	LA1	3.9.B.2	This does not appear to be appropriate material for relocation of the Bases.	The licensee should reconsider this change.	This material was not relocated to the bases. As noted in LA1, the 4kV bus tie board is no longer part of a qualified offsite power source. Under CTS this condition is acceptable if no credit is taken for this source.
4	LA7	3.9.B.9	This change is acceptable, but the DOC should be changed. The absence of a 10CFR requirement does not preclude the Commission from imposing additional TS.	The licensee should consider that part of the DOC which states that TS cannot supersede regulations with a view towards revision.	LA7 was deleted. DOC L11 and corresponding No Significant Hazards Consideration created.

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
5	LA1	3.9.D.1	DOC LA1 does not adequately indicate how the issue of an inoperable DG that is required for support of SGT or CREVs. This CTS requirement does not appear to be captured in the ITS, and does not appear to be acceptable for relocation.	The licensee should provide a response to the staff concerns.	LA1 was revised in Revision 1 to add discussion relating to the requirements of CTS 3.9.D.1. These CTS requirements are in ITS 3.8.1.c and 3.8.7.g.
6	N/A	N/A	The CTS markup and the proposed ITS appear to be broke as indicated below: • The ITS does not include any requirement for DGs to support SGT or CREV systems. It is not covered in ITS LCO 3.8.1 or in LCO 3.6 or LCO 3.7. • There is no Action stated if the req'd. DGs become inoperable. • The CTS does not include any action if the DGs required to support SGT or CREV systems are inoperable. • The CTS only address inoperable DGs on a unit that is in cold shutdown, refueling or defueled. The above deficiencies must be fixed. DOC LA1 does not do the job, and DOC A.4 does not do the job.	The licensee should address the staff.	During operation applicable DGs are required by LCO 3.8.1.c and loss of one of these DGs is covered by Condition 3.8.1.K. Associated distribution systems are required by LCO 3.8.7.g and their loss is covered by Condition 3.8.7.G. DOC A4 has been revised to provide additional discussion on this subject.

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
1	P6	LCO 3.8.2 Insert 3.8-18A	The staff does not understand the proposed wording of the Insert. If the Unit 3 DGs are required to support Unit 1 or 2, what difference does it make what MODE Unit 3 is in. Stated differently, how many Unit 3 DGs are req'd. to support Unit 2 (in MODE 4 or 5) when Unit 3 is in MODE 1, 2 or 3? Is there any difference?	The licensee should consider revising the Insert to delete the reference to the MODE Unit 3 is in. (this is also applicable to the Unit 1 and 2 DGs req'd. to support Unit 3)	LCO 3.8.2.c was revised to remove qualifying phrase.
2	P27	LCO 3.8.2 Cond. A	This JFD appears to be in conflict with the proposed change. The JFD discusses "inoperable" while the change says "no AC source to any req'd. 4.16 kV SD BD." Moreover, the staff does not understand the difference between "de-energized" and "no AC source."	The licensee should review this change and the related JFD with a view towards eliminating any inconsistency and confusion.	The Note associated with Condition 3.8.2.B was moved in Revision 2 to Condition 3.8.2.A consistent with NUREG guidance. The Note was revised along with associated basis to state "qualified source" in place of "AC power source." The BFN design allows numerous paths through which to energize a 4.16 kV shutdown board, but not all of them are qualified. Only the respective DG and offsite circuits as described in the bases are qualified.

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
3	P6	LCO 3.8.2 Cond. A.1	The staff does not fully understand how the Completion Time for this condition is supposed to work and the Bases does not provide much help. With only one offsite ckt. Req'd., all required features are supported by the one offsite source. If it becomes inoperable, all required features must be declared inoperable, including the redundant req'd. features. This means that the inoperability of the one offsite source means immediate entry into the LCOs for req'd features. In light of this, what is the purpose of having this conditions?	The licensee should review the staffs concerns with a view towards identifying what, if anything, the staff does not understand about the proposed LCO and Bases, and propose appropriate revisions to make the submittal more clear.	The Conditions, associated Required Actions, and Completion Times were revised to be consistent with the NUREG. Required Action Completion Times are now "Immediately" for the loss of the offsite power source.
4	P6	Insert 3.8-20A	Consider Unit 2 and Unit 3 in MODE 4 or 5. The SRs required for the DGs in these MODES are not the same as the SRs req'd. in MODES 1, 2 or 3. Does the proposed insert take this into account? Are the DG SRs req'd with a unit in MODES 4 or 5 adequate to establish OPERABILITY of the DGs required to support another unit?	The licensee should review the staffs concern and propose changes as appropriate.	Regardless of the other units condition, the required DG support will be determined for each unit based on the equipment required to support its current condition. SRs required to support DGs operability are the same without respect to which unit requires it to be operable.

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
1	N/A	LCO 3.8.2.b	The staff suggests the following wording change to avoid possible confusion: change "Two Unit 1 and 2 DGs" to "Two of the four Unit 1 and 2 DGs"		Changed LCO 3.8.2.b to read "Two of the four Unit 1 and 2 DGs".
2	LA1	3.9.D.1 3.9.D.2	Proposed LCO 3.8.2 does not include the CTS requirements for specific DGs to be OPERABLE to support SGT and CREVs. LCO 3.8.8 does not require specific DGs to be aligned to specific systems/components, and LCO 3.8.2 is worded such that offsite and a DG are not req'd. for all 4 kV busses. Placing this information in the Bases does not appear to be acceptable.	The licensee should revise the submittal to retain CTS with respect to SGT and CREVs or provide an adequate justification for the change. DOC LA1 does not appear to be adequate.	LCO 3.8.2.c specifies that the Unit 3 DGs capable of supplying the Unit 3 4.16 kV shutdown boards required by LCO 3.8.8 are required. Each DG can only be aligned to one 4.16 kV shutdown board. Therefore, specific DG requirements will be driven by what is required to support LCO 3.8.8. Which 4.16 kV shutdown boards are required will be determined based on equipment required to support plant conditions. Specifics of power supplies are described in the FSAR and detailed on plant drawings, which will be used to determine what 4.16 kV boards are needed to support required operable equipment. There is no need for these specifics to be in the ITS.

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
3	LA1	3.5.A.4	Proposed LCO 3.8.2 does not include the CTS requirement for a specific DG to be OPERABLE to support a core spray loop and pump and DOC LA1 does not provide an adequate justification for this change. DOC LA1 is adequate with respect to justifying relocating material to the Bases. The problem here is that the material selected for relocation should not have been selected.	The licensee should retain CTS requirements, or provide an adequate justification for the change.	CTS 3.5.A.4 requires a Core Spray pump and associated DG to be operable. ITS 3.8.2 does this by requiring DGs to support the 4.16 kV boards required by ITS 3.8.8.
4	LA1	3.5.A*	This is the same issue as discussed in comments 2&3, above, except the components/systems involved are CSS and RHR.		See response to Issue 3.

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
1	P48	NUREG LCO 3.8.3 Cond. D	The licensee proposes to substitute a modified NUREG SR 3.8.3.3 for CTS 4.9.A.1.e. This is acceptable to an extent; i.e., the staff acknowledges that the properties of fuel oil in ASTM D975 need not be periodically verified. However, these properties do need to be verified for new fuel, and critical parameters should be checked prior to adding any new fuel to the stored fuel inventory. This can be accomplished by retaining Cond. D and the portions of NUREG SR 3.8.3.3 proposed for deletion.	The licensee should consider adopting the NUREG Fuel Oil program since it is more effective than CTS, but involves approximately the same level of effort.	CTS requirements are specified by SR 3.8.3.3 as have been restated in ITS Section 5.5.9. BFNs Chemistry program requires that new fuel be tested and verified to be in accordance with ASTM-D975-89 prior to being transferred to a diesel fuel oil storage tank. In addition, this tank is periodically tested to ensure fuel oil quality is maintained prior to transferring to the individual DG storage tanks. Because make-up fuel oil is stored externally and maintained within the ASTM-D975-89 limits under the current Chemistry program, maintaining CTS requirements is adequate.
2	P35	LCO 3.8.3 Cond. D	It appears that the licensee does not fully understand the organization of NUREG LCO 3.8.3. The intent of the NUREG is to allow some flexibility if the air receiver pressure is less than that required for the maximum number of starts, but still adequate for one or more starts. Also, what is the basis for the 165 psig value, and what is meant by "the required" and "unit " proposed for addition to Cond. D?	The licensee should review the proposed changes to Cond. D and discuss them with the staff with a view towards retaining the NUREG version. Also, provide a response to the staffs questions.	It is understood that the NUREG intended to allow flexibility regarding DG air start requirements. However, BFN has no analysis which identifies the air pressure at which at least a single start is guaranteed. Therefore, TVA chooses to maintain the Condition, Required action, and Completion Time as proposed. The 165 psig value assures at least one start attempt and was provided by the vendor. Each DG has two air start banks, each capable of starting the DG. A selector switch determines which bank is aligned to start the DG. Use of the term "the required" was intended to indicate that only one of the banks is required and "unit" was the term chosen to describe the air start bank.

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
3	P16	LCO 3.8.3 Cond. D	The JFD does not provide a comprehensive discussion on why the change is proposed or why it is acceptable.	The licensee should revise the JFD.	Because P16 is referenced, it is assumed that this NRC comment actually concerns Condition E. This change was intended to be a catch-all for fuel oil, lube oil, and starting air problems. The change has been deleted.
4	P48 P35	SR 3.8.3.3 SR 3.8.3.4	See staff comments regarding changes to NUREG Cond. D associated with these JFDs.		TVA believes these SRs are acceptable in light of responses to issues 1 and 2.
5	P22	SR 3.8.3.5 SR 3.8.3.6	Is it the intent of this JFD to state that these NUREG SRs are not currently required at BFN, and that the licensee has opted to not adopt them as part of the BFN ITS? If so, the JFD should be revised to so state, and the JFD discussion regarding maintenance activities deleted.	The licensee should revise the JFD as required.	The NUREG SRs are not part of current licensing basis. P22 was revised to indicate that BFN chooses not to adopt this NUREG SR since it is a preventative maintenance type requirement that will be plant controlled.

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
1	P6	LCO 3.8.4 Cond. A	Should the term "one" be added to Insert 3.8-24B ahead of "Unit"?	Provide a response to the staffs question.	Revised as suggested.
2	P1	LCO 3.8.4 RA A.1	What is the purpose of adding the term "required" to this action? The addition appears to add confusion.	Provide a response to the staffs question.	Deleted "required" from Required Action 3.8.4.A.1.
3	N/A	SR 3.8.4.3 SR 3.8.4.4	The Bases discussion for these SRs includes a reference to IEEE-279. However, the proposed ITS and Bases incorporate the modified performance discharge test for station batteries. This test only appears in IEEE-450(1995). Therefore, either the reference is wrong, or the proposed ITS is wrong. The submittal should be revised to include the appropriate SRs with the correct reference.		Replaced reference to IEEE-279 in Bases for SR 3.8.4.4 with reference to IEEE-450 and IEEE-308.

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
1	LA2	3.9.B.7	It is suggested that this DOC be revised. What is stated in the DOC is correct in general terms, but is not applicable here. There are no requirements for reporting, so the CTS do not supersede any regulations. However, in the absence of any specific regulations, the "Commission may include such additional TS as the Commission finds appropriate." (See 10CFR50.36) Except for the above concern with the DOC language, the changes associated with this DOC are acceptable.	The licensee should consider revising the DOC. Note: This comment is applicable elsewhere in the DOCs where the same language is used.	LA2 was deleted. DOC L4 and corresponding No Significant Hazards Consideration created.

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
1	N/A	SR 3.8.5.1	Inclusion of the Note in proposed SR 3.8.5.1 appears to be inappropriate. As stated in JFD P34, the DC subsystems are totally shared, and SRs must be conducted at power to avoid a multiple unit shutdown. The reverse is also true, i.e., demonstration of the OPERABILITY of a DC subsystem in support of an operating unit can not be deferred because one unit is in MODE 4 or 5. This issue requires further discussion with the staff.		The reason for the Note is to preclude requiring the Operable DC sources from being discharged below their capability to provide the required power supply or otherwise rendering them inoperable during the performance of SRs. It is the intent that these SRs must still be capable of being met, but actual performance is not required unless required to support an operating unit per Section 3.8.4.

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
1	P46	Table 3.8.6-1 Note d	The staff understands what the licensee would like to accomplish with proposed Note d. However, the proposed wording is not specific enough; i.e., "used as appropriate" is not adequately defined. Also, the "alternate values" are appropriate only to specific batteries, but the proposed Note, as part of the BFN TS is generic and would apply to any battery (existing or future). This is not acceptable. The proposed TS need to be revised.	The licensee should review the proposed TS with a view towards revising the TS to incorporate the idea of Note d in more specific terms and to identify those existing batteries to which the Note is applicable. The licensee should also provide a copy of the mfg.'s. Evaluation justification for staff review.	Note (d) reflects the current methodology used at BFN and was added to allow use of alternate values of specific gravity based on manufacturer recommendations. In response to the NRC concern, Note (d) was revised to be more specific as to allowances. The note is applicable to all of the batteries listed in LCO 3.8.6. Specifics of how the note applies to each battery are included in the bases. Revised reference from TVA memorandum to vendor manual

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
1	M1	pg. 3.9/4.9-4	The last statement of the first paragraph makes the reference to 1988 letter from IEEE regarding a 31 day AOT. How does this 1988 letter compare with the recommendations of IEEE-450, 1995? Can IEEE-450, 1995 be referenced here?		Requirements are consistent with IEEE-450, 1995. The 31 day AOT is not from IEEE-450, so the reference to the 1988 letter is still required here.

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
1	P12	LCO 3.8.7	Why are 480 VAC RMOV Boards 1A, 1B and 1C (Unit 1), 2A, 2B and 2C (Unit 2), and 3A, 3B and 3C (Unit 3) not included in the ITS.		The A, B, and C 480 V RMOV boards are load centers and as such, a loss of one of these boards will result in the equipment supplied by the board being inoperable. The Revision 2 submittal provided additional discussion of these boards to the 3.8.7 bases.
2	P12	LCO 3.8.7 Cond. A	CTS 3.9.B.4 allows one shutdown board to be inoperable for 5 days provided that specific OPERABILITY requirements for other power equipment and safety systems are met. These requirements are not carried over to the ITS, at least in the same form. The CTS markup indicates that these CTS requirements are captured in LCO 3.8.1 Conditions and Actions. However, the staff is unable to determine how each of the CTS requirements is captured in ITS LCO 3.8.1. The licensee should provide specific guidance for the staff in this area and incorporate pertinent parts of the guidance in the Bases.	The licensee should provide the requested guidance and consider appropriate Bases revisions.	Required Action A.2 was added to LCO 3.8.7 to declare the associated DG inoperable. This will ensure actions for LCO 3.8.1 are entered as described in DOC A2. All of the equipment listed in CTS 3.9.B.4 are redundant features that would be verified under LCO 3.8.1 Required Actions B1 and B2.

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
3	P12	LCO 3.8.7 Cond. A Comp Time	What is the basis for the second Completion Time (12 days) for this condition? This question is also applicable to the Completion Times for Conditions B and C.	The licensee should provide a response to the staffs question.	The 12 days is based on the entry of two separate conditions, one after the other. For this LCO, Required Actions A.1 and D.1 have 5-day completion times while Required Action E.1 has a 7-day completion time. The 12 days allows entry into Action E.1 with a preceding or subsequent entry into A.1 or D.1. This completion time does not extend the completion time for any required action. CTS have no restrictions on the overlapping of conditions. Revised P12 to better explain.
4	N/A	LCO 3.8.7 Cond. A	CTS 3.9.B.5 addresses an inoperable shutdown bus and allows inoperability for up to 7 days. This CTS requirement is proposed to be addressed in Action A.3 of ITS LCO 3.8.1, Cond. A. The staff does not understand how this is accomplished. The licensees should provide a detailed discussion of how the ITS captures the CTS requirement. The licensee should also explain why it is acceptable to allow a shutdown bus to be inoperable for 7 days while a shutdown board is limited to 5 days.	The licensee should provide a response to the staffs question.	The function of the shutdown buses is to connect the 4.16 kV shutdown boards to the offsite power sources as described in the Bases description of the offsite circuits. As discussed in the Bases descriptions, loss of a shutdown bus is a loss of one of the offsite circuits, which is captured by LCO 3.8.1 Condition A. The CTS Required Action time of 7 days to return a shutdown bus is consistent with Required Action 3.8.1.A.3 to restore a required offsite circuit. The loss of a shutdown board will result in a loss of equipment. Loss of a shutdown bus does not, in itself, result in the loss of any equipment but in the loss of an offsite circuit. Therefore, the shutdown board completion time is more restrictive

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
5	P12	LCO 3.8.7 Cond. B	The staff does not understand why an inoperable 480V SD BD results in an Action with an 8 hour completion time while an inoperable 4KV SD BD results in an Action with a 7 day completion time. The licensee should provide an explanation for this apparent inconsistency.	The licensee should provide information to address the staffs concern.	Loss of a 4.16 kV shutdown board will result in the loss of half of one division's ECCS pumps. The loss of a 480 V shutdown board results in the loss of AC power to support devices for a complete division of ECCS.
6	P15	LCO 3.8.7 Cond. D	The staff does not understand why it is acceptable for a DG Aux Board (480V) to be inoperable (de-energized) for 5 days. It is the staff understanding that the DG Aux Boards are essential for DG OPERABILITY; i.e., inop aux board equals inop DG. Since each aux board supports 2 DGs, inoperability of an aux board equals 2 inoperable DGs. ITS LCO 3.8.1, Cond. G addresses 2 DGs inoperable and allows 2 hours to restore at least one DG to OPERABLE status. The licensee should explain the obvious inconsistency between 5 days in one case and 2 hours in the other.	The licensee should provide the explanation requested by the staff.	The two 480 V DG Aux. Boards support redundant equipment so that the loss of one DG Aux. board will not disable any DG but will remove the designed redundancy.

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
7	P12	LCO 3.8.7 Insert 3.8-38E	There are 4 RMOV MG Sets per unit at BFN. CTS 3.9.B.1.d (Unit 1) requires the plant to be shutdown in 24 if any two MG Sets are inoperable. The proposed ITS (LCO 3.8.7, Cond. C) requires declaring the associated RHR Subsystem inoperable if a 480V RMOV Board is inoperable; i.e., both MG sets feeding the board are inoperable. The proposed ITS is a substantial relaxation from the CTS that has not been justified and is, therefore, not acceptable. The licensee should provide a thorough justification for this substantial relaxation or revise the submittal to reflect the CTS requirements. The licensee should also explain why only 480V RMOV Boards D&E (all units) are in TS while 480V RMOV Boards A, B, and C (all units) are not included. What Actions are appropriate when A, B or C boards are inoperable?	The licensee should provide the justification requested by the staff or revise the submittal to reflect CTS. The licensee should provide a response to the staffs question regarding 480V RMOV Boards A, B, and C (all units).	LA5 was added in ITS Section 3.8 Revision 2 to better explain how CTS have been implemented in ITS. In essence, loss of a single M-G set results in loss of required auto transfer capability and concurrent loss of the associated loop of LPCI under ITS Condition 3.8.7.C. The action time for correction of ITS Condition 3.5.1.A.1 (one LPCI subsystem inoperable) is 7 days which is consistent with CTS 3.9.B.13. Loss of the second M-G set on the same RMOV board is bounded by the conditions associated with the inoperable LPCI loop. Subsequent loss of an M-G set on the other RMOV board would require immediate shutdown by Required Actions 3.8.7.I.1 and 3.5.1.H.1. This is consistent with CTS 3.9.B.14. Also see response to Issue 1.
8	P12	LCO 3.8.7 Cond. G	Why is Cond. C not included in this default condition?	The licensee should provide a response to the staffs question.	Required Action for Condition C has an immediate completion time. After declaring the affected LPCI loop inoperable, LCO 3.5.1 will be controlling.
9	N/A	LCO 3.8.7 Cond. C&H	It should be noted that the inoperability of 480 V RMOV Boards D&E in any unit requires entry into LCO 3.0.3 for that unit, regardless of loss of function.	No specific action is required.	Loss of both D and E 480 V RMOV boards results in a total loss of LPCI, which is covered by LCO 3.5.1.

ISSUE	JFD	REF	DESCRIPTION	COMMENTS	RESPONSE
1	N/A	3.9.B.6	This CTS is proposed as ITS LCO 3:8.7, Cond. D. This gives rise to a question. With one 480 VAC DG Aux Board inoperable, two DGs are without aux power and are, to all intents and purposes, inoperable. Given this, how can a 5 day AOT for an inoperable DG aux board be justified.		The two 480 V DG Aux. Boards support redundant equipment so that the loss of one DG Aux. Board will not disable any DG but will remove the designed redundancy.
2	L4	3.9.B.8	The proposed change appears to be acceptable. However, a final decision is delayed pending a review of the BFN DC system design.		Pending review of the BFN DC system design by NRC reviewer.
3	LA2	3.9.B.8	See comments regarding wording of DOC LA2 in comments to LCO 3.8.4.		LA2 was deleted. DOC L5 and corresponding No Significant Hazards Consideration created.
4	L3	3.9.B.2	Allowing 8 hours to resolve an inoperable 480V shutdown board is ok, but adding 12 days in place of the NUREG 16 hours is not acceptable.		Use of 12 days is consistent with the NUREG in that the 12 days encompasses all LCO 3.8.7 conditions. The NUREG 16 hours from discovery of failure to meet LCO is an overall time to exit LCO 3.8.7 (NUREG 3.8.9). It does not permit exceeding the individual condition required action completion times. Similarly the use of 12 days is based on the CTS condition Required Action completion times of 7 days for Action E.1 plus the 5 days for either Action A.1 or D.1. This does not permit any extension to the 8 hour completion time of LCO 3.8.7 Condition B.

SUMMARY DESCRIPTION
OF ITS/ITS BASES CHANGES

PROPOSED TECHNICAL SPECIFICATIONS (TS)
CHANGE NO. 362 IMPROVED STANDARD TS (ITS)
SUPPLEMENT TO ITS SECTION 3.8, Revision 3

TVA is submitting a proposed supplement to TS-362 for ITS Section 3.8, ELECTRICAL POWER SYSTEMS. This supplement makes several changes associated with NRC comments on Section 3.8 and incorporates minor changes resulting from an internal TVA review. A synopsis of the ITS and ITS BASES changes is provided below.

ITS LCO 3.8.1.C and corresponding Bases

In response to an NRC comment, removed words "When Unit 3 <Units 1 or 2> is not in MODE 1, 2, or 3," from the LCO and revised Bases as appropriate in the LCO section and ACTIONS section.

ITS SR 3.8.1.1 and corresponding Bases

Inserted BFN specific steady state voltage values.

In response to an NRC comment:

- Note 1 from NUREG-1433 reinserted to allow performance of SR 3.8.1.4 to satisfy this SR.
- Moved wording from Note 4 of SR 3.8.1.2 to Note 2 of SR 3.8.1.1. This allows all DG starts to be preceded by an engine prelube period followed by a warm-up period prior to loading. ITS now conforms to NUREG wording.
- Reinserted NUREG words "from standby conditions."

ITS SR 3.8.1.2 and corresponding Bases

As stated above, moved wording from existing Note 4 of SR 3.8.1.2 to Note 2 of SR 3.8.1.1. ITS now conforms to NUREG wording.

In response to an NRC comment, revised SR with a required load range for the DGs instead of just a required minimum loading. The range specified is equal to 90 - 100% of continuous rating. This is consistent with Reg Guide 1.9 direction and corresponds with the NUREG.

ITS SR 3.8.1.4 and corresponding Bases

For consistency, in response to a previous NRC comment, added a Note from NUREG which allows DG starts to be preceded by an engine prelube period.

In response to an NRC comment, revised SR to correspond with an NRC accepted TS provision from NRC approved TVA Watts Bar Nuclear Plant ITS. This change requires DGs reach a minimum voltage and frequency value within 10 seconds and that, at steady state, voltage and frequency are within specified bands.

ITS SR 3.8.1.5 and corresponding Bases

Corrected typographical error in ITS Note, changed header from "NOTES" to "NOTE."

In response to an NRC comment:

- Revised (b) to specify voltage range instead of just a maximum voltage. Minimum voltage specified corresponds with the degraded voltage setpoint and the maximum voltage specified corresponds with the overvoltage alarm setpoint. This corresponds with the NUREG.
- Reinserted (c) which specifies frequency range following load rejection. This is consistent with the NUREG.

ITS SR 3.8.1.6 and corresponding Bases

For consistency, in response to a previous NRC comment, returned Note 1 from NUREG which allows engine prelube period. In addition, added to the Note the allowance for a warm-up period. This will reduce the wear on the DGs without affecting SR testing.

In response to an NRC comment, returned words from the NUREG "from standby condition."

ITS Bases SR 3.8.1.6

Added wording which explains method used to minimize number of DGs involved in testing.

ITS SR 3.8.1.7 and corresponding Bases

In response to an NRC comment, revised SR with a required load range for the DGs instead of just a required minimum loading. This is consistent with Regulatory Guide 1.9 direction and corresponds with the NUREG.

ITS SR 3.8.1.8 and corresponding Bases

In response to an NRC comment, replaced words "calibration tolerances" with "allowable values" and provided appropriate wording in Bases.

ITS Bases SR 3.8.1.8 and 3.8.1 REFERENCES section

Corrected reference.

ITS SR 3.8.1.9 and corresponding Bases

For consistency, in response to a previous NRC comment, returned Note 1 from NUREG which allows engine prelube period.

In (c.3), inserted BFN specific values for steady state voltage.

ITS LCO Bases 3.8.1

Corrected typographical error. Changed "ther" to "the."

ITS LCO 3.8.2.b and corresponding Bases

In response to an NRC comment, changed "Two Unit 1 and 2 diesel generators" to "Two of the four Unit 1 and 2 diesel generators." "Unit 3" is used in Unit 3 ITS instead of "Unit 1 and 2." Wording changed in Bases as appropriate.

ITS LCO 3.8.2.c and corresponding Bases

In response to an NRC comment, removed words that reference MODE of other unit.

ITS 3.8.2 ACTIONS A and B and corresponding Bases

Revised to correspond with NUREG.

ITS 3.8.2 ACTION C and corresponding Bases

Inserted ACTION C to provide assurance that a loss of offsite power, during the period that a required other Unit DG is inoperable, does not result in a complete loss of safety function for SGT or CREVS.

ITS 3.8.3 ACTION E and corresponding Bases

In response to an NRC comment, (E) was rewritten to more closely correspond with NUREG.

ITS Bases 3.8.3 BACKGROUND, LCO, and ACTIONS

In response to an NRC comment, revised description of DG Air Start System and when the corresponding DG must be declared inoperable based on Air Start System.

ITS Bases 3.8.4 and Bases Reference Section

Corrected references from IEEE Standard 279 to IEEE Standard 308 and IEEE Standard 450 as appropriate.

ITS Bases 3.8.4 BACKGROUND Section

Based on TVA review comments, deleted "Approximately 5.5 seconds after start, the diesel battery load is about 4.2 amps."

ITS 3.8.4 ACTION A

In response to NRC comment, returned to NUREG wording by deleting word "required."

ITS Bases SR 3.8.4.1

Based on TVA review comments, added "while supplying adequate power to the connected DC loads."

ITS SR 3.8.4.5 and corresponding Bases

Based on TVA review comments, reinserted part of NUREG Note which allows credit for unplanned events to satisfy this SR.

ITS Bases SR 3.8.5.1

In response to NRC comment, provided additional clarification for NOTE in ITS SR 3.8.5.1

ITS Table 3.8.6-1

In response to an NRC comment, revised note (d) to be more specific as to when alternate values of specific gravity (based on manufacturer recommendations) may be used.

ITS 3.8.7 ACTION A and corresponding Bases

In response to NRC comment, added REQUIRED ACTION A.2 to declare associated DG inoperable. This will ensure actions for LCO 3.8.1 are entered when required.

ITS Bases 3.8.7 ACTION F.1

Corrected typographical error. Changed "board" to "boards."

BROWNS FERRY NUCLEAR PLANT - IMPROVED TECHNICAL SPECIFICATIONS
SECTION 3.8
LIST OF REVISED PAGES

UNIT 1 ITS SECTIONS

Replaced page 3.8-1 page 3.8-1 *R3
Replaced pages 3.8-7 through 3.8-34 (various revision levels) with pages 3.8-7 through 3.8-35 *R3

3.8 ELECTRICAL POWER SYSTEMS

3.8.1 AC Sources—Operating

LCO 3.8.1 The following AC electrical power sources shall be OPERABLE:

a. Two qualified circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System;

b. Unit 1 and 2 diesel generators (DGs) with two divisions of 480 V load shed logic and common accident signal logic OPERABLE; and

c. Unit 3 DG(s) capable of supplying the Unit 3 4.16 kV shutdown board(s) required by LCO 3.8.7, "Distribution Systems—Operating."

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required offsite circuit inoperable.	A.1 Verify power availability from the remaining OPERABLE offsite transmission network. AND	1 hour AND Once per 8 hours thereafter
		(continued)

SURVEILLANCE REQUIREMENTS

----------NOTE----------
SR 3.8.1.1 through SR 3.8.1.9 are applicable to the Unit 1 and 2 AC sources. SR 3.8.1.10 is applicable only to Unit 3 AC sources.

SURVEILLANCE		FREQUENCY
SR 3.8.1.1	----------NOTES---------- 1. Performance of SR 3.8.1.4 satisfies this SR. 2. All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. 3. A modified DG start involving idling and gradual acceleration to synchronous speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.4 must be met. ---------- Verify each DG starts from standby conditions and achieves steady state voltage ≥ 3940 V and ≤ 4400 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.2	----------NOTES---------- 1. DG loadings may include gradual loading as recommended by the manufacturer. 2. Momentary transients outside the load range do not invalidate this test. 3. This Surveillance shall be conducted on only one DG at a time. 4. This SR shall be preceded by and immediately follow, without shutdown, a successful performance of SR 3.8.1.1 or SR 3.8.1.4. ---------- Verify each DG is synchronized and loaded and operates for ≥ 60 minutes at a load ≥ 2295 kW and ≤ 2550 kW.	31 days
SR 3.8.1.3	Verify the fuel oil transfer system operates to automatically transfer fuel oil from 7-day storage tank to the day tank.	31 days
SR 3.8.1.4	----------NOTE---------- All DG starts may be preceded by an engine prelube period. ---------- Verify each DG starts from standby condition and achieves, in ≤ 10 seconds, voltage ≥ 3940 V and frequency ≥ 58.8 Hz. Verify after DG fast start from standby conditions that the DG achieves steady state voltage ≥ 3940 V and ≤ 4400 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	184 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.5	----------NOTE---------- If performed with the DG synchronized with offsite power, it shall be performed at a power factor ≤ 0.9. ---------- Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and: a. Following load rejection, the frequency is ≤ 66.75 Hz; and b. Following load rejection, the steady state voltage recovers to ≥ 3940 V and ≤ 4400 V. c. Following load rejection, the steady state frequency recovers to ≥ 58.8 Hz and ≤ 61.2 Hz.	18 months
SR 3.8.1.6	----------NOTE---------- All DG starts may be preceded by an engine prelube period followed by a warmup period. ---------- Verify on an actual or simulated accident signal each DG auto-starts from standby condition.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.7	----------NOTE---------- Momentary transients outside the load and power factor ranges do not invalidate this test. ---------- Verify each DG operating at a power factor ≤ 0.9 operates for ≥ 24 hours: a. For ≥ 2 hours loaded ≥ 2680 kW and ≤ 2805 kW; and b. For the remaining hours of the test loaded ≥ 2295 kW and ≤ 2550 kW.	18 months
SR 3.8.1.8	Verify interval between each timed load block is within the allowable values for each individual timer.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.9	----------NOTE---------- All DG starts may be preceded by an engine prelube period. ---------- Verify, on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ECCS initiation signal: a. De-energization of emergency buses; b. Load shedding from emergency buses; and c. DG auto-starts from standby condition and: 1. energizes permanently connected loads in ≤ 10 seconds, 2. energizes auto-connected emergency loads through individual timers, 3. achieves steady state voltage ≥ 3940 V and ≤ 4400 V, 4. achieves steady state frequency ≥ 58.8 Hz and ≤ 61.2 Hz, and 5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.	18 months
SR 3.8.1.10	For required Unit 3 DGs, the SRs of Unit 3 Technical Specifications are applicable.	In accordance with applicable SRs.

3.8 ELECTRICAL POWER SYSTEMS

3.8.2 AC Sources – Shutdown

LCO 3.8.2 The following AC electrical power sources shall be OPERABLE:

a. One qualified circuit connected between the offsite transmission network and the onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.8, "Distribution Systems – Shutdown";

b. Two of the four Unit 1 and 2 diesel generators (DGs) each capable of supplying one 4.16 kV shutdown board of the onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.8, "Distribution Systems – Shutdown"; and

c. Unit 3 DGs capable of supplying the Unit 3 4.16 kV shutdown boards required by LCO 3.8.8.

APPLICABILITY: MODES 4 and 5,
During movement of irradiated fuel assemblies in the secondary containment.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required offsite circuit inoperable.	----------NOTE---------- Enter applicable Condition and Required Actions of LCO 3.8.8, with any required 4.16 kV shutdown board not energized from a qualified source as a result of Condition A. ----------	
	A.1 Declare affected required feature(s) with no qualified offsite power available inoperable.	Immediately
	OR	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2.2 Suspend movement of irradiated fuel assemblies in secondary containment.	Immediately
	AND	
	A.2.3 Initiate action to suspend operations with a potential for draining the reactor vessel (OPDRVs).	Immediately
	AND	
	A.2.4 Initiate action to restore required offsite power circuit to OPERABLE status.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. One or more required Unit 1 and 2 DGs inoperable.	B.1.1	Suspend CORE ALTERATIONS.	Immediately
		AND	
	B.1.2	Suspend movement of irradiated fuel assemblies in secondary containment.	Immediately
		AND	
	B.1.3	Initiate action to suspend OPDRVs.	Immediately
		AND	
	B.1.4	Initiate action to restore required Unit 1 and 2 DGs to OPERABLE status.	Immediately
C. One or more required Unit 3 DGs inoperable.	C.1	Declare affected SGT and CREV subsystem(s) inoperable.	30 days AND Immediately from discovery of Condition C concurrent with inoperability of redundant required feature(s).

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.2.1	----------NOTE---------- The following SRs are not required to be performed: SR 3.8.1.2, SR 3.8.1.5, SR 3.8.1.7, SR 3.8.1.8, and SR 3.8.1.9. ---------- For Unit 1 and 2 AC sources required to be OPERABLE, the SRs of Specification 3.8.1 are applicable.	In accordance with applicable SRs
SR 3.8.2.2	For the required Unit 3 DG, the SRs of Unit 3 Technical Specifications are applicable.	In accordance with applicable SRs

3.8 ELECTRICAL POWER SYSTEMS

3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air

LCO 3.8.3 The stored diesel fuel oil, lube oil, and starting air subsystem shall be within limits for each required diesel generator (DG).

APPLICABILITY: When associated DG is required to be OPERABLE.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each DG.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more DGs with fuel oil level < 35,280 gal and > 30,240 gal in storage tank.	A.1 Restore fuel oil level to within limits.	48 hours
B. One or more DGs with lube oil inventory < 175 gal and > 150 gal.	B.1 Restore lube oil inventory to within limits.	48 hours
C. One or more DGs with stored fuel oil total particulates not within limits.	C.1 Restore fuel oil total particulates to within limit.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One or more DGs with the required starting air receiver unit pressure < 165 psig.	D.1 Declare associated DG inoperable.	Immediately
E. Required Action and associated Completion Time not met. OR One or more DGs with diesel fuel oil, lube oil, or starting air subsystem inoperable for reasons other than Condition A, B, C or D.	E.1 Declare associated DG inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.3.1	Verify each fuel oil storage tank contains ≥ 35,280 gal of fuel.	31 days
SR 3.8.3.2	Verify lube oil inventory is ≥ 175 gal.	31 days
SR 3.8.3.3	Verify fuel oil total particulate concentration in stored fuel oil is tested in accordance with, and maintained within the limits of, the Diesel Fuel Oil Testing Program.	In accordance with the Diesel Fuel Oil Testing Program
SR 3.8.3.4	Verify each required DG air start receiver unit pressure is ≥ 165 psig.	31 days

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources—Operating

LCO 3.8.4 The following DC electrical power systems shall be OPERABLE:

a. Unit DC subsystems 1, 2, and 3;

b. Shutdown Board DC subsystems A, B, C, and D;

c. Unit 1 and 2 Diesel Generator (DG) DC subsystems;

d. Unit 3 DG DC subsystem(s) supporting DG(s) required to be OPERABLE by LCO 3.8.1, "AC Sources—Operating"; and

e. Unit 3 Shutdown Board DC subsystem 3EB needed to support equipment required to be OPERABLE by LCO 3.7.3, "Control Room Emergency Ventilation (CREV) System."

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One Unit DC electrical power subsystem inoperable. OR One Unit 1 and 2 Shutdown Board DC electrical power subsystem inoperable.	A.1 Restore DC electrical power subsystem to OPERABLE status.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Required Action and Associated Completion Time of Condition A not met.	B.1	Be in MODE 3.	12 hours
	AND		
	B.2	Be in MODE 4.	36 hours
C. One or more DG DC electrical power subsystem(s) inoperable.	C.1	Declare associated DG inoperable.	Immediately
D. Unit 3 3EB Shutdown Board DC electrical power subsystem inoperable.	D.1	Declare the affected CREV subsystem inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.4.1	Verify battery terminal voltage is ≥ 248 V for each Unit and Shutdown Board battery and ≥ 124 V for each DG battery on float charge.	7 days
SR 3.8.4.2	----------NOTE---------- Performance of SR 3.8.4.5 satisfies this SR. ---------- Verify each required battery charger charges its respective battery after the battery's 18 month service test.	18 months
SR 3.8.4.3	----------NOTES---------- The modified performance discharge test in SR 3.8.4.4 may be performed in lieu of the service test in SR 3.8.4.3 once per 60 months. ---------- Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.4.4	Verify battery capacity is ≥ 80% of the manufacturer's rating when subjected to a performance discharge test or a modified performance discharge test.	60 months AND 12 months when battery shows degradation or has reached 85% of expected life with capacity < 100% of manufacturer's rating AND 24 months when battery has reached 85% of expected life with capacity ≥ 100% of manufacturer's rating
SR 3.8.4.5	----------NOTE---------- Credit may be taken for unplanned events that satisfy this SR. ---------- Verify each required battery charger supplies ≥ 300 amps for the Unit and 50 amps for the Shutdown Board subsystems at ≥ 210 V and ≥ 15 amps for DG subsystems at ≥ 105 V.	60 months

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources – Shutdown

LCO 3.8.5 DC electrical power subsystems shall be OPERABLE to support the DC electrical power distribution subsystem(s) required by LCO 3.8.8, "Distribution Systems – Shutdown."

APPLICABILITY: MODES 4 and 5,
During movement of irradiated fuel assemblies in the secondary containment.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required DC electrical power subsystems inoperable.	A.1 Declare affected required feature(s) inoperable.	Immediately
	OR	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2.2 Suspend movement of irradiated fuel assemblies in the secondary containment.	Immediately
	AND	
		(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.3 Initiate action to suspend operations with a potential for draining the reactor vessel.	Immediately
	AND	
	A.2.4 Initiate action to restore required DC electrical power subsystems or systems to OPERABLE status.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.5.1	----------NOTE---------- The following SRs are not required to be performed: SR 3.8.4.2, SR 3.8.4.3, SR 3.8.4.4, and SR 3.8.4.5. ----------	
	For DC sources required to be OPERABLE the following SRs are applicable: SR 3.8.4.1 SR 3.8.4.2 SR 3.8.4.3 SR 3.8.4.4 SR 3.8.4.5	In accordance with applicable SRs

ACTIONS
3.8 ELECTRICAL POWER SYSTEMS

3.8.6 Battery Cell Parameters

LCO 3.8.6 Battery cell parameters for the Unit, Shutdown Board, and DG batteries shall be within the limits of Table 3.8.6-1.

APPLICABILITY: When associated DC electrical power subsystems are required to be OPERABLE.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each battery.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more batteries with one or more battery cell parameters not within Category A or B limits.	A.1	Verify pilot cells electrolyte level and float voltage meet Table 3.8.6-1 Category C limits.	1 hour
	AND		
	A.2	Verify battery cell parameters meet Table 3.8.6-1 Category C limits.	24 hours AND Once per 7 days thereafter
	AND		
	A.3	Restore battery cell parameters to Category A and B limits of Table 3.8.6-1.	31 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met. OR One or more batteries with average electrolyte temperature of the representative cells not within limits. OR One or more batteries with one or more battery cell parameters not within Category C values.	B.1 Declare associated battery inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.6.1	Verify battery cell parameters meet Table 3.8.6-1 Category A limits.	7 days
SR 3.8.6.2	Verify battery cell parameters meet Table 3.8.6-1 Category B limits.	92 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.6.3	Verify average electrolyte temperature of representative cells is ≥ 60°F for each Unit and Shutdown Board battery (except Shutdown Board battery 3EB), and ≥ 40°F for Shutdown Board battery 3EB and each DG battery.	92 days

Table 3.8.6-1 (page 1 of 1)
Battery Cell Parameter Requirements

PARAMETER	CATEGORY A: LIMITS FOR EACH DESIGNATED PILOT CELL	CATEGORY B: LIMITS FOR EACH CONNECTED CELL	CATEGORY C: ALLOWABLE VALUE FOR EACH CONNECTED CELL
Electrolyte Level	> Minimum level indication mark, and ≤ ¼ inch above maximum level indication mark[a]	> Minimum level indication mark, and ≤ ¼ inch above maximum level indication mark[a]	Above top of plates, and not overflowing
Float Voltage	≥ 2.13 V	≥ 2.13 V	> 2.07 V
Specific Gravity[b][c][d]	≥ 1.20	≥ 1.195 <u>AND</u> Average of all connected cells > 1.205	Not more than 0.020 below average of all connected cells <u>AND</u> Average of all connected cells ≥ 1.195

(a) It is acceptable for the electrolyte level to temporarily increase above the specified maximum level during equalizing charges provided it is not overflowing.

(b) Corrected for electrolyte temperature.

(c) As an alternative to the specific gravity measurements, a battery charging current of < 1 amp for Unit and Shutdown Board batteries and < 0.5 amp for DG batteries when on float charge is acceptable only during a maximum of 7 days following a battery recharge. When charging current is used to satisfy specific gravity requirements, specific gravity of each connected cell shall be measured prior to expiration of the 7 day allowance.

(d) Alternate values may be used for a limited number of cells provided demonstrated battery capacity at the last discharge test meets the minimum qualifying value.

3.8 ELECTRICAL POWER SYSTEMS

3.8.7 Distribution Systems—Operating

LCO 3.8.7 The following AC and DC electrical power distribution subsystems shall be OPERABLE:

a. Unit 1 and 2 4.16 kV Shutdown Boards;

b. Unit 1 480 V Shutdown Boards;

c. Unit 1 480 V RMOV Boards 1D and 1E;

d. Unit 1 and 2 DG Auxiliary Boards;

e. Unit DC Boards;

f. Unit 1 and 2 Shutdown Board DC Distribution Panels; and

g. Unit 2 and 3 AC and DC Boards needed to support equipment required to be OPERABLE by LCO 3.6.4.3, "Standby Gas Treatment (SGT) System," and LCO 3.7.3, "Control Room Emergency Ventilation (CREV) System."

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One Unit 1 and 2 4.16 kV Shutdown Board inoperable.	----------NOTE---------- Enter applicable conditions and required actions of Condition B, C, D, and G when Condition A results in no power source to a required 480 volt board. ----------	
	A.1 Restore the Unit 1 and 2 4.16 kV Shutdown Board to OPERABLE status.	5 days AND 12 days from discovery of failure to meet LCO
	AND	
	A.2 Declare associated diesel generator inoperable.	Immediately
B. One Unit 1 480 V Shutdown Board inoperable.	----------NOTE---------- Enter Condition C when Condition B results in no power source to a required 480 volt RMOV board. ----------	
	B.1 Restore Unit 1 480 V Shutdown Board to OPERABLE status.	8 hours AND 12 days from the discovery of failure to meet LCO

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Unit 1 480 V RMOV Board 1D inoperable. OR Unit 1 480 V RMOV Board 1E inoperable.	C.1 Declare the affected RHR subsystem inoperable.	Immediately
D. One Unit 1 and 2 DG Auxiliary Board inoperable.	D.1 Restore Unit 1 and 2 DG Auxiliary Board to OPERABLE status.	5 days AND 12 days from discovery of failure to meet LCO
E. One Unit DC Board inoperable. OR One Unit 1 and 2 Shutdown Board DC Distribution Panel inoperable.	E.1 Restore required Unit DC Board or Shutdown Board DC Distribution Panel to OPERABLE status.	7 days AND 12 days from discovery of failure to meet LCO

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Unit 1 and 2 4.16 kV Shutdown Board A and B inoperable. OR Unit 1 and 2 4.16 kV Shutdown Board C and D inoperable.	----------NOTE---------- Enter applicable conditions and required actions of Condition B, C, D, and G when Condition F results in no power source to a required 480 volt board. ---------- F.1 Restore one 4.16 kV Shutdown Board to OPERABLE status.	8 hours AND 12 days from discovery of failure to meet LCO
G. One or more required Unit 2 or 3 AC or DC Boards inoperable.	G.1 Declare the affected SGT or CREV subsystem inoperable.	Immediately
H. Required Action and associated Completion Time of Condition A, B, D, E, or F not met.	H.1 Be in Mode 3. AND H.2 Be in Mode 4.	12 hours 36 hours
I. Two or more electrical power distribution subsystems inoperable that result in a loss of function.	I.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.7.1	Verify indicated power availability to required AC and DC electrical power distribution subsystems.	7 days

3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Distribution Systems – Shutdown

LCO 3.8.8 The necessary portions of the AC and DC electrical power distribution subsystems shall be OPERABLE to support equipment required to be OPERABLE.

APPLICABILITY: MODES 4 and 5,
During movement of irradiated fuel assemblies in the secondary containment.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more required AC or DC electrical power distribution subsystems inoperable.	A.1	Declare associated supported required feature(s) inoperable.	Immediately
	OR		
	A.2.1	Suspend CORE ALTERATIONS.	Immediately
	AND		
	A.2.2	Suspend handling of irradiated fuel assemblies in the secondary containment.	Immediately
	AND		
	A.2.3	Initiate action to suspend operations with a potential for draining the reactor vessel.	Immediately
	AND		
			(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.4 Initiate actions to restore required AC and DC electrical power distribution subsystems to OPERABLE status.	Immediately
	AND	
	A.2.5 Declare associated required shutdown cooling subsystem(s) inoperable and not in operation.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.8.1	Verify indicated power availability to required AC and DC electrical power distribution subsystems.	7 days

BROWNS FERRY NUCLEAR PLANT - IMPROVED TECHNICAL SPECIFICATIONS
SECTION 3.8
LIST OF REVISED PAGES

UNIT 2 ITS SECTIONS

Replaced page 3.8-1 page 3.8-1 *R3
Replaced pages 3.8-7 through 3.8-34 (various revision levels) with pages 3.8-7 through 3.8-35 *R3

3.8 ELECTRICAL POWER SYSTEMS

3.8.1 AC Sources—Operating

LCO 3.8.1 The following AC electrical power sources shall be OPERABLE:

a. Two qualified circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System;

b. Unit 1 and 2 diesel generators (DGs) with two divisions of 480 V load shed logic and common accident signal logic OPERABLE; and

c. Unit 3 DG(s) capable of supplying the Unit 3 4.16 kV shutdown board(s) required by LCO 3.8.7, "Distribution Systems—Operating."

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required offsite circuit inoperable.	A.1 Verify power availability from the remaining OPERABLE offsite transmission network. AND	1 hour AND Once per 8 hours thereafter
		(continued)

SURVEILLANCE REQUIREMENTS

----------NOTE----------
SR 3.8.1.1 through SR 3.8.1.9 are applicable to the Unit 1 and 2 AC sources.
SR 3.8.1.10 is applicable only to Unit 3 AC sources.

SURVEILLANCE		FREQUENCY
SR 3.8.1.1	----------NOTES---------- 1. Performance of SR 3.8.1.4 satisfies this SR. 2. All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. 3. A modified DG start involving idling and gradual acceleration to synchronous speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.4 must be met. --- Verify each DG starts from standby conditions and achieves steady state voltage ≥ 3940 V and ≤ 4400 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.2	----------NOTES---------- 1. DG loadings may include gradual loading as recommended by the manufacturer. 2. Momentary transients outside the load range do not invalidate this test. 3. This Surveillance shall be conducted on only one DG at a time. 4. This SR shall be preceded by and immediately follow, without shutdown, a successful performance of SR 3.8.1.1 or SR 3.8.1.4. ---------- Verify each DG is synchronized and loaded and operates for ≥ 60 minutes at a load ≥ 2295 kW and ≤ 2550 kW.	31 days
SR 3.8.1.3	Verify the fuel oil transfer system operates to automatically transfer fuel oil from 7-day storage tank to the day tank.	31 days
SR 3.8.1.4	----------NOTE---------- All DG starts may be preceded by an engine prelube period. ---------- Verify each DG starts from standby condition and achieves, in ≤ 10 seconds, voltage ≥ 3940 V and frequency ≥ 58.8 Hz. Verify after DG fast start from standby conditions that the DG achieves steady state voltage ≥ 3940 V and ≤ 4400 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	184 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.5	----------NOTE---------- If performed with the DG synchronized with offsite power, it shall be performed at a power factor ≤ 0.9. ---------- Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and: a. Following load rejection, the frequency is ≤ 66.75 Hz; and b. Following load rejection, the steady state voltage recovers to ≥ 3940 V and ≤ 4400 V. c. Following load rejection, the steady state frequency recovers to ≥ 58.8 Hz and ≤ 61.2 Hz.	18 months
SR 3.8.1.6	----------NOTE---------- All DG starts may be preceded by an engine prelube period followed by a warmup period. ---------- Verify on an actual or simulated accident signal each DG auto-starts from standby condition.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.7	----------NOTE---------- Momentary transients outside the load and power factor ranges do not invalidate this test. ---------- Verify each DG operating at a power factor ≤ 0.9 operates for ≥ 24 hours: a. For ≥ 2 hours loaded ≥ 2680 kW and ≤ 2805 kW; and b. For the remaining hours of the test loaded ≥ 2295 kW and ≤ 2550 kW.	18 months
SR 3.8.1.8	Verify Interval between each timed load block is within the allowable values for each individual timer.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.9	----------NOTE---------- All DG starts may be preceded by an engine prelube period. ---------- Verify, on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ECCS initiation signal: a. De-energization of emergency buses; b. Load shedding from emergency buses; and c. DG auto-starts from standby condition and: 1. energizes permanently connected loads in ≤ 10 seconds, 2. energizes auto-connected emergency loads through individual timers, 3. achieves steady state voltage ≥ 3940 V and ≤ 4400 V, 4. achieves steady state frequency ≥ 58.8 Hz and ≤ 61.2 Hz, and 5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.	18 months
SR 3.8.1.10	For required Unit 3 DGs, the SRs of Unit 3 Technical Specifications are applicable.	In accordance with applicable SRs.

3.8 ELECTRICAL POWER SYSTEMS

3.8.2 AC Sources – Shutdown

LCO 3.8.2 The following AC electrical power sources shall be OPERABLE:

a. One qualified circuit connected between the offsite transmission network and the onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.8, "Distribution Systems – Shutdown";

b. Two of the four Unit 1 and 2 diesel generators (DGs) each capable of supplying one 4.16 kV shutdown board of the onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.8, "Distribution Systems – Shutdown"; and

c. Unit 3 DGs capable of supplying the Unit 3 4.16 kV shutdown boards required by LCO 3.8.8.

APPLICABILITY: MODES 4 and 5,
During movement of irradiated fuel assemblies in the secondary containment.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required offsite circuit inoperable.	----------NOTE---------- Enter applicable Condition and Required Actions of LCO 3.8.8, with any required 4.16 kV shutdown board not energized from a qualified source as a result of Condition A. ----------	
	A.1 Declare affected required feature(s) with no qualified offsite power available inoperable.	Immediately
	OR	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2.2 Suspend movement of irradiated fuel assemblies in secondary containment.	Immediately
	AND	
	A.2.3 Initiate action to suspend operations with a potential for draining the reactor vessel (OPDRVs).	Immediately
	AND	
	A.2.4 Initiate action to restore required offsite power circuit to OPERABLE status.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. One or more required Unit 1 and 2 DGs inoperable.	B.1.1	Suspend CORE ALTERATIONS.	Immediately
		AND	
	B.1.2	Suspend movement of irradiated fuel assemblies in secondary containment.	Immediately
		AND	
	B.1.3	Initiate action to suspend OPDRVs.	Immediately
		AND	
	B.1.4	Initiate action to restore required Unit 1 and 2 DGs to OPERABLE status.	Immediately
C. One or more required Unit 3 DGs inoperable.	C.1	Declare affected SGT and CREV subsystem(s) inoperable.	30 days AND Immediately from discovery of Condition C concurrent with inoperability of redundant required feature(s).

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.2.1	----------NOTE---------- The following SRs are not required to be performed: SR 3.8.1.2, SR 3.8.1.5, SR 3.8.1.7, SR 3.8.1.8, and SR 3.8.1.9. ---------- For Unit 1 and 2 AC sources required to be OPERABLE, the SRs of Specification 3.8.1 are applicable.	In accordance with applicable SRs
SR 3.8.2.2	For the required Unit 3 DG, the SRs of Unit 3 Technical Specifications are applicable.	In accordance with applicable SRs

3.8 ELECTRICAL POWER SYSTEMS

3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air

LCO 3.8.3 The stored diesel fuel oil, lube oil, and starting air subsystem shall be within limits for each required diesel generator (DG).

APPLICABILITY: When associated DG is required to be OPERABLE.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each DG.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more DGs with fuel oil level < 35,280 gal and > 30,240 gal in storage tank.	A.1 Restore fuel oil level to within limits.	48 hours
B. One or more DGs with lube oil inventory < 175 gal and > 150 gal.	B.1 Restore lube oil inventory to within limits.	48 hours
C. One or more DGs with stored fuel oil total particulates not within limits.	C.1 Restore fuel oil total particulates to within limit.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One or more DGs with the required starting air receiver unit pressure < 165 psig.	D.1 Declare associated DG inoperable.	Immediately
E. Required Action and associated Completion Time not met. OR One or more DGs with diesel fuel oil, lube oil, or starting air subsystem inoperable for reasons other than Condition A, B, C or D.	E.1 Declare associated DG inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.3.1	Verify each fuel oil storage tank contains ≥ 35,280 gal of fuel.	31 days
SR 3.8.3.2	Verify lube oil inventory is ≥ 175 gal.	31 days
SR 3.8.3.3	Verify fuel oil total particulate concentration in stored fuel oil is tested in accordance with, and maintained within the limits of, the Diesel Fuel Oil Testing Program.	In accordance with the Diesel Fuel Oil Testing Program
SR 3.8.3.4	Verify each required DG air start receiver unit pressure is ≥ 165 psig.	31 days

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources—Operating

LCO 3.8.4 The following DC electrical power systems shall be OPERABLE:

a. Unit DC subsystems 1, 2, and 3;

b. Shutdown Board DC subsystems A, B, C, and D;

c. Unit 1 and 2 Diesel Generator (DG) DC subsystems;

d. Unit 3 DG DC subsystem(s) supporting DG(s) required to be OPERABLE by LCO 3.8.1, "AC Sources—Operating"; and

e. Unit 3 Shutdown Board DC subsystem 3EB needed to support equipment required to be OPERABLE by LCO 3.7.3, "Control Room Emergency Ventilation (CREV) System."

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One Unit DC electrical power subsystem inoperable. OR One Unit 1 and 2 Shutdown Board DC electrical power subsystem inoperable.	A.1 Restore DC electrical power subsystem to OPERABLE status.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Required Action and Associated Completion Time of Condition A not met.	B.1	Be in MODE 3.	12 hours
	AND		
	B.2	Be in MODE 4.	36 hours
C. One or more DG DC electrical power subsystem(s) inoperable.	C.1	Declare associated DG inoperable.	Immediately
D. Unit 3 3EB Shutdown Board DC electrical power subsystem inoperable.	D.1	Declare the affected CREV subsystem inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.4.1	Verify battery terminal voltage is ≥ 248 V for each Unit and Shutdown Board battery and ≥ 124 V for each DG battery on float charge.	7 days
SR 3.8.4.2	----------NOTE---------- Performance of SR 3.8.4.5 satisfies this SR. ---------- Verify each required battery charger charges its respective battery after the battery's 18 month service test.	18 months
SR 3.8.4.3	----------NOTES---------- The modified performance discharge test in SR 3.8.4.4 may be performed in lieu of the service test in SR 3.8.4.3 once per 60 months. ---------- Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.4.4	Verify battery capacity is ≥ 80% of the manufacturer's rating when subjected to a performance discharge test or a modified performance discharge test.	60 months AND 12 months when battery shows degradation or has reached 85% of expected life with capacity < 100% of manufacturer's rating AND 24 months when battery has reached 85% of expected life with capacity ≥ 100% of manufacturer's rating
SR 3.8.4.5	----------NOTE---------- Credit may be taken for unplanned events that satisfy this SR. ---------- Verify each required battery charger supplies ≥ 300 amps for the Unit and 50 amps for the Shutdown Board subsystems at ≥ 210 V and ≥ 15 amps for DG subsystems at ≥ 105 V.	60 months

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources – Shutdown

LCO 3.8.5 DC electrical power subsystems shall be OPERABLE to support the DC electrical power distribution subsystem(s) required by LCO 3.8.8, "Distribution Systems – Shutdown."

APPLICABILITY: MODES 4 and 5,
During movement of irradiated fuel assemblies in the secondary containment.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more required DC electrical power subsystems inoperable.	A.1	Declare affected required feature(s) inoperable.	Immediately
	OR		
	A.2.1	Suspend CORE ALTERATIONS.	Immediately
	AND		
	A.2.2	Suspend movement of irradiated fuel assemblies in the secondary containment.	Immediately
	AND		
			(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.3 Initiate action to suspend operations with a potential for draining the reactor vessel.	Immediately
	AND	
	A.2.4 Initiate action to restore required DC electrical power subsystems or systems to OPERABLE status.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.5.1	----------NOTE---------- The following SRs are not required to be performed: SR 3.8.4.2, SR 3.8.4.3, SR 3.8.4.4, and SR 3.8.4.5. ----------	
	For DC sources required to be OPERABLE the following SRs are applicable: SR 3.8.4.1 SR 3.8.4.2 SR 3.8.4.3 SR 3.8.4.4 SR 3.8.4.5	In accordance with applicable SRs

3.8 ELECTRICAL POWER SYSTEMS

3.8.6 Battery Cell Parameters

LCO 3.8.6 Battery cell parameters for the Unit, Shutdown Board, and DG batteries shall be within the limits of Table 3.8.6-1.

APPLICABILITY: When associated DC electrical power subsystems are required to be OPERABLE.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each battery.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more batteries with one or more battery cell parameters not within Category A or B limits.	A.1	Verify pilot cells electrolyte level and float voltage meet Table 3.8.6-1 Category C limits.	1 hour
	AND		
	A.2	Verify battery cell parameters meet Table 3:8.6-1 Category C limits.	24 hours AND Once per 7 days thereafter
	AND		
	A.3	Restore battery cell parameters to Category A and B limits of Table 3.8.6-1.	31 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met. OR One or more batteries with average electrolyte temperature of the representative cells not within limits. OR One or more batteries with one or more battery cell parameters not within Category C values.	B.1 Declare associated battery inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.6.1	Verify battery cell parameters meet Table 3.8.6-1 Category A limits.	7 days
SR 3.8.6.2	Verify battery cell parameters meet Table 3.8.6-1 Category B limits.	92 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.6.3	Verify average electrolyte temperature of representative cells is ≥ 60°F for each Unit and Shutdown Board battery (except Shutdown Board battery 3EB), and ≥ 40°F for Shutdown Board battery 3EB and each DG battery.	92 days

Table 3.8.6-1 (page 1 of 1)
Battery Cell Parameter Requirements

PARAMETER	CATEGORY A: LIMITS FOR EACH DESIGNATED PILOT CELL	CATEGORY B: LIMITS FOR EACH CONNECTED CELL	CATEGORY C: ALLOWABLE VALUE FOR EACH CONNECTED CELL
Electrolyte Level	> Minimum level indication mark, and ≤ ¼ inch above maximum level indication mark[a]	> Minimum level indication mark, and ≤ ¼ inch above maximum level indication mark[a]	Above top of plates, and not overflowing
Float Voltage	≥ 2.13 V	≥ 2.13 V	> 2.07 V
Specific Gravity[b][c][d]	≥ 1.20	≥ 1.195 AND Average of all connected cells > 1.205	Not more than 0.020 below average of all connected cells AND Average of all connected cells ≥ 1.195

(a) It is acceptable for the electrolyte level to temporarily increase above the specified maximum level during equalizing charges provided it is not overflowing.

(b) Corrected for electrolyte temperature.

(c) As an alternative to the specific gravity measurements, a battery charging current of < 1 amp for Unit and Shutdown Board batteries and < 0.5 amp for DG batteries when on float charge is acceptable only during a maximum of 7 days following a battery recharge. When charging current is used to satisfy specific gravity requirements, specific gravity of each connected cell shall be measured prior to expiration of the 7 day allowance.

(d) Alternate values may be used for a limited number of cells provided demonstrated battery capacity at the last discharge test meets the minimum qualifying value.

3.8 ELECTRICAL POWER SYSTEMS

3.8.7 Distribution Systems—Operating

LCO 3.8.7 The following AC and DC electrical power distribution subsystems shall be OPERABLE:

a. Unit 1 and 2 4.16 kV Shutdown Boards;

b. Unit 2 480 V Shutdown Boards;

c. Unit 2 480 V RMOV Boards 2D and 2E;

d. Unit 1 and 2 DG Auxiliary Boards;

e. Unit DC Boards;

f. Unit 1 and 2 Shutdown Board DC Distribution Panels; and

g. Unit 1 and 3 AC and DC Boards needed to support equipment required to be OPERABLE by LCO 3.6.4.3, "Standby Gas Treatment (SGT) System," and LCO 3.7.3, "Control Room Emergency Ventilation (CREV) System."

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One Unit 1 and 2 4.16 kV Shutdown Board inoperable.	----------NOTE---------- Enter applicable Conditions and Required Actions of Condition B, C, D, and G when Condition A results in no power source to a required 480 volt board. ----------	
	A.1 Restore the Unit 1 and 2 4.16 kV Shutdown Board to OPERABLE status.	5 days AND 12 days from discovery of failure to meet LCO
	AND	
	A.2 Declare associated diesel generator inoperable.	Immediately
B. One Unit 2 480 V Shutdown Board inoperable.	----------NOTE---------- Enter Condition C when Condition B results in no power source to a required 480 volt RMOV board. ----------	
	B.1 Restore Unit 2 480 V Shutdown Board to OPERABLE status.	8 hours AND 12 days from the discovery of failure to meet LCO

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Unit 2 480 V RMOV Board 2D inoperable. OR Unit 2 480 V RMOV Board 2E inoperable.	C.1 Declare the affected RHR subsystem inoperable.	Immediately
D. One Unit 1 and 2 DG Auxiliary Board inoperable.	D.1 Restore Unit 1 and 2 DG Auxiliary Board to OPERABLE status.	5 days AND 12 days from discovery of failure to meet LCO
E. One Unit DC Board inoperable. OR One Unit 1 and 2 Shutdown Board DC Distribution Panel inoperable.	E.1 Restore required Unit DC Board or Shutdown Board DC Distribution Panel to OPERABLE status.	7 days AND 12 days from discovery of failure to meet LCO

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Unit 1 and 2 4.16 kV Shutdown Board A and B inoperable. OR Unit 1 and 2 4.16 kV Shutdown Board C and D inoperable.	----------NOTE---------- Enter applicable conditions and required actions of Condition B, C, D, and G when Condition F results in no power source to a required 480 volt board. ---------- F.1 Restore one 4.16 kV Shutdown Board to OPERABLE status.	8 hours AND 12 days from discovery of failure to meet LCO
G. One or more required Unit 1 or 3 AC or DC boards inoperable.	G.1 Declare the affected SGT or CREV subsystem inoperable.	Immediately
H. Required Action and associated Completion Time of Condition A, B, D, E, or F not met.	H.1 Be in MODE 3. AND H.2 Be in MODE 4.	12 hours 36 hours
I. Two or more electrical power distribution subsystems inoperable that result in a loss of function.	I.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.7.1	Verify indicated power availability to required AC and DC electrical power distribution subsystems.	7 days

3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Distribution Systems – Shutdown

LCO 3.8.8 The necessary portions of the AC and DC electrical power distribution subsystems shall be OPERABLE to support equipment required to be OPERABLE.

APPLICABILITY: MODES 4 and 5,
During movement of irradiated fuel assemblies in the secondary containment.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required AC or DC electrical power distribution subsystems inoperable.	A.1 Declare associated supported required feature(s) inoperable.	Immediately
	OR	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2.2 Suspend handling of irradiated fuel assemblies in the secondary containment.	Immediately
	AND	
	A.2.3 Initiate action to suspend operations with a potential for draining the reactor vessel.	Immediately
	AND	
		(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.4 Initiate actions to restore required AC and DC electrical power distribution subsystems to OPERABLE status.	Immediately
	AND	
	A.2.5 Declare associated required shutdown cooling subsystem(s) inoperable and not in operation.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.8.1	Verify indicated power availability to required AC and DC electrical power distribution subsystems.	7 days

BROWNS FERRY NUCLEAR PLANT - IMPROVED TECHNICAL SPECIFICATIONS
SECTION 3.8
LIST OF REVISED PAGES

UNIT 3 ITS SECTIONS

Replaced page 3.8-1 page 3.8-1 *R3
Replaced pages 3.8-7 through 3.8-34 (various revision levels) with pages 3.8-7 through 3.8-35 *R3

3.8 ELECTRICAL POWER SYSTEMS

3.8.1 AC Sources—Operating

LCO 3.8.1 The following AC electrical power sources shall be OPERABLE:

a. Two qualified circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System;

b. Unit 3 diesel generators (DGs) with two divisions of 480 V load shed logic and common accident signal logic OPERABLE; and

c. Unit 1 and 2 DG(s) capable of supplying the Unit 1 and 2 4.16 kV shutdown board(s) required by LCO 3.8.7, "Distribution Systems—Operating."

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required offsite circuit inoperable.	A.1 Verify power availability from the remaining OPERABLE offsite transmission network. AND	1 hour AND Once per 8 hours thereafter
		(continued)

SURVEILLANCE REQUIREMENTS

----------NOTE----------
SR 3.8.1.1 through SR 3.8.1.9 are applicable to the Unit 3 AC sources. SR 3.8.1.10 is applicable only to Unit 1 and 2 AC sources.

SURVEILLANCE		FREQUENCY
SR 3.8.1.1	----------NOTES---------- 1. Performance of SR 3.8.1.4 satisfies this SR. 2. All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. 3. A modified DG start involving idling and gradual acceleration to synchronous speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.4 must be met. --- Verify each DG starts from standby conditions and achieves steady state voltage ≥ 3940 V and ≤ 4400 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	31 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.2	----------NOTES---------- 1. DG loadings may include gradual loading as recommended by the manufacturer. 2. Momentary transients outside the load range do not invalidate this test. 3. This Surveillance shall be conducted on only one DG at a time. 4. This SR shall be preceded by and immediately follow, without shutdown, a successful performance of SR 3.8.1.1 or SR 3.8.1.4. ---------- Verify each DG is synchronized and loaded and operates for ≥ 60 minutes at a load ≥ 2295 kW and ≤ 2550 kW.	31 days
SR 3.8.1.3	Verify the fuel oil transfer system operates to automatically transfer fuel oil from 7-day storage tank to the day tank.	31 days
SR 3.8.1.4	----------NOTE---------- All DG starts may be preceded by an engine prelube period. ---------- Verify each DG starts from standby condition and achieves, in ≤ 10 seconds, voltage ≥ 3940 V and frequency ≥ 58.8 Hz. Verify after DG fast start from standby conditions that the DG achieves steady state voltage ≥ 3940 V and ≤ 4400 V and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.	184 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.5	----------NOTES---------- If performed with the DG synchronized with offsite power, it shall be performed at a power factor ≤ 0.9. ---------- Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and: a. Following load rejection, the frequency is ≤ 66.75 Hz; and b. Following load rejection, the steady state voltage recovers to ≥ 3940 V and ≤ 4400 V. c. Following load rejection, the steady state frequency recovers to ≥ 58.8 Hz and ≤ 61.2 Hz.	18 months
SR 3.8.1.6	----------NOTE---------- All DG starts may be preceded by an engine prelube period followed by a warmup period. ---------- Verify on an actual or simulated accident signal each DG auto-starts from standby condition.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.7	----------NOTE---------- Momentary transients outside the load and power factor ranges do not invalidate this test. ---------- Verify each DG operating at a power factor ≤ 0.9 operates for ≥ 24 hours: a. For ≥ 2 hours loaded ≥ 2680 kW and ≤ 2805 kW; and b. For the remaining hours of the test loaded ≥ 2295 kW and ≤ 2550 kW.	18 months
SR 3.8.1.8	Verify interval between each timed load block is within the allowable values for each individual timer.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.9	----------NOTE---------- All DG starts may be preceded by an engine prelube period. ---------- Verify, on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ECCS initiation signal: a. De-energization of emergency buses; b. Load shedding from emergency buses; and c. DG auto-starts from standby condition and: 1. energizes permanently connected loads in ≤ 10 seconds, 2. energizes auto-connected emergency loads through individual timers, 3. achieves steady state voltage ≥ 3940 V and ≤ 4400 V, 4. achieves steady state frequency ≥ 58.8 Hz and ≤ 61.2 Hz, and 5. supplies permanently connected and auto-connected emergency loads for ≥ 5 minutes.	18 months
SR 3.8.1.10	For required Unit 1 and 2 DGs, the SRs of Unit 1 and 2 Technical Specifications are applicable.	In accordance with applicable SRs.

3.8 ELECTRICAL POWER SYSTEMS

3.8.2 AC Sources – Shutdown

LCO 3.8.2 The following AC electrical power sources shall be OPERABLE:

a. One qualified circuit connected between the offsite transmission network and the onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.8, "Distribution Systems – Shutdown";

b. Two of the four Unit 3 diesel generators (DGs) each capable of supplying one 4.16 kV shutdown board of the onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.8, "Distribution Systems – Shutdown"; and

c. Unit 1 and 2 DGs capable of supplying the Unit 1 and 2 4.16 kV shutdown boards required by LCO 3.8.8.

APPLICABILITY: MODES 4 and 5,
During movement of irradiated fuel assemblies in the secondary containment.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required offsite circuit inoperable.	----------NOTE---------- Enter applicable Condition and Required Actions of LCO 3.8.8, with any required 4.16 kV shutdown board not energized from a qualified source as a result of Condition A. ----------	
	A.1 Declare affected required feature(s) with no qualified offsite power available inoperable.	Immediately
	OR	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2.2 Suspend movement of irradiated fuel assemblies in secondary containment.	Immediately
	AND	
	A.2.3 Initiate action to suspend operations with a potential for draining the reactor vessel (OPDRVs).	Immediately
	AND	
	A.2.4 Initiate action to restore required offsite power circuit to OPERABLE status.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. One or more required Unit 3 DGs inoperable.	B.1.1	Suspend CORE ALTERATIONS.	Immediately
		AND	
	B.1.2	Suspend movement of irradiated fuel assemblies in secondary containment.	Immediately
		AND	
	B.1.3	Initiate action to suspend OPDRVs.	Immediately
		AND	
	B.1.4	Initiate action to restore required Unit 3 DGs to OPERABLE status.	Immediately
C. One or more required Unit 1 and 2 DGs inoperable.	C.1	Declare affected SGT and CREV subsystem(s) inoperable.	30 days AND Immediately from discovery of Condition C concurrent with inoperability of redundant required feature(s).

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.2.1	----------NOTE---------- The following SRs are not required to be performed: SR 3.8.1.2, SR 3.8.1.5, SR 3.8.1.7, SR 3.8.1.8, and SR 3.8.1.9. ---------- For Unit 3 AC sources required to be OPERABLE, the SRs of Specification 3.8.1 are applicable.	In accordance with applicable SRs
SR 3.8.2.2	For the required Unit 1 and 2 DG, the SRs of Unit 1 and 2 Technical Specifications are applicable.	In accordance with applicable SRs

3.8 ELECTRICAL POWER SYSTEMS

3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air

LCO 3.8.3 The stored diesel fuel oil, lube oil, and starting air subsystem shall be within limits for each required diesel generator (DG).

APPLICABILITY: When associated DG is required to be OPERABLE.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each DG.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more DGs with fuel oil level < 35,280 gal and > 30,240 gal in storage tank.	A.1 Restore fuel oil level to within limits.	48 hours
B. One or more DGs with lube oil inventory < 175 gal and > 150 gal.	B.1 Restore lube oil inventory to within limits.	48 hours
C. One or more DGs with stored fuel oil total particulates not within limits.	C.1 Restore fuel oil total particulates to within limit.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One or more DGs with the required starting air receiver unit pressure <.165 psig.	D.1 Declare associated DG inoperable.	Immediately
E. Required Action and associated Completion Time not met. OR One or more DGs with diesel fuel oil, lube oil, or starting air subsystem inoperable for reasons other than Condition A, B, C or D.	E.1 Declare associated DG inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.3.1	Verify each fuel oil storage tank contains ≥ 35,280 gal of fuel.	31 days
SR 3.8.3.2	Verify lube oil inventory is ≥ 175 gal.	31 days
SR 3.8.3.3	Verify fuel oil total particulate concentration in stored fuel oil is tested in accordance with, and maintained within the limits of, the Diesel Fuel Oil Testing Program.	In accordance with the Diesel Fuel Oil Testing Program
SR 3.8.3.4	Verify each required DG air start receiver unit pressure is ≥ 165 psig.	31 days

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources—Operating

LCO 3.8.4 The following DC electrical power systems shall be OPERABLE:

a. Unit DC subsystems 1, 2, and 3;

b. Shutdown Board DC subsystem 3EB;

c. Unit 3 Diesel Generator (DG) DC subsystems;

d. Unit 1 and 2 DG DC subsystem(s) supporting DG(s) required to be OPERABLE by LCO 3.8.1, "AC Sources—Operating"; and

e. Unit 1 and 2 Shutdown Board DC subsystems needed to support equipment required to be OPERABLE by LCO 3.6.4.3, "Standby Gas Treatment (SGT) System," and LCO 3.7.3, "Control Room Emergency Ventilation (CREV) System."

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One Unit DC electrical power subsystem inoperable. OR 3EB Shutdown Board DC electrical power subsystem inoperable.	A.1 Restore DC electrical power subsystem to OPERABLE status.	7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. Required Action and Associated Completion Time of Condition A not met.	B.1	Be in MODE 3.	12 hours
	AND		
	B.2	Be in MODE 4.	36 hours
C. One or more DG DC electrical power subsystem(s) inoperable.	C.1	Declare associated DG inoperable.	Immediately
D. One or more Unit 1 and 2 Shutdown Board DC electrical power subsystem(s) inoperable.	D.1	Declare the affected SGT or CREV subsystem inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.4.1	Verify battery terminal voltage is ≥ 248 V for each Unit and Shutdown Board battery and ≥ 124 V for each DG battery on float charge.	7 days
SR 3.8.4.2	----------NOTE---------- Performance of SR 3.8.4.5 satisfies this SR. ---------- Verify each required battery charger charges its respective battery after the battery's 18 month service test.	18 months
SR 3.8.4.3	----------NOTES---------- The modified performance discharge test in SR 3.8.4.4 may be performed in lieu of the service test in SR 3.8.4.3 once per 60 months. ---------- Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.	18 months

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.4.4	Verify battery capacity is ≥ 80% of the manufacturer's rating when subjected to a performance discharge test or a modified performance discharge test.	60 months AND 12 months when battery shows degradation or has reached 85% of expected life with capacity < 100% of manufacturer's rating AND 24 months when battery has reached 85% of expected life with capacity ≥ 100% of manufacturer's rating
SR 3.8.4.5	----------NOTE---------- Credit may be taken for unplanned events that satisfy this SR. ---------- Verify each required battery charger supplies ≥ 300 amps for the Unit and 50 amps for the Shutdown Board subsystems at ≥ 210 V and ≥ 15 amps for DG subsystems at ≥ 105 V.	60 months

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources – Shutdown

LCO 3.8.5 DC electrical power subsystems shall be OPERABLE to support the DC electrical power distribution subsystem(s) required by LCO 3.8.8, "Distribution Systems – Shutdown."

APPLICABILITY: MODES 4 and 5,
During movement of irradiated fuel assemblies in the secondary containment.

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more required DC electrical power subsystems inoperable.	A.1	Declare affected required feature(s) inoperable.	Immediately
	OR		
	A.2.1	Suspend CORE ALTERATIONS.	Immediately
	AND		
	A.2.2	Suspend movement of irradiated fuel assemblies in the secondary containment.	Immediately
	AND		
			(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.3 Initiate action to suspend operations with a potential for draining the reactor vessel.	Immediately
	AND	
	A.2.4 Initiate action to restore required DC electrical power subsystems or systems to OPERABLE status.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.5.1	----------NOTE---------- The following SRs are not required to be performed: SR 3.8.4.2, SR 3.8.4.3, SR 3.8.4.4, and SR 3.8.4.5. ---------- For DC sources required to be OPERABLE the following SRs are applicable: SR 3.8.4.1 SR 3.8.4.2 SR 3.8.4.3 SR 3.8.4.4 SR 3.8.4.5	In accordance with applicable SRs

3.8 ELECTRICAL POWER SYSTEMS

3.8.6 Battery Cell Parameters

LCO 3.8.6 Battery cell parameters for the Unit, Shutdown Board, and DG batteries shall be within the limits of Table 3.8.6-1.

APPLICABILITY: When associated DC electrical power subsystems are required to be OPERABLE.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each battery.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One or more batteries with one or more battery cell parameters not within Category A or B limits.	A.1	Verify pilot cells electrolyte level and float voltage meet Table 3.8.6-1 Category C limits.	1 hour
	AND		
	A.2	Verify battery cell parameters meet Table 3.8.6-1 Category C limits.	24 hours AND Once per 7 days thereafter
	AND		
	A.3	Restore battery cell parameters to Category A and B limits of Table 3.8.6-1.	31 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Required Action and associated Completion Time of Condition A not met. OR One or more batteries with average electrolyte temperature of the representative cells not within limits. OR One or more batteries with one or more battery cell parameters not within Category C values.	B.1 Declare associated battery inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.6.1	Verify battery cell parameters meet Table 3.8.6-1 Category A limits.	7 days
SR 3.8.6.2	Verify battery cell parameters meet Table 3.8.6-1 Category B limits.	92 days

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.6.3	Verify average electrolyte temperature of representative cells is ≥ 60°F for each Unit and Shutdown Board battery (except Shutdown Board battery 3EB), and ≥ 40°F for Shutdown Board battery 3EB and each DG battery.	92 days

Table 3.8.6-1 (page 1 of 1)
Battery Cell Parameter Requirements

PARAMETER	CATEGORY A: LIMITS FOR EACH DESIGNATED PILOT CELL	CATEGORY B: LIMITS FOR EACH CONNECTED CELL	CATEGORY C: ALLOWABLE VALUE FOR EACH CONNECTED CELL
Electrolyte Level	> Minimum level indication mark, and ≤ ¼ inch above maximum level indication mark[a]	> Minimum level indication mark, and ≤ ¼ inch above maximum level indication mark[a]	Above top of plates, and not overflowing
Float Voltage	≥ 2.13 V	≥ 2.13 V	> 2.07 V
Specific Gravity[b][c][d]	≥ 1.20	≥ 1.195 <u>AND</u> Average of all connected cells > 1.205	Not more than 0.020 below average of all connected cells <u>AND</u> Average of all connected cells ≥ 1.195

(a) It is acceptable for the electrolyte level to temporarily increase above the specified maximum level during equalizing charges provided it is not overflowing.

(b) Corrected for electrolyte temperature.

(c) As an alternative to the specific gravity measurements, a battery charging current of < 1 amp for Unit and Shutdown Board batteries and < 0.5 amp for DG batteries when on float charge is acceptable only during a maximum of 7 days following a battery recharge. When charging current is used to satisfy specific gravity requirements, specific gravity of each connected cell shall be measured prior to expiration of the 7 day allowance.

(d) Alternate values may be used for a limited number of cells provided demonstrated battery capacity at the last discharge test meets the minimum qualifying value.

3.8 ELECTRICAL POWER SYSTEMS

3.8.7 Distribution Systems—Operating

LCO 3.8.7 The following AC and DC electrical power distribution subsystems shall be OPERABLE:

a. Unit 3 4.16 kV Shutdown Boards;

b. Unit 3 480 V Shutdown Boards;

c. Unit 3 480 V RMOV Boards 3D and 3E;

d. Unit 3 DG Auxiliary Boards;

e. Unit DC Boards;

f. Shutdown Board DC Distribution Panel 3EB; and

g. Unit 1 and 2 AC and DC Boards needed to support equipment required to be OPERABLE by LCO 3.6.4.3, "Standby Gas Treatment (SGT) System," and LCO 3.7.3, "Control Room Emergency Ventilation (CREV) System."

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One Unit 3 4.16 kV Shutdown Board inoperable.	----------NOTE---------- Enter applicable Conditions and Required Actions of Condition B, C, D, and G when Condition A results in no power source to a required 480 volt board. ----------	
	A.1 Restore the Unit 3 4.16 kV Shutdown Board to OPERABLE status.	5 days AND 12 days from discovery of failure to meet LCO
	AND	
	A.2 Declare associated diesel generator inoperable.	Immediately
B. One Unit 3 480 V Shutdown Board inoperable.	----------NOTE---------- Enter Condition C when Condition B results in no power source to a required 480 volt RMOV board. ----------	
	B.1 Restore Unit 3 480 V Shutdown Board to OPERABLE status.	8 hours AND 12 days from the discovery of failure to meet LCO

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Unit 3 480 V RMOV Board 3D inoperable. OR Unit 3 480 V RMOV Board 3E inoperable.	C.1 Declare the affected RHR subsystem inoperable.	Immediately
D. One Unit 3 DG Auxiliary Board inoperable.	D.1 Restore Unit 3 DG Auxiliary Board to OPERABLE status.	5 days AND 12 days from discovery of failure to meet LCO
E. One Unit DC Board inoperable. OR Shutdown Board DC Distribution Panel 3EB inoperable.	E.1 Restore required Unit DC Board or Shutdown Board DC Distribution Panel 3EB to OPERABLE status.	7 days AND 12 days from discovery of failure to meet LCO

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
F. Unit 3 4.16 kV Shutdown Board 3EA and 3EB inoperable. OR Unit 3 4.16 kV Shutdown Board 3EC and 3ED inoperable.	----------NOTE---------- Enter applicable conditions and required actions of Condition B, C, D, and G when Condition F results in no power source to a required 480 volt board. ---------- F.1 Restore one 4.16 kV Shutdown Board to OPERABLE status.	8 hours AND 12 days from discovery of failure to meet LCO
G. One or more required Unit 1 or 2 AC or DC Board inoperable.	G.1 Declare the affected SGT or CREV subsystem inoperable.	Immediately
H. Required Action and associated Completion Time of Condition A, B, D, E, or F not met.	H.1 Be in MODE 3. AND H.2 Be in MODE 4.	12 hours 36 hours
I. Two or more electrical power distribution subsystems inoperable that result in a loss of function.	I.1 Enter LCO 3.0.3.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.7.1	Verify indicated power availability to required AC and DC electrical power distribution subsystems.	7 days

3.8 ELECTRICAL POWER SYSTEMS

3.8.8 Distribution Systems – Shutdown

LCO 3.8.8 The necessary portions of the AC and DC electrical power distribution subsystems shall be OPERABLE to support equipment required to be OPERABLE.

APPLICABILITY: MODES 4 and 5,
During movement of irradiated fuel assemblies in the secondary containment.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more required AC or DC electrical power distribution subsystems inoperable.	A.1 Declare associated supported required feature(s) inoperable.	Immediately
	OR	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2.2 Suspend handling of irradiated fuel assemblies in the secondary containment.	Immediately
	AND	
	A.2.3 Initiate action to suspend operations with a potential for draining the reactor vessel.	Immediately
	AND	
		(continued)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. (continued)	A.2.4 Initiate actions to restore required AC and DC electrical power distribution subsystems to OPERABLE status.	Immediately
	AND	
	A.2.5 Declare associated required shutdown cooling subsystem(s) inoperable and not in operation.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.8.1	Verify indicated power availability to required AC and DC electrical power distribution subsystems.	7 days

BROWNS FERRY NUCLEAR PLANT - IMPROVED TECHNICAL SPECIFICATIONS
SECTION 3.8
LIST OF REVISED PAGES

UNIT 1 ITS BASES SECTIONS

Replaced page B 3.8-4 *R2 with page B 3.8-4 *R3
Replaced page B 3.8-5 *R2 with page B 3.8-5 *R3
Replaced page B 3.8-8 *R2 with page B 3.8-8 *R3
Replaced pages B 3.8-20 through B 3.8-83 *R2 with pages B 3.8-20 through B 3.8-85 *R3

BASES

BACKGROUND (continued)

c. 2850/2815 kW – 0 to 3 minutes (Cold Engine Instantaneous),

d. 3050/3025 kW – > 3 minutes (Hot Engine Instantaneous).

APPLICABLE SAFETY ANALYSES

The initial conditions of DBA and transient analyses in the FSAR, Chapter 6 (Ref. 4) and Chapter 14 (Ref. 5), assume ESF systems are OPERABLE. The AC electrical power sources are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System (RCS), and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

The OPERABILITY of the AC electrical power sources is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining the onsite or offsite AC sources OPERABLE during accident conditions in the event of:

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

b. A postulated worst case single failure.

AC sources satisfy Criterion 3 of the NRC Policy Statement (Ref. 15).

LCO

Two qualified circuits between the offsite transmission network and the onsite Class 1E Distribution System, four separate and independent Unit 1 and 2 DGs (A, B, C, and D), and the Unit 3 DG(s) needed to support required Standby Gas Treatment (SGT) trains and Control Room Emergency Ventilation System (CREVS) trains are required to be OPERABLE. Two divisions of 480 V load shed logic and two divisions of CAS logic are required to be OPERABLE to support Unit 1 and 2 DG OPERABILITY and post-accident loads. Unit 3 Technical Specifications will require the operability

(continued)

BASES

LCO (continued)

of all Unit 3 DGs and provide appropriate compensatory actions for inoperable Unit 3 DGs in support of Unit 3 operations. To support the operation of Unit 1, the Unit 1 LCO for AC Sources - Operating also requires the necessary Unit 3 DG(s) to support SGT and CREVS required by LCO 3.8.7, Distribution Systems - Operating, for supplying the Unit 3 4.16 kV shutdown boards. These requirements ensure availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an abnormal operational transient or a postulated DBA.

Qualified offsite circuits are those that are described in the FSAR, and are part of the licensing basis for the unit. Each offsite circuit must be capable of maintaining rated frequency and voltage, and accepting required loads during an accident, while connected to the 4.16 kV shutdown boards. An offsite circuit is considered OPERABLE if the offsite source is available to A and B or C and D 4.16 kV shutdown boards.

Each offsite circuit consists of incoming breakers to a 4.16 kV shutdown bus and then to the 4.16 kV shutdown boards (A and B or C and D). Each shutdown bus is independently supplied from separate unit boards, which are fed from transformers (via start buses as appropriate). Specific circuits and limitations for considering the offsite circuit qualified are described below. Qualified circuits are one or more of the following:

1. From the 500 kV switchyard (with no credit for the two 500 kV Trinity lines), through unit station service transformer (USST) 1B to 4.16 kV unit board 1A, to 4.16 kV shutdown bus 1, to 4.16 kV shutdown boards A and B; and/or, to 4.16 kV unit board 1B, to 4.16 kV shutdown bus 2, to 4.16 kV shutdown boards C and D. If USST 2B is credited as the second source, a minimum of two 500 kV lines must be available.

2. From the 500 kV switchyard (with no credit for the two 500 kV Trinity lines), through USST 2B to 4.16 kV unit board 2A, to 4.16 kV shutdown bus 2, to 4.16 kV shutdown boards C and D; and/or, to 4.16 kV unit board 2B, to 4.16 kV shutdown bus 1, to 4.16 kV shutdown boards A and B. If USST 1B is credited as the second

(continued)

BASES

LCO (continued)

boards is required to have the capability to be connected to at least one division of 4.16 kV shutdown boards to be considered OPERABLE.

The inability to supply qualified offsite power to an individual 4.16 kV shutdown board from a 4.16 kV shutdown bus constitutes the failure of only one offsite circuit as long as offsite power is available to the other division's shutdown boards. Thus, if one 4.16 kV shutdown board or complete division of shutdown boards (i.e., A and B or C and D) does not have a qualified offsite circuit available, then only one offsite circuit would be inoperable. If one or more shutdown boards in each division (i.e., A or B and C or D) or all four shutdown boards do not have a qualified offsite circuit available, then both (2) offsite circuits would be inoperable.

APPLICABILITY

The AC sources are required to be OPERABLE with Unit 1 in MODES 1, 2, and 3 to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of abnormal operational transients; and

b. Adequate core cooling is provided and containment OPERABILITY and other vital functions are maintained in the event of a postulated DBA.

The AC power requirements for Unit 2 in MODES 4 and 5 are covered in LCO 3.8.2, "AC Sources—Shutdown."

ACTIONS

A.1

To ensure a highly reliable power source remains with one required offsite circuit inoperable, it is necessary to verify the availability of the remaining required offsite circuit on a more frequent basis. This action ensures proper circuit continuity for the offsite AC electrical power supply to the onsite distribution network and

(continued)

BASES

ACTIONS (continued)

J.1

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

K.1

Required Action K.1 is intended to provide assurance that a loss of offsite power, during the period that a required Unit 3 DG is inoperable, does not result in a complete loss of safety function of critical systems (i.e., SGT or CREVS). These features consist of SGT or CREVS trains redundant to trains supported by the inoperable Unit 3 DG.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action the Completion Time only begins on discovery that both:

a. An inoperable required Unit 3 DG exists; and

b. An SGT or CREVS train supported by another DG, is inoperable.

If, at any time during the existence of this Condition (a required Unit 3 DG inoperable), a required SGT or CREVS train subsequently becomes inoperable, this Completion Time begins to be tracked.

Discovering a required Unit 3 DG inoperable coincident with an inoperable SGT or CREVS train, or both, that are associated with the OPERABLE DGs results in starting the Completion Time for the Required Action. Four hours from the discovery of these events existing concurrently is acceptable because it minimizes risk while allowing time for

(continued)

BASES

ACTIONS

K.1 (continued)

restoration before subjecting the unit to transients associated with shutdown.

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

K.2

In Condition K, the remaining OPERABLE DGs and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System to support operation of Unit 1. The 30 day Completion Time is commensurate with the importance of the affected system considering the low probability of a DBA in these conditions and the availability of the remaining power sources. If the inoperable Unit 3 DG cannot be restored to OPERABLE status within the associated Completion Time, the associated SGT or CREVS subsystem must be declared inoperable, and the ACTIONS in the appropriate system Specification taken.

SURVEILLANCE REQUIREMENTS

The AC sources are designed to permit inspection and testing of all important areas and features, especially those that have a standby function. Periodic component tests are supplemented by extensive functional tests (under simulated accident conditions). The SRs for demonstrating the OPERABILITY of the DGs meet the intent of Safety Guide 9 (Ref. 3), as addressed by References 13 and 14.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

Where the SRs discussed herein specify voltage and frequency tolerances, the following summary is applicable. The minimum steady state output voltage of 3740 V is 90% of the nominal 4160 V output voltage. This value, which is specified in ANSI C84.1 (Ref. 9), allows for voltage drop to the terminals of 4000 V motors whose minimum operating voltage is specified as 90% or 3600 V. It also allows for voltage drops to motors and other equipment down through the 120 V level where minimum operating voltage is also usually specified as 90% of name plate rating. The specified maximum steady state output voltage of 4580 V is equal to the maximum operating voltage specified for 4000 V motors. It ensures that for a lightly loaded distribution system, the voltage at the terminals of 4000 V motors is no more than the maximum rated operating voltages. The specified minimum and maximum frequencies of the DG are 58.8 Hz and 61.2 Hz, respectively. These values are equal to ± 2% of the 60 Hz nominal frequency and are derived from the recommendations found in Safety Guide 9 (Ref. 3).

SR 3.8.1.1 and SR 3.8.1.4

These SRs help to ensure the availability of the standby electrical power supply to mitigate DBAs and transients and maintain the unit in a safe shutdown condition.

To minimize the wear on moving parts that do not get lubricated when the engine is not running, these SRs have been modified by a Note to indicate that all DG starts for these surveillances may be preceded by an engine prelube period and followed by a warmup prior to loading.

For the purposes of this testing, the DGs are started from standby conditions. Standby conditions for a DG mean that the diesel engine coolant and oil are being continuously circulated and temperature is being maintained consistent with manufacturer recommendations.

In order to reduce stress and wear on diesel engines, a modified start may be utilized for SR 3.8.1.1 in which the starting speed of DGs is limited, engine warmup is allowed at this lower speed, and the DGs are gradually accelerated

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.1 and SR 3.8.1.4 (continued)

to synchronous speed prior to loading. These start procedures are the intent of the Note.

SR 3.8.1.4 requires that, at a 184 day Frequency, the DG starts from standby conditions and achieves required voltage and frequency within 10 seconds. The 10 second start requirement supports the assumptions in the design basis LOCA analysis of FSAR, Section 14.6.3 (Ref. 10). The 10 second start requirement is not applicable to SR 3.8.1.1 (see the Note for SR 3.8.1.1), when a modified start procedure as described above is used. If a modified start is not used, the 10 second start requirement of SR 3.8.1.4 applies.

Since SR 3.8.1.4 does require a 10 second start, it is more restrictive than SR 3.8.1.1, and it may be performed in lieu of SR 3.8.1.1. This procedure is the intent of Note 1 of SR 3.8.1.1.

The 31 day Frequency for SR 3.8.1.1 is consistent with Safety Guide 9 (Ref. 3). The 184 day Frequency for SR 3.8.1.4 is a reduction in cold testing consistent with Generic Letter 84-15 (Ref. 7). These Frequencies provide adequate assurance of DG OPERABILITY, while minimizing degradation resulting from testing.

SR 3.8.1.2

This Surveillance demonstrates that the DGs are capable of synchronizing and accepting greater than 90 percent of the continuous rating. A minimum run time of 60 minutes is required to stabilize engine temperatures, while minimizing the time that the DG is connected to the offsite source.

Although no power factor requirements are established by this SR, the DG is normally operated at a power factor between 0.8 lagging and 1.0.

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BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.2 (continued)

The 31 day Frequency for this Surveillance is consistent with Safety Guide 9 (Ref. 3).

Note 1 modifies this Surveillance to indicate that diesel engine runs for this Surveillance may include gradual loading, as recommended by the manufacturer, so that mechanical stress and wear on the diesel engine are minimized.

Note 2 modifies this Surveillance by stating that momentary transients because of changing bus loads do not invalidate this test. Similarly, momentary power factor transients above the limit do not invalidate the test.

Note 3 indicates that this Surveillance should be conducted on only one DG at a time in order to avoid common cause failures that might result from offsite circuit or grid perturbations.

Note 4 stipulates a prerequisite requirement for performance of this SR. A successful DG start must precede this test to credit satisfactory performance.

SR 3.8.1.3

This Surveillance demonstrates that each required fuel oil transfer pump operates and transfers fuel oil from its associated 7-day storage tank to its associated engine fuel oil tank. It is required to support continuous operation of standby power sources. This Surveillance provides assurance that the fuel oil transfer pump is OPERABLE, the fuel oils piping system is intact, the fuel delivery piping is not obstructed, and the controls and control systems for automatic fuel transfer systems are OPERABLE.

The design of fuel transfer systems is such that pumps that transfer the fuel oil operate automatically in order to maintain an adequate volume of fuel oil in the engine tank during or following DG operation. A 31 day Frequency is appropriate, since proper operation of fuel transfer systems is an inherent part of DG OPERABILITY.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.4

See SR 3.8.1.1.

SR 3.8.1.5

Each DG is provided with an engine overspeed trip to prevent damage to the engine. Recovery from the transient caused by the loss of a large load could cause diesel engine overspeed, which, if excessive, might result in a trip of the engine. This Surveillance demonstrates the DG load response characteristics and capability to reject the largest single load without exceeding predetermined voltage and frequency and while maintaining a specified margin to the overspeed trip. The largest single load for each DG is a residual heat removal pump (2000 hp). This Surveillance may be accomplished by:

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

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

As required by IEEE-308 (Ref. 11), the load rejection test is acceptable if the increase in diesel speed does not exceed 75% of the difference between synchronous speed and the overspeed trip setpoint, or 15% above synchronous speed, whichever is lower. This represents 66.75 Hz, equivalent to 75% of the difference between nominal speed and the overspeed trip setpoint.

The voltage tolerances specified in this SR are based on the degraded voltage and overvoltage relay settings. The frequency tolerances specified in this SR are derived from Safety Guide 9 (Ref. 3) recommendations for response during load sequence intervals. The voltage and frequency specified are consistent with the design range of the equipment powered by the DG. SR 3.8.1.5.a corresponds to the maximum frequency excursion, while SR 3.8.1.5.b and 3.8.1.5.c are steady state voltage and frequency values to which the system must recover following load rejection. The

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.5 (continued)

18 month Frequency is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 8).

This SR is modified by a Note. In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, the Note requires that, if synchronized to offsite power, testing must be performed using a power factor ≤ 0.9. This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience.

SR 3.8.1.6

This Surveillance demonstrates that the DG automatically starts from the design basis actuation signal (LOCA signal). This test will also verify the start of the Unit 3 DGs aligned to the SGT and CREV Systems on an accident signal from Unit 1. In order to minimize the number of DGs involved in testing, demonstration of automatic starts of the Unit 3 DGs on an accident signal from Unit 1 may be performed in conjunction with testing to demonstrate automatic starts of the Unit 3 DGs on an accident signal from Unit 3. Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency is acceptable from a reliability standpoint.

To minimize wear and tear on the DGs, this SR has been modified by a Note which permits DG starts to be preceded by an engine prelube period followed by a warmup period.

SR 3.8.1.7

Demonstration once per 18 months that the DGs can start and run continuously at full load capability for an interval of not less than 24 hours—22 hours of which is at a load equivalent to the continuous rating of the DG, and 2 hours of which is at a load equivalent to 105 percent to 110 percent of the continuous duty rating of the DG. The DG starts for this Surveillance can be performed either from standby or hot conditions. The provisions for prelube and

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.7 (continued)

warmup, discussed in SR 3.8.1.1, and for gradual loading, discussed in SR 3.8.1.2, are applicable to this SR.

In order to ensure that the DG is tested under load conditions that are as close to design conditions as possible, testing must be performed using a power factor ≤ 0.9. This power factor is chosen to be representative of the actual design basis inductive loading that the DG could experience. A load band is provided to avoid routine overloading of the DG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY.

The 18 month Frequency is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 8).

This Surveillance has been modified by a Note that states that momentary transients due to changing bus loads do not invalidate this test. Similarly, momentary power factor transients above the limit do not invalidate the test.

SR 3.8.1.8

Under accident conditions (and loss of offsite power) loads are sequentially connected to the shutdown boards by automatic individual pump timers. The individual pump timers control the permissive and starting signals to motor breakers to prevent overloading of the DGs due to high motor starting currents. This SR is demonstrated by performance of SR 3.3.5.1.5 for the Core Spray and LPCI pump timers, SR 3.7.2.3 for the EECW pump timers, and SR 3.8.1.9.b for the 480 V load shed logic timers. The allowable values for these timers ensure that sufficient time exists for the DG to restore frequency and voltage prior to applying the next load and that safety analysis assumptions regarding ESF equipment time delays are not violated. Reference 2 provides a summary of the automatic loading of ESF shutdown boards.

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 8).

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.9

In the event of a DBA coincident with a loss of offsite power, the DGs are required to supply the necessary power to ESF systems so that the fuel, RCS, and containment design limits are not exceeded.

This Surveillance demonstrates the as designed operation of the standby power sources during a loss of offsite power actuation test signal in conjunction with an ECCS initiation signal. This test verifies all actions encountered from the loss of offsite power in conjunction with an ECCS initiation signal, including shedding of the nonessential loads and energization of the 4.16 kV shutdown boards and respective loads from the DG. It further demonstrates the capability of the DG to automatically achieve the required voltage and frequency within the specified time.

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

The Frequency of 18 months takes into consideration plant conditions required to perform the Surveillance and is intended to be consistent with an expected fuel cycle length of 18 months.

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

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.9 (continued)

being continuously circulated and temperature maintained consistent with manufacturer recommendations.

SR 3.8.1.10

This Surveillance is provided to direct that the appropriate Surveillances for the required Unit 3 DGs are governed by the Unit 3 Technical Specifications. Performance of the applicable Unit 3 Surveillances will satisfy any Unit 3 requirements, as well as this Unit 1 and 2 Surveillance requirement. The Frequency required by the applicable Unit 3 SR also governs performance of that SR for both Units.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.
2. FSAR, Chapter 8.
3. Safety Guide 9.
4. FSAR, Chapter 6.
5. FSAR, Chapter 14.
6. Regulatory Guide 1.93.
7. Generic Letter 84-15.
8. Regulatory Guide 1.9.
9. ANSI C84.1, 1982.
10. FSAR, Section 14.6.3.
11. IEEE Standard 308.
12. FSAR, Section 8.5, Table 8.5-6.
13. FSAR, Section 8.5.2.

(continued)

BASES

REFERENCES (continued)

14. TVA Design Criteria BFN-50-7082.

15. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.2 AC Sources – Shutdown

BASES

BACKGROUND

A description of the AC sources is provided in the Bases for LCO 3.8.1, "AC Sources – Operating."

APPLICABLE SAFETY ANALYSES

The OPERABILITY of the minimum AC sources during MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment ensures that:

a. The facility can be maintained in the shutdown or refueling condition for extended periods;

b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and

c. Adequate AC electrical power is provided to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident.

In general, when the unit is shut down the Technical Specifications requirements ensure that the unit has the capability to mitigate the consequences of postulated accidents. However, assuming a single failure and concurrent loss of all offsite or loss of all onsite power is not required. The rationale for this is based on the fact that many Design Basis Accidents (DBAs) that are analyzed in MODES 1, 2, and 3 have no specific analyses in MODES 4 and 5. Worst case bounding events are deemed not credible in MODES 4 and 5 because the energy contained within the reactor pressure boundary, reactor coolant temperature and pressure, and corresponding stresses result in the probabilities of occurrences significantly reduced or eliminated, and minimal consequences. These deviations from DBA analysis assumptions and design requirements during shutdown conditions are allowed by the LCO for required systems.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

During MODES 1, 2, and 3, various deviations from the analysis assumptions and design requirements are allowed within the ACTIONS. This allowance is in recognition that certain testing and maintenance activities must be conducted, provided an acceptable level of risk is not exceeded. During MODES 4 and 5, performance of a significant number of required testing and maintenance activities is also required. In MODES 4 and 5, the activities are generally planned and administratively controlled. Relaxations from typical MODES 1, 2, and 3 LCO requirements are acceptable during shutdown MODES, based on:

a. The fact that time in an outage is limited. This is a risk prudent goal as well as a utility economic consideration.

b. Requiring appropriate compensatory measures for certain conditions. These may include administrative controls, reliance on systems that do not necessarily meet typical design requirements applied to systems credited in operation MODE analyses, or both.

c. Prudent utility consideration of the risk associated with multiple activities that could affect multiple systems.

d. Maintaining, to the extent practical, the ability to perform required functions (even if not meeting MODES 1, 2, and 3 OPERABILITY requirements) with systems assumed to function during an event.

In the event of an accident during shutdown, this LCO ensures the capability of supporting systems necessary for avoiding immediate difficulty, assuming either a loss of all offsite power or a loss of all onsite (diesel generator (DG)) power.

The AC sources satisfy Criterion 3 of the NRC Policy Statement (Ref. 1).

LCO

One offsite circuit capable of supplying the onsite Class 1E power distribution subsystem(s) of LCO 3.8.8, "Distribution Systems – Shutdown," ensures that all required loads are

(continued)

BASES

LCO (continued)

powered from offsite power. Two Unit 1 and 2 DGs and Unit 3 DGs required to support OPERABLE SGT and CREV Systems OPERABLE, each associated with a Distribution System Engineered Safety Feature (ESF) 4.16 kV shutdown board required OPERABLE by LCO 3.8.8, ensures that a diverse LCO power source is available for providing electrical power support assuming a loss of the offsite circuit. Together, OPERABILITY of the required offsite circuit and DGs ensures the availability of sufficient AC sources to operate the plant in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents and reactor vessel draindown).

The qualified offsite circuit(s) must be capable of maintaining rated frequency and voltage while connected to their respective 4.16 kV shutdown boards, and of accepting required loads during an accident. Qualified offsite circuits are those that are described in the FSAR and are part of the licensing basis for the unit. An offsite circuit is considered OPERABLE if the offsite source is available to one or more required 4.16 kV shutdown boards, through its normal supply breaker.

The offsite circuit consists of incoming breakers to a 4.16 kV shutdown bus and then to the 4.16 kV shutdown boards required by LCO 3.8.8. Each shutdown bus is independently supplied from separate unit boards, which are fed from transformers (via start buses as appropriate). Specific circuits and limitations for considering the offsite circuit qualified are described below.

1. From the 500 kV switchyard (with no credit for the two 500 kV Trinity lines), through unit station service transformer (USST) 1B to 4.16 kV unit board 1A, to 4.16 kV shutdown bus 1, to 4.16 kV shutdown boards A and B; and/or, to 4.16 kV unit board 1B, to 4.16 kV shutdown bus 2, to 4.16 kV shutdown boards C and D.

2. From the 500 kV switchyard (with no credit for the two 500 kV Trinity lines), through USST 2B to 4.16 kV unit board 2A, to 4.16 kV shutdown bus 2, to 4.16 kV shutdown boards C and D; and/or, to 4.16 kV unit

(continued)

BASES

LCO (continued)

board 2B, to 4.16 kV shutdown bus 1, to 4.16 kV shutdown boards A and B.

3. From the Trinity 161 kV transmission system, through common station service transformer (CSST) A or B to start bus 1A or 1B, to 4.16 kV unit board 1A or 2B, to 4.16 kV shutdown bus 1, to 4.16 kV shutdown boards A and B; or alternately, to 4.16 kV unit board 1B or 2A, to 4.16 kV shutdown bus 2, to 4.16 kV shutdown boards C and D.

4. From the Athens 161 kV transmission system, through CSST A or B to start bus 1A or 1B, to 4.16 kV unit board 1A or 2B, to 4.16 kV shutdown bus 1, to 4.16 kV shutdown boards A and B; or alternately, to 4.16 kV unit board 1B or 2A, to 4.16 kV shutdown bus 2, to 4.16 kV shutdown boards C and D.

For the Athens 161 kV offsite power to be considered as one of the qualified offsite power supplies, the following restrictions must also be met:

a. The 161 kV capacitor bank must be available for the Athens 161 kV line.

b. Credit for offsite power from the Athens 161 kV line may be taken by only one unit at one time. However, more than one unit may be aligned to the Athens line without invalidating the offsite power supply for the unit claiming it.

For the Trinity 161 kV offsite power to be considered as one of the qualified offsite power supplies, the following restrictions must also be met:

a. For the Trinity 161 kV line to be considered as one of the qualified offsite power supplies by only one unit, either the 161 kV capacitor bank must be available or the Trinity Inter-Tie transformer must be in service with 161 kV line nominal voltage $\geq$ 165 kV.

b. The Trinity 161 kV line may be considered as one of the qualified offsite power supplies by two separate units at any one time, provided that both CSST A and B are available and either the 161 kV capacitor bank is

(continued)

BASES

LCO (continued)

available or the Athens line and Trinity Inter-Tie transformer are in service with 161 kV line nominal voltage ≥ 165 kV.

c. The Trinity 161 kV line may be considered as one of the qualified offsite power supplies by three separate units at any one time, provided that both CSST A and B are available, Unit 3 claims USST 3B as its other offsite power source, and either the 161 kV capacitor bank is available or the Athens line and Trinity Inter-Tie transformer are in service with 161 kV line nominal voltage ≥ 165 kV.

The only requirements for the position of the 161 kV bus 1 and bus 2 cross-tie breakers (924 and 928) are those implied by the restrictions on claiming Athens and Trinity as offsite power supplies.

The required DGs must be capable of starting, accelerating to rated speed and voltage, connecting to respective 4.16 kV shutdown boards on detection of bus undervoltage, and accepting required loads. This sequence must be accomplished within 10 seconds. Each DG must also be capable of accepting required loads within the assumed loading sequence intervals, and must continue to operate until offsite power can be restored to the 4.16 kV shutdown boards.

Proper sequencing of loads, including tripping of nonessential loads, is a required function for DG OPERABILITY.

APPLICABILITY

The AC sources are required to be OPERABLE in MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment to provide assurance that:

a. Systems providing adequate coolant inventory makeup are available for the irradiated fuel assemblies in the core in case of an inadvertent draindown of the reactor vessel;

b. Systems needed to mitigate a fuel handling accident are available;

(continued)

BASES

APPLICABILITY (continued)

c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

AC power requirements for MODES 1, 2, and 3 are covered in LCO 3.8.1.

ACTIONS

A.1

With the required offsite circuit inoperable, the remaining AC sources available may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for draining the reactor vessel. By the allowance of the option to declare required features inoperable that are supported by the inoperable AC source, appropriate restrictions can be implemented in accordance with the affected required feature(s) LCOs' ACTIONS.

Pursuant to LCO 3.0.6, the Distribution System ACTIONS would not be entered even if all AC sources to it are inoperable, resulting in de-energization. Therefore, the Required Actions of Condition A have been modified by a Note to indicate that when Condition A is entered with no qualified AC power to any required 4.16 kV shutdown board, ACTIONS for LCO 3.8.8 must be immediately entered. This Note allows Condition A to provide requirements for the loss of the offsite circuit whether or not a 4.16 kV shutdown board is made inoperable. LCO 3.8.8 provides the appropriate restrictions for the situation involving an inoperable 4.16 kV shutdown board.

A.2.1, A.2.2, A.2.3, A.2.4, B.1.1, B.1.2, B.1.3, and B.1.4

With no offsite circuit available or one or more DGs inoperable, the option still exists to declare all required features inoperable. However, since this option may involve undesired administrative efforts, the allowance for sufficiently

(continued)

BASES

ACTIONS

A.2.1, A.2.2, A.2.3, A.2.4, B.1.1, B.1.2, B.1.3, and B.1.4 (continued)

conservative actions is made. It is, therefore, required to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies in the secondary containment, and activities that could result in inadvertent draining of the reactor vessel.

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC sources and to continue this action until restoration is accomplished in order to provide the necessary AC power to the plant safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required AC electrical power sources should be completed as quickly as possible in order to minimize the time during which the plant safety systems may be without sufficient power.

C.1

Required Action C.1 is intended to provide assurance that a loss of offsite power, during the period that a required Unit 3 DG is inoperable, does not result in a complete loss of safety function of critical systems (i.e., SGT or CREVS). These features consist of SGT or CREVS trains redundant to trains supported by the inoperable Unit 3 DG.

The 30 day completion time takes into account the operability of the redundant required features and their offsite and DG power availability. Additionally, the 30 day completion time takes into account the capacity and capability of the remaining AC sources, reasonable time for repairs, and low probability of an event occurring during this period. If the redundant required feature(s) is(are) not OPERABLE, the second completion time requires immediately declaring the required feature(s), supported by the inoperable AC source, inoperable. This results in

(continued)

BASES

ACTIONS

C.1 (continued)

taking the appropriate Actions in the supported system specification for the inoperable function.

SURVEILLANCE REQUIREMENTS

SR 3.8.2.1

SR 3.8.2.1 requires the SRs from LCO 3.8.1 that are necessary for ensuring the OPERABILITY of the Unit 1 and 2 AC sources in other than MODES 1, 2, and 3. Refer to the corresponding Bases for LCO 3.8.1 for a discussion of each SR.

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE DG(s) from being paralleled with the offsite power network or otherwise rendered inoperable during the performance of SRs, and to preclude deenergizing a required 4.16 kV shutdown board or disconnecting a required offsite circuit during performance of SRs. With limited AC sources available, a single event could compromise both the required circuit and the DG. It is the intent that these SRs must still be capable of being met, but actual performance is not required during periods when the DG and offsite circuit is required to be OPERABLE.

SR 3.8.2.2

This Surveillance is provided to direct that the appropriate Surveillances for the required Unit 3 DGs are governed by the Unit 3 Technical Specifications. Performance of the applicable Unit 3 Surveillances will satisfy any Unit 3 requirements, as well as satisfying this Unit 2 Surveillance requirement. The Frequency required by the applicable Unit 3 SR also governs performance of that SR for both Units.

(continued)

BASES (continued)

REFERENCES

1. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air

BASES

BACKGROUND

Each diesel generator (DG) is provided with three interconnected storage tanks having a minimum usable fuel oil volume (35,280 gallons) sufficient to operate that DG for a period of 7 days while the DG is supplying maximum post loss of coolant accident (LOCA) load demand discussed in FSAR, Section 8.5.3.4 (Ref. 1). A transfer pump is located at the fuel oil storage tanks which can supply fuel oil from two 71,000-gallon fuel oil storage tanks to the 7-day storage tanks. In addition, it is possible to transfer fuel from one 7-day storage tank to any other by using transfer pumps. This onsite fuel oil capacity is sufficient to operate the DGs for longer than the time to replenish the onsite supply from outside sources.

Fuel oil is transferred from the 7-day storage tank to the day tank by either of two transfer pumps associated with each diesel generator. This is accomplished automatically by level switches on the day tank. Redundancy of pumps and piping precludes the failure of one pump, or the rupture of any pipe, valve, or tank to result in the loss of more than one DG. All 7-day tanks are embedded in the substructure of the Standby Diesel Generator Building.

For proper operation of the standby DGs, it is necessary to ensure the proper quality of the stored fuel oil. The fuel oil property monitored is the total particulate concentration. Periodic testing of the stored fuel oil total particulate concentration is a method to monitor the potential degradation related to long term storage and the potential impact to fuel filter plugging as a result of high particulate levels.

The DG lubrication system is designed to provide sufficient lubrication to permit proper operation of its associated DG under all loading conditions. The system is required to circulate the lube oil to the diesel engine working surfaces and to remove excess heat generated by friction during operation. Each engine oil sump contains an inventory capable of supporting a minimum of 7 days of operation.

(continued)

BASES

BACKGROUND (continued)

The 175-gallon and 150-gallon capacities listed in Condition B are based upon the DG seven-day consumption and six-day consumption of lube oil, respectively. The total lube oil system capacity is 465 gallons, of which, 235 gallons are useable (i.e., 230 gallons are not useable). If the seven-day and six-day capacities are added to the non-useable capacity, a minimum value of lube oil capacity can be established for purposes of this LCO. Therefore, 405 gallons are required to ensure the seven-day requirement (i.e., 230 + 175); while, 380 gallons (i.e., 230 + 150) are required to ensure the six-day requirement. Note: actual lube oil consumption is 0.98 gal/hr or 23.52 gal/day - 25 gal/day was conservatively chosen to establish the seven-day and six-day requirements.

This supply is sufficient to allow the operator to replenish lube oil from outside sources.

Each DG has two fully redundant air start systems either of which is fully capable of starting the engine. Each air start system has adequate capacity for at least one start attempt on the DG without recharging of its air receivers. The air compressors may be cross-tied without affecting operability of either air start system. For DG operability, only one of the air start systems is required. The associated DG must be declared inoperable if both air start systems are inoperable.

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in FSAR, Chapter 6 (Ref. 3), and Chapter 14 (Ref. 4), assume Engineered Safety Feature (ESF) systems are OPERABLE. The DGs are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.5, Emergency Core Cooling System (ECCS) and Reactor Core Isolation Cooling (RCIC) System; and Section 3.6, Containment Systems.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)	Since diesel fuel oil, lube oil, and starting air subsystems support the operation of the standby AC power sources, they satisfy Criterion 3 of the NRC Policy Statement (Ref. 5).
LCO	Stored diesel fuel oil is required to have sufficient supply for 7 days of full load operation. It is also required to meet specific standards for quality. Additionally, sufficient lube oil supply must be available to ensure the capability to operate at full load for 7 days. This requirement, in conjunction with an ability to obtain replacement supplies within 7 days, supports the availability of DGs required to shut down the reactor and to maintain it in a safe condition for an abnormal operational transient or a postulated DBA with loss of offsite power. DG day tank fuel oil requirements, as well as transfer capability from the 7-day storage tank to the day tank, are addressed in LCO 3.8.1, "AC Sources—Operating," and LCO 3.8.2, "AC Sources—Shutdown." One of the two redundant starting air systems is required to have a minimum capacity for one DG start attempt without recharging the air start receivers. The associated DG must be declared inoperable if both air start systems are inoperable.
APPLICABILITY	The AC sources (LCO 3.8.1 and LCO 3.8.2) are required to ensure the availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an abnormal operational transient or a postulated DBA. Because stored diesel fuel oil, lube oil, and starting air subsystem support LCO 3.8.1 and LCO 3.8.2, stored diesel fuel oil, lube oil, and starting air are required to be within limits when the associated DG is required to be OPERABLE.

(continued)

BASES (continued)

ACTIONS

The ACTIONS Table is modified by a Note indicating that separate Condition entry is allowed for each DG. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable DG subsystem. Complying with the Required Actions for one inoperable DG subsystem may allow for continued operation, and subsequent inoperable DG subsystem(s) governed by separate Condition entry and application of associated Required Actions.

A.1

In this condition, the 7 day fuel oil supply for a DG is not available. However, the Condition is restricted to fuel oil level reductions that maintain at least a 6 day supply. These circumstances may be caused by events such as:

a. Full load operation required for an inadvertent start while at minimum required level; or

b. Feed and bleed operations that may be necessitated by increasing particulate levels or any number of other oil quality degradations.

This restriction allows sufficient time for obtaining the requisite replacement volume and performing the analyses required prior to addition of the fuel oil to the tank. A period of 48 hours is considered sufficient to complete restoration of the required level prior to declaring the DG inoperable. This period is acceptable based on the remaining capacity (> 6 days), the fact that procedures will be initiated to obtain replenishment, and the low probability of an event during this brief period.

B.1

With lube oil inventory < 175 gal, sufficient lube oil to support 7 days of continuous DG operation at full load conditions may not be available. However, the Condition is restricted to lube oil volume reductions that maintain at least a 6 day supply. This restriction allows sufficient time for obtaining the requisite replacement volume. A period of 48 hours is considered sufficient to complete

(continued)

BASES

ACTIONS

B.1 (continued)

restoration of the required volume prior to declaring the DG inoperable. This period is acceptable based on the remaining capacity (> 6 days), the low rate of usage, the fact that procedures will be initiated to obtain replenishment, and the low probability of an event during this brief period.

C.1

This Condition is entered as a result of a failure to meet the acceptance criterion for particulates. Normally, trending of particulate levels allows sufficient time to correct high particulate levels prior to reaching the limit of acceptability. Poor sample procedures (bottom sampling), contaminated sampling equipment, and errors in laboratory analysis can produce failures that do not follow a trend. Since the presence of particulates does not mean failure of the fuel oil to burn properly in the diesel engine, since particulate concentration is unlikely to change significantly between Surveillance Frequency intervals, and since proper engine performance has been recently demonstrated (within 31 days), it is prudent to allow a brief period prior to declaring the associated DG inoperable. The 7 day Completion Time allows for further evaluation, re-sampling, and re-analysis of the DG fuel oil.

D.1

Only one of the two redundant air starting systems is required to support associated DG operability. With the starting air receiver pressure < 165 psig in the required starting air system, sufficient capacity to start the associated DG may not exist. The associated DG may be incapable of performing its intended function and must be immediately declared inoperable. This declaration also requires entry into applicable Conditions and Required Actions for an inoperable DG, LCO 3.8.1, "AC Sources—Operating."

(continued)

BASES

ACTIONS (continued)

E.1

With a Required Action and associated Completion Time not met, or the stored diesel fuel oil, lube oil, or starting air subsystem inoperable for reasons other than addressed by Conditions A through D, the associated DG may be incapable of performing its intended function and must be immediately declared inoperable.

SURVEILLANCE REQUIREMENTS

SR 3.8.3.1

This SR provides verification that there is an adequate inventory of fuel oil in the storage tanks to support each DG's operation for 7 days at full load. The 7 day period is sufficient time to place the unit in a safe shutdown condition and to bring in replenishment fuel from an offsite location.

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

SR 3.8.3.2

This Surveillance ensures that sufficient lubricating oil inventory is available to support at least 7 days of full load operation for each DG. The 175 gal requirement is based on the DG manufacturer's consumption values for the run time of the DG. Implicit in this SR is the requirement to verify the capability to transfer the lube oil from its storage location to the DG, when the DG lube oil sump does not hold adequate inventory for 7 days of full load operation without the level reaching the manufacturer's recommended minimum level.

A 31 day Frequency is adequate to ensure that a sufficient lube oil supply is onsite, since DG starts and run time are closely monitored by the plant staff.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.3.3

This SR verifies that the required fuel oil testing is performed in accordance with the Diesel Fuel Oil Testing Program. Tests are a means of monitoring the potential degradation related to long term storage and the potential impact to fuel filter plugging as a result of high particulate levels. Specific sampling requirements, frequencies, and additional information are discussed in detail in the Diesel Fuel Oil Testing Program.

SR 3.8.3.4

This Surveillance ensures that, without the aid of the refill compressor, sufficient air start capacity for each DG is available. The system design requirements provide for at least one start cycle from one of two redundant air start systems without recharging. A start cycle is defined by the DG vendor, but usually is measured in terms of time (seconds of cranking) or engine cranking speed. The pressure specified in this SR is the lowest pressure at which at least one start attempt can be accomplished using one of two redundant air start systems.

The 31 day Frequency takes into account the capacity, capability, redundancy, and diversity of the AC sources and other indications available in the control room, including alarms, to alert the operator to below normal air start pressure.

REFERENCES

1. FSAR, Section 8.5.3.4.
2. Regulatory Guide 1.137.
3. FSAR, Chapter 6.
4. FSAR, Chapter 14.
5. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.4 DC Sources—Operating

BASES

BACKGROUND

The DC electrical power system provides the AC emergency power system with control power. It also provides both motive and control power to selected safety related equipment. As required by 10 CFR 50, Appendix A, GDC 17 (Ref. 1), the DC electrical power system is designed to have sufficient independence, redundancy, and testability to perform its safety functions, assuming a single failure. The DC electrical power system also conforms to the recommendations of Regulatory Guide 1.6 (Ref. 2) and meets the intent of IEEE-308 (Ref. 3).

Three separate DC Source Systems consist of:

1. Three 250 VDC Unit DC subsystems, together with the associated charger, circuitry, switches, indicators, and alarms. Each Unit DC battery board can be supplied from its own battery charger or from the spare charger. The three Unit batteries have engineered safety feature loads for the three units distributed among them so that redundant subsystems on each unit have separate normal and alternate power supplies. The Unit DC battery boards also supply control power for the bus-tie board, the cooling tower switchgear, three Unit 3 shutdown boards, and the alternate feeder to Unit 1 and 2 shutdown boards and one Unit 3 shutdown board. The battery boards, motor-operated valve boards, and distribution panels supply nominal 250 VDC power to their loads without interruption unless the supply battery is discharged and power to the charger is lost. All transfers from normal to alternate sources are done manually.

2. Four 250 VDC shutdown board subsystems supply control power for 4.16 kV shutdown boards A, B, C, and D, respectively, and 480 V shutdown boards 1A, 1B, 2A and 2B. Each DC shutdown board subsystem consists of a battery together with the associated charger, circuitry, switches, indicators, and alarms. Each shutdown board DC subsystem can receive power from its

(continued)

BASES

BACKGROUND (continued)

own battery, battery charger, or from the spare charger. Normal 250 VDC control power for 4.16 kV shutdown boards A, B, C, and D is supplied by one of the shutdown board DC subsystems with an alternate supply from one of the Unit DC battery boards through a manual transfer switch; and control power for 480 V shutdown boards 1A, 1B, 2A, and 2B is supplied by one of the shutdown board DC subsystems with an alternate supply from one of the Unit DC battery boards through a manual transfer switch. Alternate supplies have been provided through manual transfer switches. Separation between redundant control power circuits is maintained external to and within the switchgear.

3. The diesel generator (DG) DC subsystems provide control and instrumentation power for their respective DG. Each DG DC subsystem is energized by one 125 V battery and one of two 125 V battery chargers per 125 V subsystem.

During normal operation, the DC loads are powered from the battery chargers with the batteries floating on the system. In case of loss of normal power to the battery charger, the DC loads are automatically powered from the batteries.

The DC power distribution system is described in more detail in Bases for LCO 3.8.7, "Distribution System—Operating," and LCO 3.8.8, "Distribution System—Shutdown."

Each Unit and Shutdown Board battery has adequate storage capacity to carry the required load continuously for approximately 30 minutes (Ref. 4).

Each diesel battery has adequate storage capacity to carry required loads. These include control and logic power, governor booster pumps, generator relay protection, generator field flashing, and the motor-driven fuel pumps. The governor booster pumps and generator field flashing require power for only a relatively short time during a diesel start.

Each Unit and Shutdown Board DC battery subsystem is separately housed in a ventilated room apart from its charger and distribution centers. Each subsystem is located

(continued)

BASES

BACKGROUND (continued)

in an area separated physically and electrically from the other subsystems to ensure that a single failure in one subsystem does not cause a failure in a redundant subsystem. Each diesel battery is located in the room with the diesel generator it serves. One of its chargers is also in the room; the other is immediately outside the door in the Diesel Generator Building hallway.

The batteries for Unit DC, Shutdown Board DC, and DG DC electrical power subsystems are sized to produce required capacity at 80% of nameplate rating, corresponding to warranted capacity at end of life cycles and the 100% design demand. The minimum design voltage limit for the Unit DC and Shutdown Board DC subsystems is 210 V. The minimum design voltage limit for the DG DC subsystems is 105 V.

Each battery charger for a DC electrical power subsystem has ample power output capacity for the steady state operation of connected loads required during normal operation, while at the same time maintaining its battery bank fully charged. Each battery charger has sufficient capacity to restore the battery from the design minimum charge to its fully charged state within 12 hours while supplying normal steady state loads (Ref. 4).

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter 6 (Ref. 5) and Chapter 14 (Ref. 5), assume that Engineered Safety Feature (ESF) systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the DGs, emergency auxiliaries, and control and switching during all MODES of operation. The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining DC sources OPERABLE during accident conditions in the event of:

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

b. A postulated worst case single failure.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

The DC sources satisfy Criterion 3 of the NRC Policy Statement (Ref. 11).

LCO

The DC Electrical Power System—with: 1) three Unit DC subsystems, each consisting of one 250 V battery, one battery charger, and the corresponding control equipment and interconnecting cabling supplying power to the associated Unit battery board; 2) four shutdown board DC subsystems (and the Unit 3 shutdown board DC subsystem needed to support OPERABILITY of the CREV System), each consisting of one 250 V battery, its associated charger, and the corresponding control equipment and interconnecting cabling supplying power to the associated DC shutdown board; and 3) four Unit 2 and two Unit 3 DG DC subsystems each consisting of one battery bank, one battery charger, and the corresponding control equipment and interconnecting cabling, is required to be OPERABLE to ensure the availability of the required power to shut down the reactor and maintain it in a safe condition after an abnormal operational transient or a postulated DBA. Loss of any DC electrical power subsystem does not prevent the minimum safety function from being performed (Ref. 4).

APPLICABILITY

The DC electrical power sources are required to be OPERABLE in MODES 1, 2, and 3 to ensure safe unit operation and to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of abnormal operational transients; and

b. Adequate core cooling is provided, and containment integrity and other vital functions are maintained in the event of a postulated DBA.

The DC electrical power requirements for MODES 4 and 5 are addressed in the Bases for LCO 3.8.5, "DC Sources—Shutdown."

(continued)

BASES (continued)

ACTIONS

A.1

Condition A represents one Unit or Shutdown Board DC subsystem with a loss of ability to completely respond to an event, and a potential loss of ability to remain energized during normal operation. It is therefore imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for complete loss of DC power to the affected division. The 7 day limit is consistent with the allowed time for an inoperable Unit DC Board or Shutdown Board Distribution Panel.

If one Unit or Shutdown Board DC electrical power subsystem is inoperable (e.g., inoperable battery, inoperable battery charger(s), or inoperable battery charger and associated inoperable battery), the remaining Unit or Shutdown Board DC electrical power subsystems have the capacity to support a safe shutdown and cooldown of all three units in the event of a loss of offsite power and a DBA on one Unit. Since a subsequent worst case single failure could, however, result in the loss of minimum necessary DC electrical subsystems to mitigate a worst case accident, continued power operation should not exceed 7 days. The loss of one shutdown board electrical power subsystem affects normal control power supply for the 480 V and 4.16 kV shutdown board(s) which it supplies. Loss of uninterrupted control power to these shutdown boards may result in loss of those engineered safety features supplied by these boards. Therefore, 7 days is considered a reasonable time to effect repairs and perform required testing of the unit or shutdown board DC electrical power subsystem, recognizes the ability to connect alternate sources to support continued operation or accident mitigation, and, if the unit or shutdown board DC electrical power subsystem is not restored to OPERABLE status, to prepare to effect an orderly and safe unit shutdown.

B.1 and B.2

If the Unit or Shutdown Board DC electrical power subsystem cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit

(continued)

BASES

ACTIONS

B.1 and B.2 (continued)

must be brought to at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems. The Completion Time to bring the unit to MODE 4 is consistent with the time required in Regulatory Guide 1.93 (Ref. 6).

C.1

If a DG DC electrical power subsystem is inoperable, the associated DG may be incapable of performing its intended function and must be immediately declared inoperable. This declaration also requires entry into applicable Conditions and Required Actions for an inoperable DG, LCO 3.8.1, "AC Sources—Operating."

D.1

Required Action D.1 is intended to provide assurance that a loss of Unit 3 Shutdown Board DC electrical power subsystem 3EB does not result in a complete loss of safety function of critical systems (i.e., CREVS). With Unit 3 Shutdown Board DC electrical power subsystem 3EB inoperable, the CREVS train supported by that shutdown board is inoperable. Therefore, the associated CREVS subsystem must be declared inoperable immediately, and the ACTIONS in the appropriate system Specification taken.

SURVEILLANCE REQUIREMENTS

SR 3.8.4.1

Verifying battery terminal voltage while on float charge for the batteries helps to ensure the effectiveness of the charging system and the ability of the batteries to perform their intended function. Float charge is the condition in which the charger is supplying the continuous charge required to overcome the internal losses of a battery (or battery cell) and maintain the battery (or a battery cell)

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.1 (continued)

in a fully charged state, while supplying adequate power to the connected DC loads. The voltage requirements are based on the nominal design voltage of the battery and are consistent with the initial voltages assumed in the battery sizing calculations. The 7 day Frequency is consistent with manufacturer recommendations and IEEE-450 (Ref. 7).

SR 3.8.4.2 and SR 3.8.4.5

Battery charger capability requirements are based on the design capacity of the chargers (Ref. 4). According to Regulatory Guide 1.32 (Ref. 8), the battery charger supply is required to be based on the largest combined demands of the various steady state loads and the charging capacity to restore the battery from the design minimum charge state to the fully charged state, irrespective of the status of the unit during these demand occurrences. The minimum required amperes and verification of the charger's ability to recharge the battery ensures that these requirements can be satisfied.

SR 3.8.4.2 verifies that the chargers are capable of charging the batteries after their designed duty cycle testing and ensures that the chargers will perform their design function. This SR is modified by a Note that allows the performance of SR 3.8.4.5 in lieu of this surveillance requirement. SR 3.8.4.5 verifies that the chargers are capable of charging the batteries after each discharge test and ensures that the chargers are capable of performing at maximum output. SR 3.8.4.2 is performed at the same frequency as the 18 month service test (SR 3.8.4.3), while SR 3.8.4.5 is performed following the 60 month battery discharge test (SR 3.8.4.4).

SR 3.8.4.5 is modified by a Note. The Note is added to this SR to acknowledge that credit may be taken for unplanned events that satisfy the Surveillance.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.3

A battery service test is a special test of the battery's capability, as found, to satisfy the design requirements (battery duty cycle) of the DC electrical power system. The discharge rate and test length corresponds to the design duty cycle requirements as specified in Reference 4.

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.32 (Ref. 8) and Regulatory Guide 1.129 (Ref. 9), which state, in part, that the battery service test should be performed with intervals between tests not to exceed 18 months.

This SR is modified by a Note that allows the performance of a modified performance discharge test in lieu of a service test once per 60 months. The modified performance discharge test is a simulated duty cycle consisting of just two rates; the one minute rate published for the battery or the largest current load of the duty cycle, followed by the test rate employed for the performance test, both of which envelope the duty cycle of the service test. Since the ampere-hours removed by a rated one minute discharge represents a very small portion of the battery capacity, the test rate can be changed to that for the performance test without compromising the results of the performance discharge test. The battery terminal voltage for the modified performance discharge test should remain above the minimum battery terminal voltage specified in the battery service test for the duration of time equal to that of the service test.

A modified discharge test is a test of the battery capacity and its ability to provide a high rate, short duration load (usually the highest rate of the duty cycle). This will often confirm the battery's ability to meet the critical period of the load duty cycle, in addition to determining its percentage of rated capacity. Initial conditions for the modified performance discharge test should be identical to those specified for a service test.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.4

A battery performance discharge test is a test of constant current capacity of a battery, normally done in the as found condition, after having been in service, to detect any change in the capacity determined by the acceptance test. The test is intended to determine overall battery degradation due to age and usage.

A battery modified performance discharge test is described in the Bases for SR 3.8.4.3. Either the battery performance discharge test or the modified performance discharge test is acceptable for satisfying SR 3.8.4.4; however, only the modified performance discharge test may be used to satisfy SR 3.8.4.4 while satisfying the requirements of SR 3.8.4.3 at the same time.

The acceptance criteria for this Surveillance is consistent with IEEE-450 (Ref. 7) and IEEE-485 (Ref. 10). These references recommend that the battery be replaced if its capacity is below 80% of the manufacturer's rating. A capacity of 80% shows that the battery rate of deterioration is increasing, even if there is ample capacity to meet the load requirements.

The Frequency for this test is normally 60 months. If the battery shows degradation, or if the battery has reached 85% of its expected life and capacity is < 100% of the manufacturer's rating, the Surveillance Frequency is reduced to 12 months. However, if the battery shows no degradation but has reached 85% of its expected life, the Surveillance Frequency is only reduced to 24 months for batteries that retain capacity ≥ 100% of the manufacturer's rating. Degradation is indicated, according to IEEE-450 (Ref. 7), when the battery capacity drops by more than 10% relative to its capacity on the previous performance test or when it is 10% below the manufacturer's rating. All these Frequencies are consistent with the recommendations in IEEE-450 (Ref. 7).

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.

2. Regulatory Guide 1.6.

(continued)

BASES

REFERENCES (continued)

3. IEEE Standard 308.

4. FSAR, Sections 8.5 and 8.6.

5. FSAR, Chapters 6 and 14.

6. Regulatory Guide 1.93.

7. IEEE Standard 450-1995.

8. Regulatory Guide 1.32, February 1977.

9. Regulatory Guide 1.129, December 1974.

10. IEEE Standard 485, 1983.

11. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.5 DC Sources—Shutdown

BASES

BACKGROUND

A description of the DC sources is provided in the Bases for LCO 3.8.4, "DC Sources—Operating."

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident and transient analyses in the FSAR, Chapter 6 (Ref. 1) and Chapter 14 (Ref. 2), assume that Engineered Safety Feature systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the diesel generators (DGs), emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum DC electrical power sources during MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment ensures that:

a. The facility can be maintained in the shutdown or refueling condition for extended periods;

b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and

c. Adequate DC electrical power is provided to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident.

The DC sources satisfy Criterion 3 of the NRC Policy Statement (Ref. 3).

(continued)

BASES (continued)

LCO

The DC Electrical Power Systems—with: 1) each Unit DC subsystem, supporting Unit battery boards required OPERABLE by LCO 3.8.8, consisting of one 250 V battery, one battery charger, and the corresponding control equipment and interconnecting cabling supplying power to the associated Unit battery board; 2) each shutdown board DC subsystem, supporting DC shutdown boards required OPERABLE by LCO 3.8.8, consisting of one 250 V battery, its associated charger, and the corresponding control equipment and interconnecting cabling supplying power to the associated DC shutdown board; and 3) each DG DC subsystem supporting DGs required OPERABLE for 4.16 kV shutdown boards required OPERABLE by LCO 3.8.8, consisting of one 125 V battery, one battery charger, and the corresponding control equipment and interconnecting cabling. This requirement ensures the availability of sufficient DC electrical power sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents and inadvertent reactor vessel draindown).

APPLICABILITY

The DC electrical power sources required to be OPERABLE in MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment provide assurance that:

a. Required features to provide adequate coolant inventory makeup are available for the irradiated fuel assemblies in the core in case of an inadvertent draindown of the reactor vessel;

b. Required features needed to mitigate a fuel handling accident are available;

c. Required features necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

(continued)

BASES

APPLICABILITY (continued)

The DC electrical power requirements for MODES 1, 2, and 3 are covered in LCO 3.8.4.

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

If more than one DC distribution subsystem is required according to LCO 3.8.8, the DC subsystems remaining OPERABLE with one or more DC power sources inoperable may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for draining the reactor vessel. By allowance of the option to declare required features inoperable with associated DC power sources inoperable, appropriate restrictions are implemented in accordance with the affected system LCOs' ACTIONS. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and any activities that could result in inadvertent draining of the reactor vessel).

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required DC electrical power subsystems and to continue this action until restoration is accomplished in order to provide the necessary DC electrical power to the plant safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required DC electrical power subsystems should be completed as quickly as possible in order to minimize the time during which the plant safety systems may be without sufficient power.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.5.1

SR 3.8.5.1 requires performance of all Surveillances required by SR 3.8.4.1 through SR 3.8.4.5. Therefore, see the corresponding Bases for LCO 3.8.4 for a discussion of each SR.

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE DC sources from being discharged below their capability to provide the required power supply or otherwise rendering them inoperable during the performance of SRs. It is the intent that these SRs must still be capable of being met, but actual performance is not required, unless required to support an operating unit per Section 3.8.4.

REFERENCES

1. FSAR, Chapter 6.

2. FSAR, Chapter 14.

3. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.6 Battery Cell Parameters

BASES

BACKGROUND

This LCO delineates the limits on electrolyte temperature, level, float voltage, and specific gravity for the DC electrical power subsystems batteries. At BFN, these batteries were designed to IEEE-279 Standards (Ref. 4). However, the batteries have been analyzed and meet IEEE-450 Standards (Ref. 3). A discussion of these batteries and their OPERABILITY requirements is provided in the Bases for LCO 3.8.4, "DC Sources— Operating," and LCO 3.8.5, "DC Sources—Shutdown."

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in FSAR, Chapter 6 (Ref. 1) and Chapter 14 (Ref. 2), assume Engineered Safety Feature systems are OPERABLE. The DC electrical power subsystems provide normal and emergency DC electrical power for the diesel generators (DGs), emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining at least one division of DC sources OPERABLE during accident conditions, in the event of:

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

b. A postulated worst case single failure.

Since battery cell parameters support the operation of the DC electrical power subsystems, they satisfy Criterion 3 of the NRC Policy Statement (Ref. 5).

LCO

Battery cell parameters must remain within acceptable limits to ensure availability of the required DC power to shut down the reactor and maintain it in a safe condition after an

(continued)

BASES

LCO (continued)

anticipated operational occurrence or a postulated DBA. Electrolyte limits are conservatively established, allowing continued DC electrical system function even with Category A and B limits not met.

APPLICABILITY

The battery cell parameters are required solely for the support of the associated DC electrical power subsystem. Therefore, battery electrolyte is only required when the DC power source is required to be OPERABLE. Refer to the Applicability discussions in Bases for LCO 3.8.4 and LCO 3.8.5.

ACTIONS

A Note has been added providing that, for this LCO, separate Condition entry is allowed for each battery. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable battery. Complying with the Required Actions for battery cell parameters allows for restoration and continued operation, and subsequent out of limit battery cell parameters may be governed by separate Condition entry and application of associated Required Action.

A.1, A.2, and A.3

With parameters of one or more cells in one or more batteries not within limits (i.e., Category A limits not met or Category B limits not met, or Category A and B limits not met) but within the Category C limits specified in Table 3.8.6-1, the battery is degraded but there is still sufficient capacity to perform the intended function. Therefore, the affected battery is not required to be considered inoperable solely as a result of Category A or B limits not met, and continued operation is permitted for a limited period.

The pilot cell electrolyte level and float voltage are required to be verified to meet the Category C limits within 1 hour (Required Action A.1). This check provides a quick indication of the status of the remainder of the battery

(continued)

BASES

ACTIONS

A.1, A.2, and A.3 (continued)

cells. One hour provides time to inspect the electrolyte level and to confirm the float voltage of the pilot cells. One hour is considered a reasonable amount of time to perform the required verification.

Verification that the Category C limits are met (Required Action A.2) provides assurance that during the time needed to restore the parameters to the Category A and B limits, the battery is still capable of performing its intended function. A period of 24 hours is allowed to complete the initial verification because specific gravity measurements must be obtained for each connected cell. Taking into consideration both the time required to perform the required verification and the assurance that the battery cell parameters are not severely degraded, this time is considered reasonable. The verification is repeated at 7 day intervals until the parameters are restored to Category A and B limits. This periodic verification is consistent with the normal Frequency of pilot cell Surveillances.

Continued operation is only permitted for 31 days before battery cell parameters must be restored to within Category A and B limits. Taking into consideration that, while battery capacity is degraded, sufficient capacity exists to perform the intended function and to allow time to fully restore the battery cell parameters to normal limits, this time is acceptable for operation prior to declaring the associated DC battery inoperable.

B.1

When any battery parameter is outside the Category C limit for any connected cell, sufficient capacity to supply the maximum expected load requirement is not ensured and the corresponding DC electrical power subsystem must be declared inoperable. Additionally, other potentially extreme conditions, such as not completing the Required Actions of Condition A within the required Completion Time or average electrolyte temperature of representative cells falling below 60°F for each Unit and Shutdown Board battery (except Shutdown Board battery 3EB) and 40°F for Shutdown Board battery 3EB and each DG battery, also are cause for

(continued)

BASES

ACTIONS

B.1 (continued)

immediately declaring the associated DC electrical power subsystem inoperable.

SURVEILLANCE REQUIREMENTS

SR 3.8.6.1

This SR verifies that Category A battery cell parameters are consistent with IEEE-450 (Ref. 3), which recommends regular battery inspections (at least one per month) including voltage, specific gravity, and electrolyte temperature of pilot cells.

SR 3.8.6.2

The 92 day inspection of specific gravity and voltage is consistent with IEEE-450 (Ref. 3).

SR 3.8.6.3

This Surveillance verification that the average temperature of representative cells is within limits is consistent with a recommendation of IEEE-450 (Ref. 3) that states that the temperature of electrolytes in representative (10 percent of) cells should be determined on a quarterly basis.

Lower than normal temperatures act to inhibit or reduce battery capacity. This SR ensures that the operating temperatures remain within an acceptable operating range. This limit is based on manufacturer's recommendations.

Table 3.8.6-1

This table delineates the limits on electrolyte level, float voltage, and specific gravity for three different categories. The meaning of each category is discussed below.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

Table 3.8.6-1 (continued)

Category A defines the normal parameter limit for each designed pilot cell in each battery. The cells selected as pilot cells are those whose temperature, voltage, and electrolyte specific gravity approximate the state of charge of the entire battery.The Category A limits specified for electrolyte level are based on manufacturer's recommendations and are consistent with the guidance in IEEE-450 (Ref. 3), with the extra ¼ inch allowance above the high water level indication for operating margin to account for temperature and charge effects. In addition to this allowance, footnote a to Table 3.8.6-1 permits the electrolyte level to be above the specified maximum level during equalizing charge, provided it is not overflowing. These limits ensure that the plates suffer no physical damage, and that adequate electron transfer capability is maintained in the event of transient conditions. IEEE-450 (Ref. 3) recommends that electrolyte level readings should be made only after the battery has been at float charge for at least 72 hours.

The Category A limit specified for float voltage is ≥ 2.13 V per cell. This value is based on the recommendation of IEEE-450 (Ref. 3), which states that prolonged operation of cells below 2.13 V can reduce the life expectancy of cells. The Category A limit specified for specific gravity for each pilot cell is ≥ 1.200 (0.015 below the manufacturer's fully charged nominal specific gravity or a battery charging current that had stabilized at a low value). This value is characteristic of a charged cell with adequate capacity. According to IEEE-450 (Ref. 3), the specific gravity readings are based on a temperature of 77°F (25°C).

The specific gravity readings are corrected for actual electrolyte temperature. For each 3°F (1.67°C) above 77°F (25°C), 1 point (0.001) is added to the reading; 1 point is subtracted for each 3°F below 77°F. The specific gravity of the electrolyte in a cell increases with a loss of water due to electrolysis or evaporation.

Category B defines the normal parameter limits for each connected cell. The term "connected cell" excludes any battery cell that may be jumpered out.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

Table 3.8.6-1 (continued)

The Category B limits specified for electrolyte level and float voltage are the same as those specified for Category A and have been discussed above. The Category B limit specified for specific gravity for each connected cell is ≥ 1.195 (0.020 below the manufacturer's fully charged, nominal specific gravity) with the average of all connected cells 1.205 (0.010 below the manufacturer's fully charged, nominal specific gravity). These values are based on manufacturer's recommendations. The minimum specific gravity value required for each cell ensures that the effects of a highly charged or newly installed cell do not mask overall degradation of the battery.

Category C defines the limits for each connected cell. These values, although reduced, provide assurance that sufficient capacity exists to perform the intended function and maintain a margin of safety. When any battery parameter is outside the Category C limits, the assurance of sufficient capacity described above no longer exists, and the battery must be declared inoperable.

The Category C limit specified for electrolyte level (above the top of the plates and not overflowing) ensures that the plates suffer no physical damage and maintain adequate electron transfer capability. The Category C Allowable Value for voltage is based on IEEE-450 (Ref. 3), which states that a cell voltage of 2.07 V or below, under float conditions and not caused by elevated temperature of the cell, indicates internal cell problems and may require cell replacement.

The Category C limit on average specific gravity ≥ 1.195, is based on manufacturer's recommendations (0.020 below the manufacturer's recommended fully charged, nominal specific gravity). In addition to that limit, it is required that the specific gravity for each connected cell must be no less than 0.020 below the average of all connected cells. This limit ensures that the effect of a highly charged or new cell does not mask overall degradation of the battery.

The footnotes to Table 3.8.6-1 that apply to specific gravity are applicable to Category A, B, and C specific

(continued)

BASES

SURVEILLANCE REQUIREMENTS

Table 3.8.6-1 (continued)

gravity. Footnote (b) of Table 3.8.6-1 requires the above mentioned correction for electrolyte temperature.

Because of specific gravity gradients that are produced during the recharging process, delays of several days may occur while waiting for the specific gravity to stabilize. A stabilized charger current is an acceptable alternative to specific gravity measurement for determining the state of charge of the designated pilot cell. This phenomenon is discussed in IEEE-450 (Ref. 3). Footnote (c) to Table 3.8.6-1 allows the float charge current to be used as an alternate to specific gravity for up to 7 days following a battery recharge. Within 7 days, each connected cell's specific gravity must be measured to confirm the state of charge. Following a minor battery recharge (such as equalizing charge that does not follow a deep discharge) specific gravity gradients are not significant, and confirming measurements may be made in less than 7 days. Footnote (d) to Table 3.8.6-1 allows alternate values recommended by the manufacturer to be used for specific gravity as appropriate (Ref. 6). For the DG and Shutdown batteries, up to 10 cells for each DG battery and up to 20 cells for each Shutdown battery can have specific gravities of 1.180 to 1.200 provided the demonstrated battery capacity at the last discharge test is ≥ 81.2 percent. For the Unit batteries, up to 12 cells for each battery can have specific gravities of 1.180 to 1.200 provided the demonstrated battery capacity at the last discharge test is ≥ 80.7 percent.

REFERENCES

1. FSAR, Chapter 6.
2. FSAR, Chapter 14.
3. IEEE Standard 450, 1987.
4. IEEE Standard 279.
5. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.
6. Vendor Technical Manual for C&D Standby Batteries and Battery Chargers (BFN-VTM-C173-0010)

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.7 Distribution Systems—Operating

BASES

BACKGROUND

The onsite Class 1E AC and DC electrical power distribution system is divided into redundant and independent AC and DC electrical power distribution subsystems.

The primary AC distribution system consists of four Unit 1 and 2 4.16 kV shutdown boards each having an offsite source of power as well as a dedicated onsite diesel generator (DG) source. Each 4.16 kV shutdown board is normally connected to a unit station service transformer (USST) (1B or 2B) via a 4.16 kV unit board and a shutdown bus (1 or 2). If no offsite source is available, the onsite emergency DGs supply power to the 4.16 kV shutdown boards. A shutdown board must be fed through its normal feeder to have a qualified offsite source. The alternate feeder trips on CAS A/CAS B logic initiation.

The secondary plant distribution system includes 480 VAC shutdown boards and associated load centers, and transformers.

There are three Unit DC and five Shutdown Board 250 V DC electrical power distribution subsystems and one 125 V DC DG electrical power distribution subsystem for each DG that support the necessary power for Unit 1 and 2 ESF functions.

The list of all distribution boards is presented in Table B 3.8.7-1.

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter 6 (Ref. 1) and Chapter 14 (Ref. 2), assume ESF systems are OPERABLE. The AC and DC electrical power distribution systems are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.5, Emergency Core

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

Cooling System (ECCS) and Reactor Core Isolation Cooling (RCIC) System; and Section 3.6 Containment Systems.

The OPERABILITY of the AC and DC electrical power distribution subsystems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining distribution systems OPERABLE during accident conditions in the event of:

a. An assumed loss of all offsite power or all onsite AC electrical power sources; and

b. A postulated worst case single failure.

The AC and DC electrical power distribution system satisfies Criterion 3 of the NRC Policy Statement (Ref. 4).

LCO

The required electrical power distribution subsystems listed in Table B 3.8.7-1 ensure the availability of AC and DC electrical power for the systems required to shut down the reactor and maintain it in a safe condition after an abnormal operational transient or a postulated DBA. The AC and DC electrical power distribution subsystems are required to be OPERABLE.

Maintaining the AC and DC electrical power distribution subsystems OPERABLE ensures that the redundancy incorporated into the design of ESF is not defeated. Therefore, a single failure within any system or within the electrical power distribution subsystems will not prevent safe shutdown of the reactor.

The AC electrical power distribution subsystems require the associated buses and electrical circuits to be energized to their proper voltages. In addition, for the D or E RMOV Boards to be OPERABLE, they must be able to auto-transfer on loss of voltage. This feature ensures that the failure of one Diesel Generator will not result in the loss of an RHR subsystem. OPERABLE DC electrical power distribution subsystems require the associated buses to be energized to their proper voltage from either the associated battery or charger.

(continued)

BASES

LCO (continued)

The Unit 1 480 V RMOV boards 1A, 1B, and 1C are not specifically listed in Table B 3.8.7-1. Should one of these boards become inoperable due to a failure not affecting the operability of a board listed in Table B 3.8.7-1, the individual loads on the board would be considered inoperable and the appropriate conditions and required actions of the LCOs governing the individual loads would be entered. If however, one or more of the 1A, 1B, or 1C RMOV boards are inoperable due to a failure also affecting the operability of 1A or 1B 480 V shutdown board; the conditions and required actions are not required to be entered since LCO 3.0.6 allows this exception, and the required actions for the inoperable 480 V shutdown board are sufficient. In addition, the alternate supply breakers to 480 V RMOV boards 1A, 1B, and 1C must be open. This prevents a single malfunction causing a failure of a redundant subsystem and a loss of safety function. If any alternate breakers for the 1A, 1B, or 1C 480 V RMOV boards are closed, the affected systems/components which are not powered from its normal source are inoperable.

The 480 V shutdown boards and diesel auxiliary boards can be placed on their alternate feeder breakers and considered OPERABLE as long as the restrictions on the associated drawings are met. In addition, tie breakers between redundant safety related DC power distribution subsystems must be open. This prevents any electrical malfunction in any DC power distribution subsystem from propagating to the redundant subsystem, which could cause the failure of a redundant DC subsystem and a loss of essential safety function(s). If any DC tie breakers are closed, the affected redundant DC electrical power distribution subsystems are considered inoperable. This applies to the onsite, safety related, redundant DC electrical power distribution subsystems.

The Unit DC Boards are sized to accommodate alternate loads normally supplied by the Shutdown DC Distribution Panels with no effect on OPERABILITY.

APPLICABILITY

The electrical power distribution subsystems are required to be OPERABLE in MODES 1, 2, and 3 to ensure that:

(continued)

BASES

APPLICABILITY (continued)

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of abnormal operational transients; and

b. Adequate core cooling is provided, and containment OPERABILITY and other vital functions are maintained in the event of a postulated DBA.

Electrical power distribution subsystem requirements for MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment are covered in the Bases for LCO 3.8.8, "Distribution Systems – Shutdown."

ACTIONS

A.1

With one Unit 1 and 2 4.16 kV shutdown board inoperable, the remaining Unit 1 and 2 4.16 kV shutdown boards are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming a single failure. The overall liability is reduced, however, because another single failure in the remaining three 4.16 kV shutdown boards could result in the minimum required ESF functions not being supported. Therefore, the 4.16 kV shutdown board must be restored to OPERABLE status within 5 days.

The Condition A postulated worst scenario is one 4.16 kV shutdown board without AC power (i.e., no offsite power to the 4.16 kV shutdown board and the associated DG inoperable). In this condition, ESF capabilities are not at their maximum, however, they remain adequate. The four 4.16 kV shutdown boards have ESF loads for Units 1 and 2 distributed among them so that an additional single failure will not result in a loss of safety function (e.g., one RHR pump for Unit 1 and one for Unit 2 on each board). Therefore, loss of two shutdown boards still leaves two RHR pumps per Unit. The 5 day time limit before requiring a unit shutdown in this Condition is acceptable because:

a. The remaining 4.16 kV shutdown boards have AC power available.

(continued)

BASES

ACTIONS

A.1 (continued)

b. The potential for an event in conjunction with a single failure of a redundant component in the 4.16 kV shutdown board with AC power. (The redundant component is verified OPERABLE in accordance with Specification 5.5.11, "Safety Function Determination Program (SFDP).")

The second Completion Time for Required Action A.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition A is entered while, for instance, a Unit DC board is inoperable and subsequently returned OPERABLE, this LCO may already have been not met for up to 7 days. This situation could lead to a total duration of 12 days, since initial failure of the LCO, to restore the 4.16 kV shutdown board. At this time a Unit DC board could again become inoperable, and the 4.16 kV shutdown board could be restored OPERABLE. This could continue indefinitely.

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

Pursuant to LCO 3.0.6, the Distribution System Actions B, C, D, or G would not be entered even if the 4.16 kV shutdown board was inoperable, resulting in de-energization of a 480 V board. Therefore, the Required Actions of Condition A are modified by a Note to indicate that when Condition A is entered with no power source to a required 480 V board, Actions B, C, D, or G must be immediately entered. This allows Condition A to provide requirements for the loss of the 4.16 kV shutdown board without regard to whether a 480 V shutdown board is de-energized. Actions B, C, D, or G provide the appropriate restrictions for a de-energized 480 V board.

(continued)

BASES

ACTIONS (continued)

A.2

With a shutdown board inoperable, the associated DG would have no power distribution mechanism and would hence also be inoperable. Required actions for an inoperable DG are included in LCO 3.8.1.

B.1

With one Unit 1 480 V shutdown board inoperable, the remaining 480 V shutdown board is capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition assuming no single failure. The overall reliability is reduced because a single failure in the remaining 480 V shutdown board could result in the minimum required ESF functions not being supported. Therefore, the inoperable 480 V shutdown board must be restored to OPERABLE status within 8 hours.

The Condition B postulated worst case scenario is one division (480 V shutdown board) without AC power (i.e., no offsite power to the division and the associated DG inoperable). In this condition, the unit is more vulnerable to a complete loss of AC power. It is, therefore, imperative that the unit operators' attention be focused on minimizing the potential for loss of power to the remaining division by stabilizing the unit, and on restoring power to the affected division. The 8 hour time period before requiring a unit shutdown is acceptable because:

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

b. The potential for an event in conjunction with a single failure of a redundant component in the division with AC power is minimal. (The redundant component is verified OPERABLE in accordance with Specification 5.5.11, "Safety Function Determination Program (SFDP).")

(continued)

BASES

ACTIONS

B.1 (continued)

The second Completion Time (12 days) for Required Action B.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable in any single contiguous occurrence of failing to meet the LCO. If Condition B is entered while, for instance, a 4.16 kV shutdown board is inoperable and subsequently restored OPERABLE, the LCO may already have been not met for up to 5 days. This situation could lead to a total duration of 5 days and 8 hours, since initial failure of the LCO, to restore the 480 V shutdown board. At this time, a 4.16 kV shutdown board could again become inoperable, and the 480 V shutdown board could be restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This allowance results in establishing the "time zero" at the time the LCO was initially not met, instead of at the time Condition B was entered. The 12 day Completion Time is an acceptable limitation on this potential of failing to meet the LCO indefinitely.

Pursuant to LCO 3.0.6, the Distribution System Action C would not be entered even if the 480 V shutdown board was inoperable, resulting in de-energization of a 480 V RMOV board. Therefore, the Required Actions of Condition B are modified by a Note to indicate that when Condition B is entered with no power source to a required 480 V RMOV board, Action C must be immediately entered. This allows Condition B to provide requirements for the loss of the 480 V shutdown board without regard to whether a 480 V RMOV board is de-energized. Action C provides the appropriate restrictions for a de-energized 480 V RMOV board.

C.1

With 480 V RMOV Board D or E inoperable, the respective RHR subsystem supported by each affected board is inoperable for LPCI. The overall reliability is reduced because of the loss of one LPCI/RHR subsystem. In this condition, the remaining OPERABLE ECCS subsystems provide adequate core cooling during a LOCA. However, overall ECCS reliability is

(continued)

BASES

ACTIONS

C.1 (continued)

reduced, because a single failure in one of the remaining OPERABLE subsystems, concurrent with a LOCA, may result in the ECCS not being able to perform its intended safety function. Therefore, the associated RHR subsystem must be declared inoperable immediately, and the actions in the appropriate system specification taken.

D.1

With one Units 1 and 2 480 V diesel auxiliary board inoperable, the remaining 480 V diesel auxiliary board is capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition assuming no single failure. The overall reliability is reduced because a single failure in the remaining 480 V diesel auxiliary board could result in the minimum required ESF functions not being supported. Therefore, the 480 V diesel auxiliary board must be restored to OPERABLE status within 5 days.

The Condition D postulated worst scenario is one 480 V diesel auxiliary board without AC power (i.e., no offsite power to the diesel auxiliary board). In this Condition, the Unit 1 and 2 DGs and SGT trains A and B are more vulnerable to a complete loss of AC power. These boards are normally fed from Shutdown Boards A and D. However, both of these boards have an alternate source of power coming from 4.16 kV shutdown board B. Thus, each auxiliary board has access to two DGs. Therefore, the 5 day time limit before requiring a unit shutdown in this Condition is acceptable because:

a. The remaining diesel auxiliary board has an alternate source of AC power in addition to the normal source and their dedicated DG.

b. The potential for an event in conjunction with a single failure of a redundant component in the 480 V diesel auxiliary board with AC power is minimal. (The redundant component is verified OPERABLE in accordance with Specification 5.5.11, "Safety Function Determination Program (SFDP).")

(continued)

BASES

ACTIONS

D.1 (continued)

The second Completion Time (12 days) for Required Action D.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable in any single contiguous occurrence of failing to meet the LCO. If Condition D is entered while, for instance, a 4.16 kV shutdown board is inoperable and subsequently restored OPERABLE, the LCO may already have been not met for up to 5 days. This situation could lead to a total duration of 10 days, since initial failure of the LCO, to restore the 480 V DG auxiliary board. At this time, a 4.16 kV shutdown board could again become inoperable, and the 480 V DG auxiliary board could be restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This allowance results in establishing the "time zero" at the time the LCO was initially not met, instead of at the time Condition D was entered. The 12 day Completion Time is an acceptable limitation on this potential of failing to meet the LCO indefinitely.

E.1

With one Unit DC board or one Unit 1 and 2 Shutdown Board DC Distribution Panel inoperable, the remaining boards are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining boards could result in the minimum required ESF functions not being supported. Therefore, the required Unit DC board or Unit 1 and 2 Shutdown Board DC Distribution Panel must be restored to OPERABLE status within 7 days by powering it from the associated battery or charger.

Condition E represents one Unit DC board or one Unit 1 and 2 Shutdown Board DC Distribution Panel without adequate DC power, potentially with both the battery significantly degraded and the associated charger nonfunctioning. In this situation the plant is significantly more vulnerable to a partial loss of DC power. However, the three Unit DC boards

(continued)

BASES

ACTIONS

E.1 (continued)

have ESF loads for the three BFN units distributed among them so that redundant subsystems on each unit have separate normal and alternate power supplies. The 7 day Completion Time is partially based on this and reflects a reasonable time to assess unit status as a function of the inoperable Unit DC board or Unit 1 and 2 Shutdown Board DC Distribution Panel and, if not restored to OPERABLE status, to prepare to effect an orderly and safe shutdown.

The second Completion Time for Required Action E.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition E is entered while, for instance, a 4.16 kV shutdown board is inoperable and subsequently restored OPERABLE, the LCO may already have been not met for up to 5 days. This situation could lead to a total duration of 12 days, since initial failure of the LCO, to restore the Unit DC board or the Shutdown Board DC Distribution Panel. At this time, a 4.16 kV shutdown board could again become inoperable, and the Unit DC board or the Shutdown Board DC Distribution Panel could be restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This allowance results in establishing the "time zero" at the time the LCO was initially not met, instead of at the time Condition E was entered. The 12 day Completion Time is an acceptable limitation on this potential of failing to meet the LCO indefinitely.

F.1

With one division of 4.16 kV shutdown boards inoperable, the remaining division of shutdown boards is capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition assuming no single failure. The overall reliability is reduced because a single failure in the remaining 4.16 kV shutdown boards could result in the minimum required ESF functions not being supported.

(continued)

BASES

ACTIONS

F.1 (continued)

Therefore, one of the inoperable 4.16 kV shutdown boards must be restored to OPERABLE status within 8 hours.

The Condition F postulated worst case scenario is one division of 4.16 kV shutdown board without AC power (i.e., no offsite power to the division and the associated DGs inoperable). In this condition, the unit is more vulnerable to a complete loss of AC power. It is, therefore, imperative that the unit operators' attention be focused on minimizing the potential for loss of power to the remaining division by stabilizing the unit, and on restoring power to the affected division. The 8 hour time period before requiring a unit shutdown is acceptable because:

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

b. The potential for an event in conjunction with a single failure of a redundant component in the division with AC power is minimal. (The redundant component is verified OPERABLE in accordance with Specification 5.5.11, "Safety Function Determination Program (SFDP).")

The second Completion Time (12 days) for Required Action F.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable in any single contiguous occurrence of failing to meet the LCO. If Condition F is entered while, for instance, a 480 V DG auxiliary board is inoperable and subsequently restored OPERABLE, the LCO may already have been not met for up to 5 days. This situation could lead to a total duration of 5 days and 8 hours, since initial failure of the LCO, to restore the 480 V shutdown board. At this time, a 480 V DG auxiliary board could again become inoperable, and a 4.16 kV shutdown board could be restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock."

(continued)

BASES

ACTIONS

F.1 (continued)

This allowance results in establishing the "time zero" at the time the LCO was initially not met, instead of at the time Condition F was entered. The 12 day Completion Time is an acceptable limitation on this potential of failing to meet the LCO indefinitely.

Pursuant to LCO 3.0.6, the Distribution System Actions B, C, D, or G would not be entered even if the 4.16 kV shutdown boards were inoperable, resulting in de-energization of a 480 V board. Therefore, the Required Actions of Condition F are modified by a Note to indicate that when Condition F is entered with no AC source to the 4.16 kV shutdown boards, Actions B, C, D, or G must be immediately entered. This allows Condition F to provide requirement for the loss of the 4.16 kV shutdown boards without regard to whether 480 V board is de-energized. Actions B, C, D, or G provide the appropriate restrictions for a de-energized 480 V board.

G.1

Required Action G.1 is intended to provide assurance that a loss of one or more required Unit 2 or 3 AC or DC boards does not result in a complete loss of safety function of critical systems (i.e., SGT or CREVS). With one or more of the required boards inoperable, the SGT or CREVS train supported by each affected board is inoperable. Therefore, the associated SGT or CREVS subsystem must be declared inoperable immediately, and the ACTIONS in the appropriate system Specification taken.

H.1 and H.2

If the inoperable distribution subsystem cannot be restored to OPERABLE status within the associated Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

(continued)

BASES

ACTIONS (continued)

I.1

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

SURVEILLANCE REQUIREMENTS

SR 3.8.7.1

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

REFERENCES

1. FSAR, Chapter 6.
2. FSAR, Chapter 14.
3. Regulatory Guide 1.93, December 1974.
4. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

Table B 3.8.7-1 (page 1 of 1)
AC and DC Electrical Power Distribution Systems

TYPE	VOLTAGE	ELECTRICAL POWER DISTRIBUTION SUBSYSTEMS
AC safety boards	4160 V	Shutdown Board A Shutdown Board B Shutdown Board C Shutdown Board D Shutdown Board 3EB or 3EC Shutdown Board 3ED
	480 V	Shutdown Board 1A Shutdown Board 1B Shutdown Board 3B RMOV Board 1D RMOV Board 1E SGT Board Diesel Auxiliary Board A Diesel Auxiliary Board B
DC boards	250 V	Unit DC Board 1 Unit DC Board 2 Unit DC Board 3 Shutdown Board DC Distribution Panel A Shutdown Board DC Distribution Panel B Shutdown Board DC Distribution Panel C Shutdown Board DC Distribution Panel D Shutdown Board DC Distribution Panel 3EB

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.8 Distribution Systems – Shutdown

BASES

BACKGROUND

A description of the AC and DC electrical power distribution system is provided in the Bases for LCO 3.8.7, "Distribution Systems – Operating."

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident and transient analyses in the FSAR, Chapter 6 (Ref. 1) and Chapter 14 (Ref. 2), assume Engineered Safety Feature (ESF) systems are OPERABLE. The AC and DC electrical power distribution systems are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System, and containment design limits are not exceeded.

The OPERABILITY of the AC and DC electrical power distribution system is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum AC and DC electrical power sources and associated power distribution subsystems during MODES 4 and 5, and during movement of irradiated fuel assemblies in the secondary containment ensures that:

a. The facility can be maintained in the shutdown or refueling condition for extended periods;

b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and

c. Adequate power is provided to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident.

The AC and DC electrical power distribution systems satisfy Criterion 3 of the NRC Policy Statement (Ref. 3).

(continued)

BASES (continued)

LCO

Various combinations of subsystems, equipment, and components are required OPERABLE by other LCOs, depending on the specific plant condition. Implicit in those requirements is the required OPERABILITY of necessary support required features. This LCO explicitly requires energization of the portions of the electrical distribution system necessary to support OPERABILITY of Technical Specifications required systems, equipment, and components – both specifically addressed by their own LCO, and implicitly required by the definition of OPERABILITY.

In addition, some components that may be required by Unit 1 receive power through the Unit 3 electrical power distribution subsystems (e.g., Standby Gas Treatment (SGT) System, and Control Room Emergency Ventilation System (CREVS)). Therefore, the Unit 3 AC and DC electrical power distribution subsystems needed to support the required equipment must also be OPERABLE.

For a unit in MODE 4 or 5, the AC and DC boards can be placed on their alternate feeder breakers and considered OPERABLE as long as the restrictions on the associated drawings are met.

Maintaining these portions of the distribution system energized ensures the availability of sufficient power to operate the plant in a safe manner to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents and inadvertent reactor vessel draindown).

APPLICABILITY

The AC and DC electrical power distribution subsystems required to be OPERABLE in MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment provide assurance that:

a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel in the core in case of an inadvertent draindown of the reactor vessel;

b. Systems needed to mitigate a fuel handling accident are available;

(continued)

BASES

APPLICABILITY (continued)

c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

The AC and DC electrical power distribution subsystem requirements for MODES 1, 2, and 3 are covered in LCO 3.8.7.

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, A.2.4, and A.2.5

Although redundant required features may require redundant divisions of electrical power distribution subsystems to be OPERABLE, one OPERABLE distribution subsystem division may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for draining the reactor vessel. By allowing the option to declare required features associated with an inoperable distribution subsystem inoperable, appropriate restrictions are implemented in accordance with the affected distribution subsystem LCO's Required Actions. In many instances this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made, (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies in the secondary containment, and any activities that could result in inadvertent draining of the reactor vessel).

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC and DC electrical power distribution subsystems and to continue this action until restoration is accomplished in order to provide the necessary power to the plant safety systems.

(continued)

BASES

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, A.2.4, and A.2.5 (continued)

Notwithstanding performance of the above conservative Required Actions, a required residual heat removal-shutdown cooling (RHR-SDC) subsystem may be inoperable. In this case, Required Actions A.2.1 through A.2.4 do not adequately address the concerns relating to coolant circulation and heat removal. Pursuant to LCO 3.0.6, the RHR-SDC ACTIONS would not be entered. Therefore, Required Action A.2.5 is provided to direct declaring RHR-SDC inoperable, which results in taking the appropriate RHR-SDC ACTIONS.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required distribution subsystems should be completed as quickly as possible in order to minimize the time the plant safety systems may be without power.

SURVEILLANCE REQUIREMENTS

SR 3.8.8.1

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

REFERENCES

1. FSAR, Chapter 6.

2. FSAR, Chapter 14.

3. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

BROWNS FERRY NUCLEAR PLANT - IMPROVED TECHNICAL SPECIFICATIONS
SECTION 3.8
LIST OF REVISED PAGES

UNIT 2 ITS BASES SECTIONS

Replaced page B 3.8-4 *R2 with page B 3.8-4 *R3
Replaced page B 3.8-5 *R2 with page B 3.8-5 *R3
Replaced page B 3.8-8 *R2 with page B 3.8-8 *R3
Replaced pages B 3.8-20 through B 3.8-83 *R2 with pages B 3.8-20 through B 3.8-85 *R3

BASES

BACKGROUND (continued)

c. 2850/2815 kW – 0 to 3 minutes (Cold Engine Instantaneous),

d. 3050/3025 kW – > 3 minutes (Hot Engine Instantaneous).

APPLICABLE SAFETY ANALYSES

The initial conditions of DBA and transient analyses in the FSAR, Chapter 6 (Ref. 4) and Chapter 14 (Ref. 5), assume ESF systems are OPERABLE. The AC electrical power sources are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System (RCS), and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

The OPERABILITY of the AC electrical power sources is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining the onsite or offsite AC sources OPERABLE during accident conditions in the event of:

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

b. A postulated worst case single failure.

AC sources satisfy Criterion 3 of the NRC Policy Statement (Ref. 15).

LCO

Two qualified circuits between the offsite transmission network and the onsite Class 1E Distribution System, four separate and independent Unit 1 and 2 DGs (A, B, C, and D), and the Unit 3 DG(s) needed to support required Standby Gas Treatment (SGT) trains and Control Room Emergency Ventilation System (CREVS) trains are required to be OPERABLE. Two divisions of 480 V load shed logic and two divisions of CAS logic are required to be OPERABLE to support Unit 1 and 2 DG OPERABILITY and post-accident loads. Unit 3 Technical Specifications will require the operability

(continued)

BASES

LCO (continued)

of all Unit 3 DGs and provide appropriate compensatory actions for inoperable Unit 3 DGs in support of Unit 3 operations. To support the operation of Unit 2, the Unit 2 LCO for AC Sources - Operating also requires the necessary Unit 3 DG(s) to support SGT and CREVS required by LCO 3.8.7, Distribution Systems - Operating, for supplying the Unit 3 4.16 kV shutdown boards. These requirements ensure availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an abnormal operational transient or a postulated DBA.

Qualified offsite circuits are those that are described in the FSAR, and are part of the licensing basis for the unit. Each offsite circuit must be capable of maintaining rated frequency and voltage, and accepting required loads during an accident, while connected to the 4.16 kV shutdown boards. An offsite circuit is considered OPERABLE if the offsite source is available to A and B or C and D 4.16 kV shutdown boards.

Each offsite circuit consists of incoming breakers to a 4.16 kV shutdown bus and then to the 4.16 kV shutdown boards (A and B or C and D). Each shutdown bus is independently supplied from separate unit boards, which are fed from transformers (via start buses as appropriate). Specific circuits and limitations for considering the offsite circuit qualified are described below. Qualified circuits are one or more of the following:

1. From the 500 kV switchyard (with no credit for the two 500 kV Trinity lines), through unit station service transformer (USST) 1B to 4.16 kV unit board 1A, to 4.16 kV shutdown bus 1, to 4.16 kV shutdown boards A and B; and/or, to 4.16 kV unit board 1B, to 4.16 kV shutdown bus 2, to 4.16 kV shutdown boards C and D. If USST 2B is credited as the second source, a minimum of two 500 kV lines must be available.

2. From the 500 kV switchyard (with no credit for the two 500 kV Trinity lines), through USST 2B to 4.16 kV unit board 2A, to 4.16 kV shutdown bus 2, to 4.16 kV shutdown boards C and D; and/or, to 4.16 kV unit board 2B, to 4.16 kV shutdown bus 1, to 4.16 kV shutdown boards A and B. If USST 1B is credited as the second

(continued)

BASES

LCO (continued)

boards is required to have the capability to be connected to at least one division of 4.16 kV shutdown boards to be considered OPERABLE.

The inability to supply qualified offsite power to an individual 4.16 kV shutdown board from a 4.16 kV shutdown bus constitutes the failure of only one offsite circuit as long as offsite power is available to the other division's shutdown boards. Thus, if one 4.16 kV shutdown board or complete division of shutdown boards (i.e., A and B or C and D) does not have a qualified offsite circuit available, then only one offsite circuit would be inoperable. If one or more shutdown boards in each division (i.e., A or B and C or D) or all four shutdown boards do not have a qualified offsite circuit available, then both (2) offsite circuits would be inoperable.

APPLICABILITY

The AC sources are required to be OPERABLE with Unit 2 in MODES 1, 2, and 3 to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of abnormal operational transients; and

b. Adequate core cooling is provided and containment OPERABILITY and other vital functions are maintained in the event of a postulated DBA.

The AC power requirements for Unit 2 in MODES 4 and 5 are covered in LCO 3.8.2, "AC Sources—Shutdown."

ACTIONS

A.1

To ensure a highly reliable power source remains with one required offsite circuit inoperable, it is necessary to verify the availability of the remaining required offsite circuit on a more frequent basis. This action ensures proper circuit continuity for the offsite AC electrical power supply to the onsite distribution network and

(continued)

BASES

ACTIONS (continued)

J.1

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

K.1

Required Action K.1 is intended to provide assurance that a loss of offsite power, during the period that a required Unit 3 DG is inoperable, does not result in a complete loss of safety function of critical systems (i.e., SGT or CREVS). These features consist of SGT or CREVS trains redundant to trains supported by the inoperable Unit 3 DG.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action the Completion Time only begins on discovery that both:

a. An inoperable required Unit 3 DG exists; and

b. An SGT or CREVS train supported by another DG, is inoperable.

If, at any time during the existence of this Condition (a required Unit 3 DG inoperable), a required SGT or CREVS train subsequently becomes inoperable, this Completion Time begins to be tracked.

Discovering a required Unit 3 DG inoperable coincident with an inoperable SGT or CREVS train, or both, that are associated with the OPERABLE DGs results in starting the Completion Time for the Required Action. Four hours from the discovery of these events existing concurrently is acceptable because it minimizes risk while allowing time for

(continued)

BASES

ACTIONS

K.1 (continued)

restoration before subjecting the unit to transients associated with shutdown.

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

K.2

In Condition K, the remaining OPERABLE DGs and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System to support operation of Unit 2. The 30 day Completion Time is commensurate with the importance of the affected system considering the low probability of a DBA in these conditions and the availability of the remaining power sources. If the inoperable Unit 3 DG cannot be restored to OPERABLE status within the associated Completion Time, the associated SGT or CREVS subsystem must be declared inoperable, and the ACTIONS in the appropriate system Specification taken.

SURVEILLANCE REQUIREMENTS

The AC sources are designed to permit inspection and testing of all important areas and features, especially those that have a standby function. Periodic component tests are supplemented by extensive functional tests (under simulated accident conditions). The SRs for demonstrating the OPERABILITY of the DGs meet the intent of Safety Guide 9 (Ref. 3), as addressed by References 13 and 14.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

Where the SRs discussed herein specify voltage and frequency tolerances, the following summary is applicable. The minimum steady state output voltage of 3740 V is 90% of the nominal 4160 V output voltage. This value, which is specified in ANSI C84.1 (Ref. 9), allows for voltage drop to the terminals of 4000 V motors whose minimum operating voltage is specified as 90% or 3600 V. It also allows for voltage drops to motors and other equipment down through the 120 V level where minimum operating voltage is also usually specified as 90% of name plate rating. The specified maximum steady state output voltage of 4580 V is equal to the maximum operating voltage specified for 4000 V motors. It ensures that for a lightly loaded distribution system, the voltage at the terminals of 4000 V motors is no more than the maximum rated operating voltages. The specified minimum and maximum frequencies of the DG are 58.8 Hz and 61.2 Hz, respectively. These values are equal to ± 2% of the 60 Hz nominal frequency and are derived from the recommendations found in Safety Guide 9 (Ref. 3).

SR 3.8.1.1 and SR 3.8.1.4

These SRs help to ensure the availability of the standby electrical power supply to mitigate DBAs and transients and maintain the unit in a safe shutdown condition.

To minimize the wear on moving parts that do not get lubricated when the engine is not running, these SRs have been modified by a Note to indicate that all DG starts for these surveillances may be preceded by an engine prelube period and followed by a warmup prior to loading.

For the purposes of this testing, the DGs are started from standby conditions. Standby conditions for a DG mean that the diesel engine coolant and oil are being continuously circulated and temperature is being maintained consistent with manufacturer recommendations.

In order to reduce stress and wear on diesel engines, a modified start may be utilized for SR 3.8.1.1 in which the starting speed of DGs is limited, engine warmup is allowed at this lower speed, and the DGs are gradually accelerated

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.1 and SR 3.8.1.4 (continued)

to synchronous speed prior to loading. These start procedures are the intent of the Note.

SR 3.8.1.4 requires that, at a 184 day Frequency, the DG starts from standby conditions and achieves required voltage and frequency within 10 seconds. The 10 second start requirement supports the assumptions in the design basis LOCA analysis of FSAR, Section 14.6.3 (Ref. 10). The 10 second start requirement is not applicable to SR 3.8.1.1 (see the Note for SR 3.8.1.1), when a modified start procedure as described above is used. If a modified start is not used, the 10 second start requirement of SR 3.8.1.4 applies.

Since SR 3.8.1.4 does require a 10 second start, it is more restrictive than SR 3.8.1.1, and it may be performed in lieu of SR 3.8.1.1. This procedure is the intent of Note 1 of SR 3.8.1.1.

The 31 day Frequency for SR 3.8.1.1 is consistent with Safety Guide 9 (Ref. 3). The 184 day Frequency for SR 3.8.1.4 is a reduction in cold testing consistent with Generic Letter 84-15 (Ref. 7). These Frequencies provide adequate assurance of DG OPERABILITY, while minimizing degradation resulting from testing.

SR 3.8.1.2

This Surveillance demonstrates that the DGs are capable of synchronizing and accepting greater than 90 percent of the continuous rating. A minimum run time of 60 minutes is required to stabilize engine temperatures, while minimizing the time that the DG is connected to the offsite source.

Although no power factor requirements are established by this SR, the DG is normally operated at a power factor between 0.8 lagging and 1.0.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.2 (continued)

The 31 day Frequency for this Surveillance is consistent with Safety Guide 9 (Ref. 3).

Note 1 modifies this Surveillance to indicate that diesel engine runs for this Surveillance may include gradual loading, as recommended by the manufacturer, so that mechanical stress and wear on the diesel engine are minimized.

Note 2 modifies this Surveillance by stating that momentary transients because of changing bus loads do not invalidate this test. Similarly, momentary power factor transients above the limit do not invalidate the test.

Note 3 indicates that this Surveillance should be conducted on only one DG at a time in order to avoid common cause failures that might result from offsite circuit or grid perturbations.

Note 4 stipulates a prerequisite requirement for performance of this SR. A successful DG start must precede this test to credit satisfactory performance.

SR 3.8.1.3

This Surveillance demonstrates that each required fuel oil transfer pump operates and transfers fuel oil from its associated 7-day storage tank to its associated engine fuel oil tank. It is required to support continuous operation of standby power sources. This Surveillance provides assurance that the fuel oil transfer pump is OPERABLE, the fuel oil piping system is intact, the fuel delivery piping is not obstructed, and the controls and control systems for automatic fuel transfer systems are OPERABLE.

The design of fuel transfer systems is such that pumps that transfer the fuel oil operate automatically in order to maintain an adequate volume of fuel oil in the engine tank during or following DG operation. A 31 day Frequency is appropriate, since proper operation of fuel transfer systems is an inherent part of DG OPERABILITY.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.4

See SR 3.8.1.1.

SR 3.8.1.5

Each DG is provided with an engine overspeed trip to prevent damage to the engine. Recovery from the transient caused by the loss of a large load could cause diesel engine overspeed, which, if excessive, might result in a trip of the engine. This Surveillance demonstrates the DG load response characteristics and capability to reject the largest single load without exceeding predetermined voltage and frequency and while maintaining a specified margin to the overspeed trip. The largest single load for each DG is a residual heat removal pump (2000 hp). This Surveillance may be accomplished by:

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

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

As required by IEEE-308 (Ref. 11), the load rejection test is acceptable if the increase in diesel speed does not exceed 75% of the difference between synchronous speed and the overspeed trip setpoint, or 15% above synchronous speed, whichever is lower. This represents 66.75 Hz, equivalent to 75% of the difference between nominal speed and the overspeed trip setpoint.

The voltage tolerances specified in this SR are based on the degraded voltage and overvoltage relay settings. The frequency tolerances specified in this SR are derived from Safety Guide 9 (Ref. 3) recommendations for response during load sequence intervals. The voltage and frequency specified are consistent with the design range of the equipment powered by the DG. SR 3.8.1.5.a corresponds to the maximum frequency excursion, while SR 3.8.1.5.b and 3.8.1.5.c are steady state voltage and frequency values to which the system must recover following load rejection. The

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.5 (continued)

18 month Frequency is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 8).

This SR is modified by a Note. In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, the Note requires that, if synchronized to offsite power, testing must be performed using a power factor $\leq$ 0.9. This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience.

SR 3.8.1.6

This Surveillance demonstrates that the DG automatically starts from the design basis actuation signal (LOCA signal). This test will also verify the start of the Unit 3 DGs aligned to the SGT and CREV Systems on an accident signal from Unit 2. In order to minimize the number of DGs involved in testing, demonstration of automatic starts of the Unit 3 DGs on an accident signal from Unit 2 may be performed in conjunction with testing to demonstrate automatic starts of the Unit 3 DGs on an accident signal from Unit 3. Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency is acceptable from a reliability standpoint.

To minimize wear and tear on the DGs, this SR has been modified by a Note which permits DG starts to be preceded by an engine prelube period followed by a warmup period.

SR 3.8.1.7

Demonstration once per 18 months that the DGs can start and run continuously at full load capability for an interval of not less than 24 hours—22 hours of which is at a load equivalent to the continuous rating of the DG, and 2 hours of which is at a load equivalent to 105 percent to 110 percent of the continuous duty rating of the DG. The DG starts for this Surveillance can be performed either from standby or hot conditions. The provisions for prelube and

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.7 (continued)

warmup, discussed in SR 3.8.1.1, and for gradual loading, discussed in SR 3.8.1.2, are applicable to this SR.

In order to ensure that the DG is tested under load conditions that are as close to design conditions as possible, testing must be performed using a power factor ≤ 0.9. This power factor is chosen to be representative of the actual design basis inductive loading that the DG could experience. A load band is provided to avoid routine overloading of the DG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY.

The 18 month Frequency is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 8).

This Surveillance has been modified by a Note that states that momentary transients due to changing bus loads do not invalidate this test. Similarly, momentary power factor transients above the limit do not invalidate the test.

SR 3.8.1.8

Under accident conditions (and loss of offsite power) loads are sequentially connected to the shutdown boards by automatic individual pump timers. The individual pump timers control the permissive and starting signals to motor breakers to prevent overloading of the DGs due to high motor starting currents. This SR is demonstrated by performance of SR 3.3.5.1.5 for the Core Spray and LPCI pump timers, SR 3.7.2.3 for the EECW pump timers, and SR 3.8.1.9.b for the 480 V load shed logic timers. The allowable values for these timers ensure that sufficient time exists for the DG to restore frequency and voltage prior to applying the next load and that safety analysis assumptions regarding ESF equipment time delays are not violated. Reference 2 provides a summary of the automatic loading of ESF shutdown boards.

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 8).

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.9

In the event of a DBA coincident with a loss of offsite power, the DGs are required to supply the necessary power to ESF systems so that the fuel, RCS, and containment design limits are not exceeded.

This Surveillance demonstrates the as designed operation of the standby power sources during a loss of offsite power actuation test signal in conjunction with an ECCS initiation signal. This test verifies all actions encountered from the loss of offsite power in conjunction with an ECCS initiation signal, including shedding of the nonessential loads and energization of the 4.16 kV shutdown boards and respective loads from the DG. It further demonstrates the capability of the DG to automatically achieve the required voltage and frequency within the specified time.

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

The Frequency of 18 months takes into consideration plant conditions required to perform the Surveillance and is intended to be consistent with an expected fuel cycle length of 18 months.

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

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.9 (continued)

being continuously circulated and temperature maintained consistent with manufacturer recommendations.

SR 3.8.1.10

This Surveillance is provided to direct that the appropriate Surveillances for the required Unit 3 DGs are governed by the Unit 3 Technical Specifications. Performance of the applicable Unit 3 Surveillances will satisfy any Unit 3 requirements, as well as this Unit 1 and 2 Surveillance requirement. The Frequency required by the applicable Unit 3 SR also governs performance of that SR for both Units.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.
2. FSAR, Chapter 8.
3. Safety Guide 9.
4. FSAR, Chapter 6.
5. FSAR, Chapter 14.
6. Regulatory Guide 1.93.
7. Generic Letter 84-15.
8. Regulatory Guide 1.9.
9. ANSI C84.1, 1982.
10. FSAR, Section 14.6.3.
11. IEEE Standard 308.
12. FSAR, Section 8.5, Table 8.5-6.
13. FSAR, Section 8.5.2.

(continued)

BASES

REFERENCES (continued)

14. TVA Design Criteria BFN-50-7082.

15. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.2 AC Sources – Shutdown

BASES

BACKGROUND

A description of the AC sources is provided in the Bases for LCO 3.8.1, "AC Sources – Operating."

APPLICABLE SAFETY ANALYSES

The OPERABILITY of the minimum AC sources during MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment ensures that:

a. The facility can be maintained in the shutdown or refueling condition for extended periods;

b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and

c. Adequate AC electrical power is provided to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident.

In general, when the unit is shut down the Technical Specifications requirements ensure that the unit has the capability to mitigate the consequences of postulated accidents. However, assuming a single failure and concurrent loss of all offsite or loss of all onsite power is not required. The rationale for this is based on the fact that many Design Basis Accidents (DBAs) that are analyzed in MODES 1, 2, and 3 have no specific analyses in MODES 4 and 5. Worst case bounding events are deemed not credible in MODES 4 and 5 because the energy contained within the reactor pressure boundary, reactor coolant temperature and pressure, and corresponding stresses result in the probabilities of occurrences significantly reduced or eliminated, and minimal consequences. These deviations from DBA analysis assumptions and design requirements during shutdown conditions are allowed by the LCO for required systems.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

During MODES 1, 2, and 3, various deviations from the analysis assumptions and design requirements are allowed within the ACTIONS. This allowance is in recognition that certain testing and maintenance activities must be conducted, provided an acceptable level of risk is not exceeded. During MODES 4 and 5, performance of a significant number of required testing and maintenance activities is also required. In MODES 4 and 5, the activities are generally planned and administratively controlled. Relaxations from typical MODES 1, 2, and 3 LCO requirements are acceptable during shutdown MODES, based on:

a. The fact that time in an outage is limited. This is a risk prudent goal as well as a utility economic consideration.

b. Requiring appropriate compensatory measures for certain conditions. These may include administrative controls, reliance on systems that do not necessarily meet typical design requirements applied to systems credited in operation MODE analyses, or both.

c. Prudent utility consideration of the risk associated with multiple activities that could affect multiple systems.

d. Maintaining, to the extent practical, the ability to perform required functions (even if not meeting MODES 1, 2, and 3 OPERABILITY requirements) with systems assumed to function during an event.

In the event of an accident during shutdown, this LCO ensures the capability of supporting systems necessary for avoiding immediate difficulty, assuming either a loss of all offsite power or a loss of all onsite (diesel generator (DG)) power.

The AC sources satisfy Criterion 3 of the NRC Policy Statement (Ref. 1).

LCO

One offsite circuit capable of supplying the onsite Class 1E power distribution subsystem(s) of LCO 3.8.8, "Distribution Systems – Shutdown," ensures that all required loads are

(continued)

BASES

LCO (continued)

powered from offsite power. Two Unit 1 and 2 DGs and Unit 3 DGs required to support OPERABLE SGT and CREV Systems, each associated with a Distribution System Engineered Safety Feature (ESF) 4.16 kV shutdown board required OPERABLE by LCO 3.8.8, ensures that a diverse LCO power source is available for providing electrical power support assuming a loss of the offsite circuit. Together, OPERABILITY of the required offsite circuit and DGs ensures the availability of sufficient AC sources to operate the plant in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents and reactor vessel draindown).

The qualified offsite circuit(s) must be capable of maintaining rated frequency and voltage while connected to their respective 4.16 kV shutdown boards, and of accepting required loads during an accident. Qualified offsite circuits are those that are described in the FSAR and are part of the licensing basis for the unit. An offsite circuit is considered OPERABLE if the offsite source is available to one or more required 4.16 kV shutdown boards, through its normal supply breaker.

The offsite circuit consists of incoming breakers to a 4.16 kV shutdown bus and then to the 4.16 kV shutdown boards required by LCO 3.8.8. Each shutdown bus is independently supplied from separate unit boards, which are fed from transformers (via start buses as appropriate). Specific circuits and limitations for considering the offsite circuit qualified are described below.

1. From the 500 kV switchyard (with no credit for the two 500 kV Trinity lines), through unit station service transformer (USST) 1B to 4.16 kV unit board 1A, to 4.16 kV shutdown bus 1, to 4.16 kV shutdown boards A and B; and/or, to 4.16 kV unit board 1B, to 4.16 kV shutdown bus 2, to 4.16 kV shutdown boards C and D.

2. From the 500 kV switchyard (with no credit for the two 500 kV Trinity lines), through USST 2B to 4.16 kV unit board 2A, to 4.16 kV shutdown bus 2, to 4.16 kV shutdown boards C and D; and/or, to 4.16 kV unit

(continued)

BASES

LCO (continued)

board 2B, to 4.16 kV shutdown bus 1, to 4.16 kV shutdown boards A and B.

3. From the Trinity 161 kV transmission system, through common station service transformer (CSST) A or B to start bus 1A or 1B, to 4.16 kV unit board 1A or 2B, to 4.16 kV shutdown bus 1, to 4.16 kV shutdown boards A and B; or alternately, to 4.16 kV unit board 1B or 2A, to 4.16 kV shutdown bus 2, to 4.16 kV shutdown boards C and D.

4. From the Athens 161 kV transmission system, through CSST A or B to start bus 1A or 1B, to 4.16 kV unit board 1A or 2B, to 4.16 kV shutdown bus 1, to 4.16 kV shutdown boards A and B; or alternately, to 4.16 kV unit board 1B or 2A, to 4.16 kV shutdown bus 2, to 4.16 kV shutdown boards C and D.

For the Athens 161 kV offsite power to be considered as one of the qualified offsite power supplies, the following restrictions must also be met:

a. The 161 kV capacitor bank must be available for the Athens 161 kV line.

b. Credit for offsite power from the Athens 161 kV line may be taken by only one unit at one time. However, more than one unit may be aligned to the Athens line without invalidating the offsite power supply for the unit claiming it.

For the Trinity 161 kV offsite power to be considered as one of the qualified offsite power supplies, the following restrictions must also be met:

a. For the Trinity 161 kV line to be considered as one of the qualified offsite power supplies by only one unit, either the 161 kV capacitor bank must be available or the Trinity Inter-Tie transformer must be in service with 161 kV line nominal voltage $\geq$ 165 kV.

b. The Trinity 161 kV line may be considered as one of the qualified offsite power supplies by two separate units at any one time, provided that both CSST A and B are available and either the 161 kV capacitor bank is

(continued)

BASES

LCO (continued)

available or the Athens line and Trinity Inter-Tie transformer are in service with 161 kV line nominal voltage ≥ 165 kV.

c. The Trinity 161 kV line may be considered as one of the qualified offsite power supplies by three separate units at any one time, provided that both CSST A and B are available, Unit 3 claims USST 3B as its other offsite power source, and either the 161 kV capacitor bank is available or the Athens line and Trinity Inter-Tie transformer are in service with 161 kV line nominal voltage ≥ 165 kV.

The only requirements for the position of the 161 kV bus 1 and bus 2 cross-tie breakers (924 and 928) are those implied by the restrictions on claiming Athens and Trinity as offsite power supplies.

The required DGs must be capable of starting, accelerating to rated speed and voltage, connecting to respective 4.16 kV shutdown boards on detection of bus undervoltage, and accepting required loads. This sequence must be accomplished within 10 seconds. Each DG must also be capable of accepting required loads within the assumed loading sequence intervals, and must continue to operate until offsite power can be restored to the 4.16 kV shutdown boards.

Proper sequencing of loads, including tripping of nonessential loads, is a required function for DG OPERABILITY.

APPLICABILITY

The AC sources are required to be OPERABLE in MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment to provide assurance that:

a. Systems providing adequate coolant inventory makeup are available for the irradiated fuel assemblies in the core in case of an inadvertent draindown of the reactor vessel;

b. Systems needed to mitigate a fuel handling accident are available;

(continued)

BASES

APPLICABILITY (continued)

c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

AC power requirements for MODES 1, 2, and 3 are covered in LCO 3.8.1.

ACTIONS

A.1

With the required offsite circuit inoperable, the remaining AC sources available may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for draining the reactor vessel. By the allowance of the option to declare required features inoperable that are supported by the inoperable AC source, appropriate restrictions can be implemented in accordance with the affected required feature(s) LCOs' ACTIONS.

Pursuant to LCO 3.0.6, the Distribution System ACTIONS would not be entered even if all AC sources to it are inoperable, resulting in de-energization. Therefore, the Required Actions of Condition A have been modified by a Note to indicate that when Condition A is entered with no qualified AC power to any required 4.16 kV shutdown board, ACTIONS for LCO 3.8.8 must be immediately entered. This Note allows Condition A to provide requirements for the loss of the offsite circuit whether or not a 4.16 kV shutdown board is made inoperable. LCO 3.8.8 provides the appropriate restrictions for the situation involving an inoperable 4.16 kV shutdown board.

A.2.1, A.2.2, A.2.3, A.2.4, B.1.1, B.1.2, B.1.3, and B.1.4

With no offsite circuit available or one or more DGs inoperable, the option still exists to declare all required features inoperable. However, since this option may involve undesired administrative efforts, the allowance for sufficiently

(continued)

BASES

ACTIONS

A.2.1, A.2.2, A.2.3, A.2.4, B.1.1, B.1.2, B.1.3, and B.1.4 (continued)

conservative actions is made. It is, therefore, required to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies in the secondary containment, and activities that could result in inadvertent draining of the reactor vessel.

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC sources and to continue this action until restoration is accomplished in order to provide the necessary AC power to the plant safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required AC electrical power sources should be completed as quickly as possible in order to minimize the time during which the plant safety systems may be without sufficient power.

C.1

Required Action C.1 is intended to provide assurance that a loss of offsite power, during the period that a required Unit 3 DG is inoperable, does not result in a complete loss of safety function of critical systems (i.e., SGT or CREVS). These features consist of SGT or CREVS trains redundant to trains supported by the inoperable Unit 3 DG.

The 30 day completion time takes into account the operability of the redundant required features and their offsite and DG power availability. Additionally, the 30 day completion time takes into account the capacity and capability of the remaining AC sources, reasonable time for repairs, and low probability of an event occurring during this period. If the redundant required feature(s) is(are) not OPERABLE, the second completion time requires immediately declaring the required feature(s), supported by the inoperable AC source, inoperable. This results in

(continued)

BASES

ACTIONS

C.1 (continued)

taking the appropriate Actions in the supported system specification for the inoperable function.

SURVEILLANCE REQUIREMENTS

SR 3.8.2.1

SR 3.8.2.1 requires the SRs from LCO 3.8.1 that are necessary for ensuring the OPERABILITY of the Unit 1 and 2 AC sources in other than MODES 1, 2, and 3. Refer to the corresponding Bases for LCO 3.8.1 for a discussion of each SR.

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE DG(s) from being paralleled with the offsite power network or otherwise rendered inoperable during the performance of SRs, and to preclude deenergizing a required 4.16 kV shutdown board or disconnecting a required offsite circuit during performance of SRs. With limited AC sources available, a single event could compromise both the required circuit and the DG. It is the intent that these SRs must still be capable of being met, but actual performance is not required during periods when the DG and offsite circuit is required to be OPERABLE.

SR 3.8.2.2

This Surveillance is provided to direct that the appropriate Surveillances for the required Unit 3 DGs are governed by the Unit 3 Technical Specifications. Performance of the applicable Unit 3 Surveillances will satisfy any Unit 3 requirements, as well as satisfying this Unit 2 Surveillance requirement. The Frequency required by the applicable Unit 3 SR also governs performance of that SR for both Units.

(continued)

BASES (continued)

REFERENCES

1. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air

BASES

BACKGROUND

Each diesel generator (DG) is provided with three interconnected storage tanks having a minimum usable fuel oil volume (35,280 gallons) sufficient to operate that DG for a period of 7 days while the DG is supplying maximum post loss of coolant accident (LOCA) load demand discussed in FSAR, Section 8.5.3.4 (Ref. 1). A transfer pump is located at the fuel oil storage tanks which can supply fuel oil from two 71,000-gallon fuel oil storage tanks to the 7-day storage tanks. In addition, it is possible to transfer fuel from one 7-day storage tank to any other by using transfer pumps. This onsite fuel oil capacity is sufficient to operate the DGs for longer than the time to replenish the onsite supply from outside sources.

Fuel oil is transferred from the 7-day storage tank to the day tank by either of two transfer pumps associated with each diesel generator. This is accomplished automatically by level switches on the day tank. Redundancy of pumps and piping precludes the failure of one pump, or the rupture of any pipe, valve, or tank to result in the loss of more than one DG. All 7-day tanks are embedded in the substructure of the Standby Diesel Generator Building.

For proper operation of the standby DGs, it is necessary to ensure the proper quality of the stored fuel oil. The fuel oil property monitored is the total particulate concentration. Periodic testing of the stored fuel oil total particulate concentration is a method to monitor the potential degradation related to long term storage and the potential impact to fuel filter plugging as a result of high particulate levels.

The DG lubrication system is designed to provide sufficient lubrication to permit proper operation of its associated DG under all loading conditions. The system is required to circulate the lube oil to the diesel engine working surfaces and to remove excess heat generated by friction during operation. Each engine oil sump contains an inventory capable of supporting a minimum of 7 days of operation.

(continued)

BASES

BACKGROUND (continued)

The 175-gallon and 150-gallon capacities listed in Condition B are based upon the DG seven-day consumption and six-day consumption of lube oil, respectively. The total lube oil system capacity is 465 gallons, of which, 235 gallons are useable (i.e., 230 gallons are not useable). If the seven-day and six-day capacities are added to the non-useable capacity, a minimum value of lube oil capacity can be established for purposes of this LCO. Therefore, 405 gallons are required to ensure the seven-day requirement (i.e., 230 + 175); while, 380 gallons (i.e., 230 + 150) are required to ensure the six-day requirement. Note: actual lube oil consumption is 0.98 gal/hr or 23.52 gal/day - 25 gal/day was conservatively chosen to establish the seven-day and six-day requirements.

This supply is sufficient to allow the operator to replenish lube oil from outside sources.

Each DG has two fully redundant air start systems either of which is fully capable of starting the engine. Each air start system has adequate capacity for at least one start attempt on the DG without recharging of its air receivers. The air compressors may be cross-tied without affecting operability of either air start system. For DG operability, only one of the air start systems is required. The associated DG must be declared inoperable if both air start systems are inoperable.

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in FSAR, Chapter 6 (Ref. 3), and Chapter 14 (Ref. 4), assume Engineered Safety Feature (ESF) systems are OPERABLE. The DGs are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.5, Emergency Core Cooling System (ECCS) and Reactor Core Isolation Cooling (RCIC) System; and Section 3.6, Containment Systems.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

Since diesel fuel oil, lube oil, and starting air subsystems support the operation of the standby AC power sources, they satisfy Criterion 3 of the NRC Policy Statement (Ref. 5).

LCO

Stored diesel fuel oil is required to have sufficient supply for 7 days of full load operation. It is also required to meet specific standards for quality. Additionally, sufficient lube oil supply must be available to ensure the capability to operate at full load for 7 days. This requirement, in conjunction with an ability to obtain replacement supplies within 7 days, supports the availability of DGs required to shut down the reactor and to maintain it in a safe condition for an abnormal operational transient or a postulated DBA with loss of offsite power. DG day tank fuel oil requirements, as well as transfer capability from the 7-day storage tank to the day tank, are addressed in LCO 3.8.1, "AC Sources—Operating," and LCO 3.8.2, "AC Sources—Shutdown."

One of the two redundant starting air systems is required to have a minimum capacity for one DG start attempt without recharging the air start receivers. The associated DG must be declared inoperable if both air start systems are inoperable.

APPLICABILITY

The AC sources (LCO 3.8.1 and LCO 3.8.2) are required to ensure the availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an abnormal operational transient or a postulated DBA. Because stored diesel fuel oil, lube oil, and starting air subsystem support LCO 3.8.1 and LCO 3.8.2, stored diesel fuel oil, lube oil, and starting air are required to be within limits when the associated DG is required to be OPERABLE.

(continued)

BASES (continued)

ACTIONS

The ACTIONS Table is modified by a Note indicating that separate Condition entry is allowed for each DG. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable DG subsystem. Complying with the Required Actions for one inoperable DG subsystem may allow for continued operation, and subsequent inoperable DG subsystem(s) governed by separate Condition entry and application of associated Required Actions.

A.1

In this condition, the 7 day fuel oil supply for a DG is not available. However, the Condition is restricted to fuel oil level reductions that maintain at least a 6 day supply. These circumstances may be caused by events such as:

a. Full load operation required for an inadvertent start while at minimum required level; or

b. Feed and bleed operations that may be necessitated by increasing particulate levels or any number of other oil quality degradations.

This restriction allows sufficient time for obtaining the requisite replacement volume and performing the analyses required prior to addition of the fuel oil to the tank. A period of 48 hours is considered sufficient to complete restoration of the required level prior to declaring the DG inoperable. This period is acceptable based on the remaining capacity (> 6 days), the fact that procedures will be initiated to obtain replenishment, and the low probability of an event during this brief period.

B.1

With lube oil inventory < 175 gal, sufficient lube oil to support 7 days of continuous DG operation at full load conditions may not be available. However, the Condition is restricted to lube oil volume reductions that maintain at least a 6 day supply. This restriction allows sufficient time for obtaining the requisite replacement volume. A period of 48 hours is considered sufficient to complete

(continued)

BASES

ACTIONS

B.1 (continued)

restoration of the required volume prior to declaring the DG inoperable. This period is acceptable based on the remaining capacity (> 6 days), the low rate of usage, the fact that procedures will be initiated to obtain replenishment, and the low probability of an event during this brief period.

C.1

This Condition is entered as a result of a failure to meet the acceptance criterion for particulates. Normally, trending of particulate levels allows sufficient time to correct high particulate levels prior to reaching the limit of acceptability. Poor sample procedures (bottom sampling), contaminated sampling equipment, and errors in laboratory analysis can produce failures that do not follow a trend. Since the presence of particulates does not mean failure of the fuel oil to burn properly in the diesel engine, since particulate concentration is unlikely to change significantly between Surveillance Frequency intervals, and since proper engine performance has been recently demonstrated (within 31 days), it is prudent to allow a brief period prior to declaring the associated DG inoperable. The 7 day Completion Time allows for further evaluation, re-sampling, and re-analysis of the DG fuel oil.

D.1

Only one of the two redundant air starting systems is required to support associated DG operability. With the starting air receiver pressure < 165 psig in the required starting air system, sufficient capacity to start the associated DG may not exist. The associated DG may be incapable of performing its intended function and must be immediately declared inoperable. This declaration also requires entry into applicable Conditions and Required Actions for an inoperable DG, LCO 3.8.1, "AC Sources—Operating."

(continued)

BASES

ACTIONS (continued)

E.1

With a Required Action and associated Completion Time not met, or the stored diesel fuel oil, lube oil, or starting air subsystem inoperable for reasons other than addressed by Conditions A through D, the associated DG may be incapable of performing its intended function and must be immediately declared inoperable.

SURVEILLANCE REQUIREMENTS

SR 3.8.3.1

This SR provides verification that there is an adequate inventory of fuel oil in the storage tanks to support each DG's operation for 7 days at full load. The 7 day period is sufficient time to place the unit in a safe shutdown condition and to bring in replenishment fuel from an offsite location.

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

SR 3.8.3.2

This Surveillance ensures that sufficient lubricating oil inventory is available to support at least 7 days of full load operation for each DG. The 175 gal requirement is based on the DG manufacturer's consumption values for the run time of the DG. Implicit in this SR is the requirement to verify the capability to transfer the lube oil from its storage location to the DG, when the DG lube oil sump does not hold adequate inventory for 7 days of full load operation without the level reaching the manufacturer's recommended minimum level.

A 31 day Frequency is adequate to ensure that a sufficient lube oil supply is onsite, since DG starts and run time are closely monitored by the plant staff.

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.3.3

This SR verifies that the required fuel oil testing is performed in accordance with the Diesel Fuel Oil Testing Program. Tests are a means of monitoring the potential degradation related to long term storage and the potential impact to fuel filter plugging as a result of high particulate levels. Specific sampling requirements, frequencies, and additional information are discussed in detail in the Diesel Fuel Oil Testing Program.

SR 3.8.3.4

This Surveillance ensures that, without the aid of the refill compressor, sufficient air start capacity for each DG is available. The system design requirements provide for at least one start cycle from one of two redundant air start systems without recharging. A start cycle is defined by the DG vendor, but usually is measured in terms of time (seconds of cranking) or engine cranking speed. The pressure specified in this SR is the lowest pressure at which at least one start attempt can be accomplished using one of two redundant air start systems.

The 31 day Frequency takes into account the capacity, capability, redundancy, and diversity of the AC sources and other indications available in the control room, including alarms, to alert the operator to below normal air start pressure.

REFERENCES

1. FSAR, Section 8.5.3.4.
2. Regulatory Guide 1.137.
3. FSAR, Chapter 6.
4. FSAR, Chapter 14.
5. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.4 DC Sources—Operating

BASES

BACKGROUND

The DC electrical power system provides the AC emergency power system with control power. It also provides both motive and control power to selected safety related equipment. As required by 10 CFR 50, Appendix A, GDC 17 (Ref. 1), the DC electrical power system is designed to have sufficient independence, redundancy, and testability to perform its safety functions, assuming a single failure. The DC electrical power system also conforms to the recommendations of Regulatory Guide 1.6 (Ref. 2) and meets the intent of IEEE-308 (Ref. 3).

Three separate DC Source Systems consist of:

1. Three 250 VDC Unit DC subsystems, together with the associated charger, circuitry, switches, indicators, and alarms. Each Unit DC battery board can be supplied from its own battery charger or from the spare charger. The three Unit batteries have engineered safety feature loads for the three units distributed among them so that redundant subsystems on each unit have separate normal and alternate power supplies. The Unit DC battery boards also supply control power for the bus-tie board, the cooling tower switchgear, three Unit 3 shutdown boards, and the alternate feeder to Unit 1 and 2 shutdown boards and one Unit 3 shutdown board. The battery boards, motor-operated valve boards, and distribution panels supply nominal 250 VDC power to their loads without interruption unless the supply battery is discharged and power to the charger is lost. All transfers from normal to alternate sources are done manually.

2. Four 250 VDC shutdown board subsystems supply control power for 4.16 kV shutdown boards A, B, C, and D, respectively, and 480 V shutdown boards 1A, 1B, 2A and 2B. Each DC shutdown board subsystem consists of a battery together with the associated charger, circuitry, switches, indicators, and alarms. Each shutdown board DC subsystem can receive power from its

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BASES

BACKGROUND (continued)

own battery, battery charger, or from the spare charger. Normal 250 VDC control power for 4.16 kV shutdown boards A, B, C, and D is supplied by one of the shutdown board DC subsystems with an alternate supply from one of the Unit DC battery boards through a manual transfer switch; and control power for 480 V shutdown boards 1A, 1B, 2A, and 2B is supplied by one of the shutdown board DC subsystems with an alternate supply from one of the Unit DC battery boards through a manual transfer switch. Alternate supplies have been provided through manual transfer switches. Separation between redundant control power circuits is maintained external to and within the switchgear.

3. The diesel generator (DG) DC subsystems provide control and instrumentation power for their respective DG. Each DG DC subsystem is energized by one 125 V battery and one of two 125 V battery chargers per 125 V subsystem.

During normal operation, the DC loads are powered from the battery chargers with the batteries floating on the system. In case of loss of normal power to the battery charger, the DC loads are automatically powered from the batteries.

The DC power distribution system is described in more detail in Bases for LCO 3.8.7, "Distribution System—Operating," and LCO 3.8.8, "Distribution System—Shutdown."

Each Unit and Shutdown Board battery has adequate storage capacity to carry the required load continuously for approximately 30 minutes (Ref. 4).

Each diesel battery has adequate storage capacity to carry required loads. These include control and logic power, governor booster pumps, generator relay protection, generator field flashing, and the motor-driven fuel pumps. The governor booster pumps and generator field flashing require power for only a relatively short time during a diesel start.

Each Unit and Shutdown Board DC battery subsystem is separately housed in a ventilated room apart from its charger and distribution centers. Each subsystem is located

(continued)

BASES

BACKGROUND (continued)

in an area separated physically and electrically from the other subsystems to ensure that a single failure in one subsystem does not cause a failure in a redundant subsystem. Each diesel battery is located in the room with the diesel generator it serves. One of its chargers is also in the room; the other is immediately outside the door in the Diesel Generator Building hallway.

The batteries for Unit DC, Shutdown Board DC, and DG DC electrical power subsystems are sized to produce required capacity at 80% of nameplate rating, corresponding to warranted capacity at end of life cycles and the 100% design demand. The minimum design voltage limit for the Unit DC and Shutdown Board DC subsystems is 210 V. The minimum design voltage limit for the DG DC subsystems is 105 V.

Each battery charger for a DC electrical power subsystem has ample power output capacity for the steady state operation of connected loads required during normal operation, while at the same time maintaining its battery bank fully charged. Each battery charger has sufficient capacity to restore the battery from the design minimum charge to its fully charged state within 12 hours while supplying normal steady state loads (Ref. 4).

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter 6 (Ref. 5) and Chapter 14 (Ref. 5), assume that Engineered Safety Feature (ESF) systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the DGs, emergency auxiliaries, and control and switching during all MODES of operation. The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining DC sources OPERABLE during accident conditions in the event of:

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

b. A postulated worst case single failure.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

The DC sources satisfy Criterion 3 of the NRC Policy statement (Ref. 11).

LCO

The DC Electrical Power System—with: 1) three Unit DC subsystems, each consisting of one 250 V battery, one battery charger, and the corresponding control equipment and interconnecting cabling supplying power to the associated Unit battery board; 2) four shutdown board DC subsystems (and the Unit 3 shutdown board DC subsystem needed to support OPERABILITY of the CREV System), each consisting of one 250 V battery, its associated charger, and the corresponding control equipment and interconnecting cabling supplying power to the associated DC shutdown board; and 3) four Unit 2 and two Unit 3 DG DC subsystems each consisting of one battery bank, one battery charger, and the corresponding control equipment and interconnecting cabling, is required to be OPERABLE to ensure the availability of the required power to shut down the reactor and maintain it in a safe condition after an abnormal operational transient or a postulated DBA. Loss of any DC electrical power subsystem does not prevent the minimum safety function from being performed (Ref. 4).

APPLICABILITY

The DC electrical power sources are required to be OPERABLE in MODES 1, 2, and 3 to ensure safe unit operation and to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of abnormal operational transients; and

b. Adequate core cooling is provided, and containment integrity and other vital functions are maintained in the event of a postulated DBA.

The DC electrical power requirements for MODES 4 and 5 are addressed in the Bases for LCO 3.8.5, "DC Sources—Shutdown."

(continued)

BASES (continued)

ACTIONS

A.1

Condition A represents one Unit or Shutdown Board DC subsystem with a loss of ability to completely respond to an event, and a potential loss of ability to remain energized during normal operation. It is therefore imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for complete loss of DC power to the affected division. The 7 day limit is consistent with the allowed time for an inoperable Unit DC Board or Shutdown Board Distribution Panel.

If one Unit or Shutdown Board DC electrical power subsystem is inoperable (e.g., inoperable battery, inoperable battery charger(s), or inoperable battery charger and associated inoperable battery), the remaining Unit or Shutdown Board DC electrical power subsystems have the capacity to support a safe shutdown and cooldown of all three units in the event of a loss of offsite power and a DBA on one Unit. Since a subsequent worst case single failure could, however, result in the loss of minimum necessary DC electrical subsystems to mitigate a worst case accident, continued power operation should not exceed 7 days. The loss of one shutdown board electrical power subsystem affects normal control power supply for the 480 V and 4.16 kV shutdown board(s) which it supplies. Loss of uninterrupted control power to these shutdown boards may result in loss of those engineered safety features supplied by these boards. Therefore, 7 days is considered a reasonable time to effect repairs and perform required testing of the unit or shutdown board DC electrical power subsystem, recognizes the ability to connect alternate sources to support continued operation or accident mitigation, and, if the unit or shutdown board DC electrical power subsystem is not restored to OPERABLE status, to prepare to effect an orderly and safe unit shutdown.

B.1 and B.2

If the Unit or Shutdown Board DC electrical power subsystem cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit

(continued)

BASES

ACTIONS

B.1 AND B.2 (continued)

must be brought to at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems. The Completion Time to bring the unit to MODE 4 is consistent with the time required in Regulatory Guide 1.93 (Ref. 6).

C.1

If a DG DC electrical power subsystem is inoperable, the associated DG may be incapable of performing its intended function and must be immediately declared inoperable. This declaration also requires entry into applicable Conditions and Required Actions for an inoperable DG, LCO 3.8.1, "AC Sources—Operating."

D.1

Required Action D.1 is intended to provide assurance that a loss of Unit 3 Shutdown Board DC electrical power subsystem 3EB does not result in a complete loss of safety function of critical systems (i.e., CREVS). With Unit 3 Shutdown Board DC electrical power subsystem 3EB inoperable, the CREVS train supported by that shutdown board is inoperable. Therefore, the associated CREVS subsystem must be declared inoperable immediately, and the ACTIONS in the appropriate system Specification taken.

SURVEILLANCE REQUIREMENTS

SR 3.8.4.1

Verifying battery terminal voltage while on float charge for the batteries helps to ensure the effectiveness of the charging system and the ability of the batteries to perform their intended function. Float charge is the condition in which the charger is supplying the continuous charge required to overcome the internal losses of a battery (or battery cell) and maintain the battery (or a battery cell)

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.1 (continued)

in a fully charged state, while supplying adequate power to the connected DC loads. The voltage requirements are based on the nominal design voltage of the battery and are consistent with the initial voltages assumed in the battery sizing calculations. The 7 day Frequency is consistent with manufacturer recommendations and IEEE-450 (Ref. 7).

SR 3.8.4.2 and SR 3.8.4.5

Battery charger capability requirements are based on the design capacity of the chargers (Ref. 4). According to Regulatory Guide 1.32 (Ref. 8), the battery charger supply is required to be based on the largest combined demands of the various steady state loads and the charging capacity to restore the battery from the design minimum charge state to the fully charged state, irrespective of the status of the unit during these demand occurrences. The minimum required amperes and verification of the charger's ability to recharge the battery ensures that these requirements can be satisfied.

SR 3.8.4.2 verifies that the chargers are capable of charging the batteries after their designed duty cycle testing and ensures that the chargers will perform their design function. This SR is modified by a Note that allows performance of SR 3.8.4.5 in lieu of this Surveillance requirement. SR 3.8.4.5 verifies that the chargers are capable of charging the batteries after each discharge test and ensures that the chargers are capable of performing at maximum output. SR 3.8.4.2 is performed at the same frequency as the 18 month service test (SR 3.8.4.3), while SR 3.8.4.5 is performed following the 60 month battery discharge test (SR 3.8.4.4).

SR 3.8.4.5 is modified by a Note. The Note is added to this SR to acknowledge that credit may be taken for unplanned events that satisfy the Surveillance.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.3

A battery service test is a special test of the battery's capability, as found, to satisfy the design requirements (battery duty cycle) of the DC electrical power system. The discharge rate and test length corresponds to the design duty cycle requirements as specified in Reference 4.

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.32 (Ref. 8) and Regulatory Guide 1.129 (Ref. 9), which state, in part, that the battery service test should be performed with intervals between tests not to exceed 18 months.

This SR is modified by a Note that allows the performance of a modified performance discharge test in lieu of a service test once per 60 months. The modified performance discharge test is a simulated duty cycle consisting of just two rates; the one minute rate published for the battery or the largest current load of the duty cycle, followed by the test rate employed for the performance test, both of which envelope the duty cycle of the service test. Since the ampere-hours removed by a rated one minute discharge represents a very small portion of the battery capacity, the test rate can be changed to that for the performance test without compromising the results of the performance discharge test. The battery terminal voltage for the modified performance discharge test should remain above the minimum battery terminal voltage specified in the battery service test for the duration of time equal to that of the service test.

A modified discharge test is a test of the battery capacity and its ability to provide a high rate, short duration load (usually the highest rate of the duty cycle). This will often confirm the battery's ability to meet the critical period of the load duty cycle, in addition to determining its percentage of rated capacity. Initial conditions for the modified performance discharge test should be identical to those specified for a service test.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.4

A battery performance discharge test is a test of constant current capacity of a battery, normally done in the as found condition, after having been in service, to detect any change in the capacity determined by the acceptance test. The test is intended to determine overall battery degradation due to age and usage.

A battery modified performance discharge test is described in the Bases for SR 3.8.4.3. Either the battery performance discharge test or the modified performance discharge test is acceptable for satisfying SR 3.8.4.4; however, only the modified performance discharge test may be used to satisfy SR 3.8.4.4 while satisfying the requirements of SR 3.8.4.3 at the same time.

The acceptance criteria for this Surveillance is consistent with IEEE-450 (Ref. 7) and IEEE-485 (Ref. 10). These references recommend that the battery be replaced if its capacity is below 80% of the manufacturer's rating. A capacity of 80% shows that the battery rate of deterioration is increasing, even if there is ample capacity to meet the load requirements.

The Frequency for this test is normally 60 months. If the battery shows degradation, or if the battery has reached 85% of its expected life and capacity is < 100% of the manufacturer's rating, the Surveillance Frequency is reduced to 12 months. However, if the battery shows no degradation but has reached 85% of its expected life, the Surveillance Frequency is only reduced to 24 months for batteries that retain capacity ≥ 100% of the manufacturer's rating. Degradation is indicated, according to IEEE-450 (Ref. 7), when the battery capacity drops by more than 10% relative to its capacity on the previous performance test or when it is 10% below the manufacturer's rating. All these Frequencies are consistent with the recommendations in IEEE-450 (Ref. 7).

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.

2. Regulatory Guide 1.6.

(continued)

BASES

REFERENCES (continued)

3. IEEE Standard 308.

4. FSAR, Sections 8.5 and 8.6.

5. FSAR, Chapters 6 and 14.

6. Regulatory Guide 1.93.

7. IEEE Standard 450-1995.

8. Regulatory Guide 1.32, February 1977.

9. Regulatory Guide 1.129, December 1974.

10. IEEE Standard 485, 1983.

11. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.5 DC Sources—Shutdown

BASES

BACKGROUND

A description of the DC sources is provided in the Bases for LCO 3.8.4, "DC Sources—Operating."

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident and transient analyses in the FSAR, Chapter 6 (Ref. 1) and Chapter 14 (Ref. 2), assume that Engineered Safety Feature systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the diesel generators (DGs), emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum DC electrical power sources during MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment ensures that:

a. The facility can be maintained in the shutdown or refueling condition for extended periods;

b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and

c. Adequate DC electrical power is provided to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident.

The DC sources satisfy Criterion 3 of the NRC Policy Statement (Ref. 3).

(continued)

BASES (continued)

LCO

The DC Electrical Power Systems – with: 1) each Unit DC subsystem, supporting Unit battery boards required OPERABLE by LCO 3.8.8, consisting of one 250 V battery, one battery charger, and the corresponding control equipment and interconnecting cabling supplying power to the associated Unit battery board; 2) each shutdown board DC subsystem, supporting DC shutdown boards required OPERABLE by LCO 3.8.8, consisting of one 250 V battery, its associated charger, and the corresponding control equipment and interconnecting cabling supplying power to the associated DC shutdown board; and 3) each DG DC subsystem supporting DGs required OPERABLE for 4.16 kV shutdown boards required OPERABLE by LCO 3.8.8, consisting of one 125 V battery, one battery charger, and the corresponding control equipment and interconnecting cabling. This requirement ensures the availability of sufficient DC electrical power sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents and inadvertent reactor vessel draindown).

APPLICABILITY

The DC electrical power sources required to be OPERABLE in MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment provide assurance that:

a. Required features to provide adequate coolant inventory makeup are available for the irradiated fuel assemblies in the core in case of an inadvertent draindown of the reactor vessel;

b. Required features needed to mitigate a fuel handling accident are available;

c. Required features necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

(continued)

BASES

APPLICABILITY (continued)

The DC electrical power requirements for MODES 1, 2, and 3 are covered in LCO 3.8.4.

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

If more than one DC distribution subsystem is required according to LCO 3.8.8, the DC subsystems remaining OPERABLE with one or more DC power sources inoperable may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for draining the reactor vessel. By allowance of the option to declare required features inoperable with associated DC power sources inoperable, appropriate restrictions are implemented in accordance with the affected system LCOs' ACTIONS. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and any activities that could result in inadvertent draining of the reactor vessel).

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required DC electrical power subsystems and to continue this action until restoration is accomplished in order to provide the necessary DC electrical power to the plant safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required DC electrical power subsystems should be completed as quickly as possible in order to minimize the time during which the plant safety systems may be without sufficient power.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.5.1

SR 3.8.5.1 requires performance of all Surveillances required by SR 3.8.4.1 through SR 3.8.4.5. Therefore, see the corresponding Bases for LCO 3.8.4 for a discussion of each SR.

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE DC sources from being discharged below their capability to provide the required power supply or otherwise rendering them inoperable during the performance of SRs. It is the intent that these SRs must still be capable of being met, but actual performance is not required unless required to support an operating unit per Section 3.8.4.

REFERENCES

1. FSAR, Chapter 6.

2. FSAR, Chapter 14.

3. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.6 Battery Cell Parameters

BASES

BACKGROUND

This LCO delineates the limits on electrolyte temperature, level, float voltage, and specific gravity for the DC electrical power subsystems batteries. At BFN, these batteries were designed to IEEE-279 Standards (Ref. 4). However, the batteries have been analyzed and meet IEEE-450 Standards (Ref. 3). A discussion of these batteries and their OPERABILITY requirements is provided in the Bases for LCO 3.8.4, "DC Sources— Operating," and LCO 3.8.5, "DC Sources—Shutdown."

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in FSAR, Chapter 6 (Ref. 1) and Chapter 14 (Ref. 2), assume Engineered Safety Feature systems are OPERABLE. The DC electrical power subsystems provide normal and emergency DC electrical power for the diesel generators (DGs), emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining at least one division of DC sources OPERABLE during accident conditions, in the event of:

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

b. A postulated worst case single failure.

Since battery cell parameters support the operation of the DC electrical power subsystems, they satisfy Criterion 3 of the NRC Policy Statement (Ref. 5).

LCO

Battery cell parameters must remain within acceptable limits to ensure availability of the required DC power to shut down the reactor and maintain it in a safe condition after an

(continued)

BASES

LCO (continued)

anticipated operational occurrence or a postulated DBA. Electrolyte limits are conservatively established, allowing continued DC electrical system function even with Category A and B limits not met.

APPLICABILITY

The battery cell parameters are required solely for the support of the associated DC electrical power subsystem. Therefore, battery electrolyte is only required when the DC power source is required to be OPERABLE. Refer to the Applicability discussions in Bases for LCO 3.8.4 and LCO 3.8.5.

ACTIONS

A Note has been added providing that, for this LCO, separate Condition entry is allowed for each battery. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable battery. Complying with the Required Actions for battery cell parameters allows for restoration and continued operation, and subsequent out of limit battery cell parameters may be governed by separate Condition entry and application of associated Required Action.

A.1, A.2, and A.3

With parameters of one or more cells in one or more batteries not within limits (i.e., Category A limits not met or Category B limits not met, or Category A and B limits not met) but within the Category C limits specified in Table 3.8.6-1, the battery is degraded but there is still sufficient capacity to perform the intended function. Therefore, the affected battery is not required to be considered inoperable solely as a result of Category A or B limits not met, and continued operation is permitted for a limited period.

The pilot cell electrolyte level and float voltage are required to be verified to meet the Category C limits within 1 hour (Required Action A.1). This check provides a quick indication of the status of the remainder of the battery

(continued)

BASES

ACTIONS

A.1, A.2, and A.3 (continued)

cells. One hour provides time to inspect the electrolyte level and to confirm the float voltage of the pilot cells. One hour is considered a reasonable amount of time to perform the required verification.

Verification that the Category C limits are met (Required Action A.2) provides assurance that during the time needed to restore the parameters to the Category A and B limits, the battery is still capable of performing its intended function. A period of 24 hours is allowed to complete the initial verification because specific gravity measurements must be obtained for each connected cell. Taking into consideration both the time required to perform the required verification and the assurance that the battery cell parameters are not severely degraded, this time is considered reasonable. The verification is repeated at 7 day intervals until the parameters are restored to Category A and B limits. This periodic verification is consistent with the normal Frequency of pilot cell Surveillances.

Continued operation is only permitted for 31 days before battery cell parameters must be restored to within Category A and B limits. Taking into consideration that, while battery capacity is degraded, sufficient capacity exists to perform the intended function and to allow time to fully restore the battery cell parameters to normal limits, this time is acceptable for operation prior to declaring the associated DC battery inoperable.

B.1

When any battery parameter is outside the Category C limit for any connected cell, sufficient capacity to supply the maximum expected load requirement is not ensured and the corresponding DC electrical power subsystem must be declared inoperable. Additionally, other potentially extreme conditions, such as not completing the Required Actions of Condition A within the required Completion Time or average electrolyte temperature of representative cells falling below 60°F for each Unit and Shutdown Board battery (except Shutdown Board battery 3EB) and 40°F for Shutdown Board battery 3EB and each DG battery, also are cause for

(continued)

BASES

ACTIONS

B.1 (continued)

immediately declaring the associated DC electrical power subsystem inoperable.

SURVEILLANCE REQUIREMENTS

SR 3.8.6.1

This SR verifies that Category A battery cell parameters are consistent with IEEE-450 (Ref. 3), which recommends regular battery inspections (at least one per month) including voltage, specific gravity, and electrolyte temperature of pilot cells.

SR 3.8.6.2

The 92 day inspection of specific gravity and voltage is consistent with IEEE-450 (Ref. 3).

SR 3.8.6.3

This Surveillance verification that the average temperature of representative cells is within limits is consistent with a recommendation of IEEE-450 (Ref. 3) that states that the temperature of electrolytes in representative (10 percent of) cells should be determined on a quarterly basis.

Lower than normal temperatures act to inhibit or reduce battery capacity. This SR ensures that the operating temperatures remain within an acceptable operating range. This limit is based on manufacturer's recommendations.

Table 3.8.6-1

This table delineates the limits on electrolyte level, float voltage, and specific gravity for three different categories. The meaning of each category is discussed below.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

Table 3.8.6-1 (continued)

Category A defines the normal parameter limit for each designed pilot cell in each battery. The cells selected as pilot cells are those whose temperature, voltage, and electrolyte specific gravity approximate the state of charge of the entire battery.

The Category A limits specified for electrolyte level are based on manufacturer's recommendations and are consistent with the guidance in IEEE-450 (Ref. 3), with the extra ¼ inch allowance above the high water level indication for operating margin to account for temperature and charge effects. In addition to this allowance, footnote a to Table 3.8.6-1 permits the electrolyte level to be above the specified maximum level during equalizing charge, provided it is not overflowing. These limits ensure that the plates suffer no physical damage, and that adequate electron transfer capability is maintained in the event of transient conditions. IEEE-450 (Ref. 3) recommends that electrolyte level readings should be made only after the battery has been at float charge for at least 72 hours.

The Category A limit specified for float voltage is ≥ 2.13 V per cell. This value is based on the recommendation of IEEE-450 (Ref. 3), which states that prolonged operation of cells below 2.13 V can reduce the life expectancy of cells. The Category A limit specified for specific gravity for each pilot cell is ≥ 1.200 (0.015 below the manufacturer's fully charged nominal specific gravity or a battery charging current that had stabilized at a low value). This value is characteristic of a charged cell with adequate capacity. According to IEEE-450 (Ref. 3), the specific gravity readings are based on a temperature of 77°F (25°C).

The specific gravity readings are corrected for actual electrolyte temperature. For each 3°F (1.67°C) above 77°F (25°C), 1 point (0.001) is added to the reading; 1 point is subtracted for each 3°F below 77°F. The specific gravity of the electrolyte in a cell increases with a loss of water due to electrolysis or evaporation.

Category B defines the normal parameter limits for each connected cell. The term "connected cell" excludes any battery cell that may be jumpered out.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

Table 3.8.6-1 (continued)

The Category B limits specified for electrolyte level and float voltage are the same as those specified for Category A and have been discussed above. The Category B limit specified for specific gravity for each connected cell is ≥ 1.195 (0.020 below the manufacturer's fully charged, nominal specific gravity) with the average of all connected cells 1.205 (0.010 below the manufacturer's fully charged, nominal specific gravity). These values are based on manufacturer's recommendations. The minimum specific gravity value required for each cell ensures that the effects of a highly charged or newly installed cell do not mask overall degradation of the battery.

Category C defines the limits for each connected cell. These values, although reduced, provide assurance that sufficient capacity exists to perform the intended function and maintain a margin of safety. When any battery parameter is outside the Category C limits, the assurance of sufficient capacity described above no longer exists, and the battery must be declared inoperable.

The Category C limit specified for electrolyte level (above the top of the plates and not overflowing) ensures that the plates suffer no physical damage and maintain adequate electron transfer capability. The Category C Allowable Value for voltage is based on IEEE-450 (Ref. 3), which states that a cell voltage of 2.07 V or below, under float conditions and not caused by elevated temperature of the cell, indicates internal cell problems and may require cell replacement.

The Category C limit on average specific gravity ≥ 1.195, is based on manufacturer's recommendations (0.020 below the manufacturer's recommended fully charged, nominal specific gravity). In addition to that limit, it is required that the specific gravity for each connected cell must be no less than 0.020 below the average of all connected cells. This limit ensures that the effect of a highly charged or new cell does not mask overall degradation of the battery.

The footnotes to Table 3.8.6-1 that apply to specific gravity are applicable to Category A, B, and C specific

(continued)

BASES

SURVEILLANCE REQUIREMENTS

Table 3.8.6-1 (continued)

gravity. Footnote (b) of Table 3.8.6-1 requires the above mentioned correction for electrolyte temperature.

Because of specific gravity gradients that are produced during the recharging process, delays of several days may occur while waiting for the specific gravity to stabilize. A stabilized charger current is an acceptable alternative to specific gravity measurement for determining the state of charge of the designated pilot cell. This phenomenon is discussed in IEEE-450 (Ref. 3). Footnote (c) to Table 3.8.6-1 allows the float charge current to be used as an alternate to specific gravity for up to 7 days following a battery recharge. Within 7 days, each connected cell's specific gravity must be measured to confirm the state of charge. Following a minor battery recharge (such as equalizing charge that does not follow a deep discharge) specific gravity gradients are not significant, and confirming measurements may be made in less than 7 days. Footnote (d) to Table 3.8.6-1 allows alternate values recommended by the manufacturer to be used for specific gravity as appropriate (Ref. 6). For the DG and Shutdown batteries, up to 10 cells for each DG battery and up to 20 cells for each Shutdown battery can have specific gravities of 1.180 to 1.200 provided the demonstrated battery capacity at the last discharge test is ≥ 81.2 percent. For the Unit batteries, up to 12 cells for each battery can have specific gravities of 1.180 to 1.200 provided the demonstrated battery capacity at the last discharge test is ≥ 80.7 percent.

REFERENCES

1. FSAR, Chapter 6.
2. FSAR, Chapter 14.
3. IEEE Standard 450, 1987.
4. IEEE Standard 279.
5. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.
6. Vendor Technical Manual for C&D Standby Batteries and Battery Chargers (BFN-VTM-C173-0010)

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.7 Distribution Systems—Operating

BASES

BACKGROUND

The onsite Class 1E AC and DC electrical power distribution system is divided into redundant and independent AC and DC electrical power distribution subsystems.

The primary AC distribution system consists of four Unit 1 and 2 4.16 kV shutdown boards each having an offsite source of power as well as a dedicated onsite diesel generator (DG) source. Each 4.16 kV shutdown board is normally connected to a unit station service transformer (USST) (1B or 2B) via a 4.16 kV unit board and a shutdown bus (1 or 2). If no offsite source is available, the onsite emergency DGs supply power to the 4.16 kV shutdown boards. A shutdown board must be fed through its normal feeder to have a qualified offsite source. The alternate feeder trips on CAS A/CAS B logic initiation.

The secondary plant distribution system includes 480 VAC shutdown boards and associated load centers, and transformers.

There are three Unit DC and five Shutdown Board 250 V DC electrical power distribution subsystems and one 125 V DC DG electrical power distribution subsystem for each DG that support the necessary power for Unit 1 and 2 ESF functions.

The list of all distribution boards is presented in Table B 3.8.7-1.

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter 6 (Ref. 1) and Chapter 14 (Ref. 2), assume ESF systems are OPERABLE. The AC and DC electrical power distribution systems are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.5, Emergency Core

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

Cooling System (ECCS) and Reactor Core Isolation Cooling (RCIC) System; and Section 3.6 Containment Systems.

The OPERABILITY of the AC and DC electrical power distribution subsystems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining distribution systems OPERABLE during accident conditions in the event of:

a. An assumed loss of all offsite power or all onsite AC electrical power sources; and

b. A postulated worst case single failure.

The AC and DC electrical power distribution system satisfies Criterion 3 of the NRC Policy Statement (Ref. 4).

LCO

The required electrical power distribution subsystems listed in Table B 3.8.7-1 ensure the availability of AC and DC electrical power for the systems required to shut down the reactor and maintain it in a safe condition after an abnormal operational transient or a postulated DBA. The AC and DC electrical power distribution subsystems are required to be OPERABLE.

Maintaining the AC and DC electrical power distribution subsystems OPERABLE ensures that the redundancy incorporated into the design of ESF is not defeated. Therefore, a single failure within any system or within the electrical power distribution subsystems will not prevent safe shutdown of the reactor.

The AC electrical power distribution subsystems require the associated buses and electrical circuits to be energized to their proper voltages. In addition, for the D or E RMOV Boards to be OPERABLE, they must be able to auto-transfer on loss of voltage. This feature ensures that the failure of one Diesel Generator will not result in the loss of an RHR subsystem. OPERABLE DC electrical power distribution subsystems require the associated buses to be energized to their proper voltage from either the associated battery or charger.

(continued)

BASES

LCO (continued)

The Unit 2 480 V RMOV boards 2A, 2B, and 2C are not specifically listed in Table B 3.8.7-1. Should one of these boards become inoperable due to a failure not affecting the operability of a board listed in Table B 3.8.7-1, the individual loads on the board would be considered inoperable and the appropriate conditions and required actions of the LCOs governing the individual loads would be entered. If however, one or more of the 2A, 2B, or 2C RMOV boards are inoperable due to a failure also affecting the operability of 2A or 2B 480 V shutdown board; the conditions and required actions are not required to be entered since LCO 3.0.6 allows this exception, and the required actions for the inoperable 480 V shutdown board are sufficient. In addition, the alternate supply breakers to 480 V RMOV boards 2A, 2B, and 2C must be open. This prevents a single malfunction causing a failure of a redundant subsystem and a loss of safety function. If any alternate breakers for the 2A, 2B, or 2C 480 V RMOV boards are closed, the affected systems/components which are not powered from its normal source are inoperable.

The 480 V shutdown boards and diesel auxiliary boards can be placed on their alternate feeder breakers and considered OPERABLE as long as the restrictions on the associated drawings are met. In addition, tie breakers between redundant safety related DC power distribution subsystems, if they exist, must be open. This prevents any electrical malfunction in any DC power distribution subsystem from propagating to the redundant subsystem, which could cause the failure of a redundant DC subsystem and a loss of essential safety function(s). If any DC tie breakers are closed, the affected redundant DC electrical power distribution subsystems are considered inoperable. This applies to the onsite, safety related, redundant DC electrical power distribution subsystems.

The Unit DC Boards are sized to accommodate alternate loads normally supplied by the Shutdown DC Distribution Panels with no effect on OPERABILITY.

APPLICABILITY

The electrical power distribution subsystems are required to be OPERABLE in MODES 1, 2, and 3 to ensure that:

(continued)

BASES

APPLICABILITY (continued)

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of abnormal operational transients; and

b. Adequate core cooling is provided, and containment OPERABILITY and other vital functions are maintained in the event of a postulated DBA.

Electrical power distribution subsystem requirements for MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment are covered in the Bases for LCO 3.8.8, "Distribution Systems – Shutdown."

ACTIONS

A.1

With one Unit 1 and 2 4.16 kV shutdown board inoperable, the remaining Unit 1 and 2 4.16 kV shutdown boards are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming a single failure. The overall reliability is reduced, however, because another single failure in the remaining three 4.16 kV shutdown boards could result in the minimum required ESF functions not being supported. Therefore, the 4.16 kV shutdown board must be restored to OPERABLE status within 5 days.

The Condition A postulated worst scenario is one 4.16 kV shutdown board without AC power (i.e., no offsite power to the 4.16 kV shutdown board and the associated DG inoperable). In this condition, ESF capabilities are not at their maximum, however, they remain adequate. The four 4.16 kV shutdown boards have ESF loads for Units 1 and 2 distributed among them so that an additional single failure will not result in a loss of safety function (e.g., one RHR pump for Unit 1 and one for Unit 2 on each board). Therefore, loss of two shutdown boards still leaves two RHR pumps per Unit. The 5 day time limit before requiring a unit shutdown in this Condition is acceptable because:

a. The remaining 4.16 kV shutdown boards have AC power available.

(continued)

BASES

ACTIONS

A.1 (continued)

b. The potential for an event in conjunction with a single failure of a redundant component in the 4.16 kV shutdown board with AC power. (The redundant component is verified OPERABLE in accordance with Specification 5.5.11, "Safety Function Determination Program (SFDP).")

The second Completion Time for Required Action A.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition A is entered while, for instance, a Unit DC board is inoperable and subsequently returned OPERABLE, this LCO may already have been not met for up to 7 days. This situation could lead to a total duration of 12 days, since initial failure of the LCO, to restore the 4.16 kV shutdown board. At this time a Unit DC board could again become inoperable, and the 4.16 kV shutdown board could be restored OPERABLE. This could continue indefinitely.

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

Pursuant to LCO 3.0.6, the Distribution System Actions B, C, D, or G would not be entered even if the 4.16 kV shutdown board was inoperable, resulting in de-energization of a 480 V board. Therefore, the Required Actions of Condition A are modified by a Note to indicate that when Condition A is entered with no power source to a required 480 V board, Actions B, C, D, or G must be immediately entered. This allows Condition A to provide requirements for the loss of the 4.16 kV shutdown board without regard to whether a 480 V shutdown board is de-energized. Actions B, C, D, or G provide the appropriate restrictions for a de-energized 480 V board.

(continued)

BASES

ACTIONS (continued)

A.2

With a shutdown board inoperable, the associated DG would have no power distribution mechanism and would hence also be inoperable. Required actions for an inoperable DG are included in LCO 3.8.1.

B.1

With one Unit 2 480 V shutdown board inoperable, the remaining 480 V shutdown board is capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition assuming no single failure. The overall reliability is reduced because a single failure in the remaining 480 V shutdown board could result in the minimum required ESF functions not being supported. Therefore, the inoperable 480 V shutdown board must be restored to OPERABLE status within 8 hours.

The Condition B postulated worst case scenario is one division (480 V shutdown board) without AC power (i.e., no offsite power to the division and the associated DG inoperable). In this condition, the unit is more vulnerable to a complete loss of AC power. It is, therefore, imperative that the unit operators' attention be focused on minimizing the potential for loss of power to the remaining division by stabilizing the unit, and on restoring power to the affected division. The 8 hour time period before requiring a unit shutdown is acceptable because:

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

b. The potential for an event in conjunction with a single failure of a redundant component in the division with AC power is minimal. (The redundant component is verified OPERABLE in accordance with Specification 5.5.11, "Safety Function Determination Program (SFDP).")

(continued)

BASES

ACTIONS

B.1 (continued)

The second Completion Time (12 days) for Required Action B.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable in any single contiguous occurrence of failing to meet the LCO. If Condition B is entered while, for instance, a 4.16 kV shutdown board is inoperable and subsequently restored OPERABLE, the LCO may already have been not met for up to 5 days. This situation could lead to a total duration of 5 days and 8 hours, since initial failure of the LCO, to restore the 480 V shutdown board. At this time, a 4.16 kV shutdown board could again become inoperable, and the 480 V shutdown board could be restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This allowance results in establishing the "time zero" at the time the LCO was initially not met, instead of at the time Condition B was entered. The 12 day Completion Time is an acceptable limitation on this potential of failing to meet the LCO indefinitely.

Pursuant to LCO 3.0.6, the Distribution System Action C would not be entered even if the 480 V shutdown board was inoperable, resulting in de-energization of a 480 V RMOV board. Therefore, the Required Actions of Condition B are modified by a Note to indicate that when Condition B is entered with no power source to a required 480 V RMOV board, Action C must be immediately entered. This allows Condition B to provide requirements for the loss of the 480 V shutdown board without regard to whether a 480 V RMOV board is de-energized. Action C provides the appropriate restrictions for a de-energized 480 V RMOV board.

C.1

With 480 V RMOV Board D or E inoperable the respective RHR subsystem supported by each affected board is inoperable for LPCI. The overall reliability is reduced because of the loss of one LPCI/RHR subsystem. In this condition, the remaining OPERABLE ECCS subsystems provide adequate core cooling during a LOCA. However, overall ECCS reliability is

(continued)

BASES

ACTIONS

C.1 (continued)

reduced, because a single failure in one of the remaining OPERABLE subsystems, concurrent with a LOCA may result in the ECCS not being able to perform its intended safety function. Therefore, the associated RHR subsystem must be declared inoperable immediately, and the actions in the appropriate system specification taken.

D.1

With one Units 1 and 2 480 V diesel auxiliary board inoperable, the remaining 480 V diesel auxiliary board is capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition assuming no single failure. The overall reliability is reduced because a single failure in the remaining 480 V diesel auxiliary board could result in the minimum required ESF functions not being supported. Therefore, the 480 V diesel auxiliary board must be restored to OPERABLE status within 5 days.

The Condition D postulated worst scenario is one 480 V diesel auxiliary board without AC power (i.e., no offsite power to the diesel auxiliary board). In this Condition, the Unit 1 and 2 DGs and SGT trains A and B are more vulnerable to a complete loss of AC power. These boards are normally fed from Shutdown Boards A and D. However, both of these boards have an alternate source of power coming from 4.16 kV shutdown board B. Thus, each auxiliary board has access to two DGs. Therefore, the 5 day time limit before requiring a unit shutdown in this Condition is acceptable because:

a. The remaining diesel auxiliary board has an alternate source of AC power in addition to the normal source and their dedicated DG.

b. The potential for an event in conjunction with a single failure of a redundant component in the 480 V diesel auxiliary board with AC power is minimal. (The redundant component is verified OPERABLE in accordance with Specification 5.5.11, "Safety Function Determination Program (SFDP).")

(continued)

BASES

ACTIONS

D.1 (continued)

The second Completion Time (12 days) for Required Action D.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable in any single contiguous occurrence of failing to meet the LCO. If Condition D is entered while, for instance, a 4.16 kV shutdown board is inoperable and subsequently restored OPERABLE, the LCO may already have been not met for up to 5 days. This situation could lead to a total duration of 10 days, since initial failure of the LCO, to restore the 480 V DG auxiliary board. At this time, a 4.16 kV shutdown board could again become inoperable, and the 480 V DG auxiliary board could be restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This allowance results in establishing the "time zero" at the time the LCO was initially not met, instead of at the time Condition D was entered. The 12 day Completion Time is an acceptable limitation on this potential of failing to meet the LCO indefinitely.

E.1

With one Unit DC board or one Unit 1 and 2 Shutdown Board DC Distribution Panel inoperable, the remaining boards are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining boards could result in the minimum required ESF functions not being supported. Therefore, the required Unit DC board or Unit 1 and 2 Shutdown Board DC Distribution Panel must be restored to OPERABLE status within 7 days by powering it from the associated battery or charger.

Condition E represents one Unit DC board or one Unit 1 and 2 Shutdown Board DC Distribution Panel without adequate DC power, potentially with both the battery significantly degraded and the associated charger nonfunctioning. In this situation the plant is significantly more vulnerable to a partial loss of DC power. However, the three Unit DC boards

(continued)

BASES

ACTIONS

E.1 (continued)

have ESF loads for the three BFN units distributed among them so that redundant subsystems on each unit have separate normal and alternate power supplies. The 7 day Completion Time is partially based on this and reflects a reasonable time to assess unit status as a function of the inoperable Unit DC board or Unit 1 and 2 Shutdown Board DC Distribution Panel and, if not restored to OPERABLE status, to prepare to effect an orderly and safe shutdown.

The second Completion Time for Required Action E.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition E is entered while, for instance, a 4.16 kV shutdown board is inoperable and subsequently restored OPERABLE, the LCO may already have been not met for up to 5 days. This situation could lead to a total duration of 12 days, since initial failure of the LCO, to restore the Unit DC board or the Shutdown Board DC Distribution Panel. At this time, a 4.16 kV shutdown board could again become inoperable, and the Unit DC board or the Shutdown Board DC Distribution Panel could be restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This allowance results in establishing the "time zero" at the time the LCO was initially not met, instead of at the time Condition E was entered. The 12 day Completion Time is an acceptable limitation on this potential of failing to meet the LCO indefinitely.

F.1

With one division of 4.16 kV shutdown boards inoperable, the remaining division of shutdown boards is capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition assuming no single failure. The overall reliability is reduced because a single failure in the remaining 4.16 kV shutdown boards could result in the minimum required ESF functions not being supported.

(continued)

BASES

ACTIONS

F.1 (continued)

Therefore, one of the inoperable 4.16 kV shutdown boards must be restored to OPERABLE status within 8 hours.

The Condition F postulated worst case scenario is one division of 4.16 kV shutdown board without AC power (i.e., no offsite power to the division and the associated DGs inoperable). In this condition, the unit is more vulnerable to a complete loss of AC power. It is, therefore, imperative that the unit operators' attention be focused on minimizing the potential for loss of power to the remaining division by stabilizing the unit, and on restoring power to the affected division. The 8 hour time period before requiring a unit shutdown is acceptable because:

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

b. The potential for an event in conjunction with a single failure of a redundant component in the division with AC power is minimal. (The redundant component is verified OPERABLE in accordance with Specification 5.5.11, "Safety Function Determination Program (SFDP).")

The second Completion Time (12 days) for Required Action F.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable in any single contiguous occurrence of failing to meet the LCO. If Condition F is entered while, for instance, a 480 V DG auxiliary board is inoperable and subsequently restored OPERABLE, the LCO may already have been not met for up to 5 days. This situation could lead to a total duration of 5 days and 8 hours, since initial failure of the LCO, to restore the 480 V shutdown board. At this time, a 480 V DG auxiliary board could again become inoperable, and a 4.16 kV shutdown board could be restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock."

(continued)

BASES

ACTIONS

F.1 (continued)

This allowance results in establishing the "time zero" at the time the LCO was initially not met, instead of at the time Condition F was entered. The 12 day Completion Time is an acceptable limitation on this potential of failing to meet the LCO indefinitely.

Pursuant to LCO 3.0.6, the Distribution System Actions B, C, D, or G would not be entered even if the 4.16 kV shutdown boards were inoperable, resulting in de-energization of a 480 V board. Therefore, the Required Actions of Condition F are modified by a Note to indicate that when Condition F is entered with no AC source to the 4.16 kV shutdown boards, Actions B, C, D, or G must be immediately entered. This allows Condition F to provide requirement for the loss of the 4.16 kV shutdown boards without regard to whether 480 V board is de-energized, Actions B, C, D, or G provide the appropriate restrictions for a de-energized 480 V board.

G.1

Required Action G.1 is intended to provide assurance that a loss of one or more required Unit 1 or 3 AC or DC boards, does not result in a complete loss of safety function of critical systems (i.e., SGT or CREVS). With one or more of the required boards inoperable, the SGT or CREVS train supported by each affected board is inoperable. Therefore, the associated SGT or CREVS subsystem must be declared inoperable immediately, and the ACTIONS in the appropriate system Specification taken.

H.1 and H.2

If the inoperable distribution subsystem cannot be restored to OPERABLE status within the associated Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

(continued)

BASES

ACTIONS (continued)

I.1

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

SURVEILLANCE REQUIREMENTS

SR 3.8.7.1

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

REFERENCES

1. FSAR, Chapter 6.

2. FSAR, Chapter 14.

3. Regulatory Guide 1.93, December 1974.

4. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

Table B 3.8.7-1 (page 1 of 1)
AC and DC Electrical Power Distribution Systems

TYPE	VOLTAGE	ELECTRICAL POWER DISTRIBUTION SUBSYSTEMS
AC safety boards	4160 V	Shutdown Board A Shutdown Board B Shutdown Board C Shutdown Board D Shutdown Board 3EB or 3EC Shutdown Board 3ED
	480 V	Shutdown Board 1A Shutdown Board 2A Shutdown Board 2B Shutdown Board 3B RMOV Board 2D RMOV Board 2E SGT Board Diesel Auxiliary Board A Diesel Auxiliary Board B
DC boards	250 V	Unit DC Board 1 Unit DC Board 2 Unit DC Board 3 Shutdown Board DC Distribution Panel A Shutdown Board DC Distribution Panel B Shutdown Board DC Distribution Panel C Shutdown Board DC Distribution Panel D Shutdown Board DC Distribution Panel 3EB

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.8 Distribution Systems – Shutdown

BASES

BACKGROUND

A description of the AC and DC electrical power distribution system is provided in the Bases for LCO 3.8.7, "Distribution Systems – Operating."

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident and transient analyses in the FSAR, Chapter 6 (Ref. 1) and Chapter 14 (Ref. 2), assume Engineered Safety Feature (ESF) systems are OPERABLE. The AC and DC electrical power distribution systems are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System, and containment design limits are not exceeded.

The OPERABILITY of the AC and DC electrical power distribution system is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum AC and DC electrical power sources and associated power distribution subsystems during MODES 4 and 5, and during movement of irradiated fuel assemblies in the secondary containment ensures that:

a. The facility can be maintained in the shutdown or refueling condition for extended periods;

b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and

c. Adequate power is provided to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident.

The AC and DC electrical power distribution systems satisfy Criterion 3 of the NRC Policy Statement (Ref. 3).

(continued)

BASES (continued)

LCO

Various combinations of subsystems, equipment, and components are required OPERABLE by other LCOs, depending on the specific plant condition. Implicit in those requirements is the required OPERABILITY of necessary support required features. This LCO explicitly requires energization of the portions of the electrical distribution system necessary to support OPERABILITY of Technical Specifications required systems, equipment, and components – both specifically addressed by their own LCO, and implicitly required by the definition of OPERABILITY.

In addition, some components that may be required by Unit 2 receive power through the Unit 3 electrical power distribution subsystems (e.g., Standby Gas Treatment (SGT) System, and Control Room Emergency Ventilation System (CREVS)). Therefore, the Unit 3 AC and DC electrical power distribution subsystems needed to support the required equipment must also be OPERABLE.

For a unit in MODE 4 or 5, the AC and DC boards can be placed on their alternate feeder breakers and considered OPERABLE as long as the restrictions on the associated drawings are met.

Maintaining these portions of the distribution system energized ensures the availability of sufficient power to operate the plant in a safe manner to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents and inadvertent reactor vessel draindown).

APPLICABILITY

The AC and DC electrical power distribution subsystems required to be OPERABLE in MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment provide assurance that:

a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel in the core in case of an inadvertent draindown of the reactor vessel;

b. Systems needed to mitigate a fuel handling accident are available;

(continued)

BASES

APPLICABILITY (continued)

c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

The AC and DC electrical power distribution subsystem requirements for MODES 1, 2, and 3 are covered in LCO 3.8.7.

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, A.2.4, and A.2.5

Although redundant required features may require redundant divisions of electrical power distribution subsystems to be OPERABLE, one OPERABLE distribution subsystem division may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for draining the reactor vessel. By allowing the option to declare required features associated with an inoperable distribution subsystem inoperable, appropriate restrictions are implemented in accordance with the affected distribution subsystem LCO's Required Actions. In many instances this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made, (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies in the secondary containment, and any activities that could result in inadvertent draining of the reactor vessel).

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC and DC electrical power distribution subsystems and to continue this action until restoration is accomplished in order to provide the necessary power to the plant safety systems.

(continued)

BASES

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, A.2.4, and A.2.5 (continued)

Notwithstanding performance of the above conservative Required Actions, a required residual heat removal-shutdown cooling (RHR-SDC) subsystem may be inoperable. In this case, Required Actions A.2.1 through A.2.4 do not adequately address the concerns relating to coolant circulation and heat removal. Pursuant to LCO 3.0.6, the RHR-SDC ACTIONS would not be entered. Therefore, Required Action A.2.5 is provided to direct declaring RHR-SDC inoperable, which results in taking the appropriate RHR-SDC ACTIONS.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required distribution subsystems should be completed as quickly as possible in order to minimize the time the plant safety systems may be without power.

SURVEILLANCE REQUIREMENTS

SR 3.8.8.1

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

REFERENCES

1. FSAR, Chapter 6.

2. FSAR, Chapter 14.

3. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

BROWNS FERRY NUCLEAR PLANT - IMPROVED TECHNICAL SPECIFICATIONS
SECTION 3.8
LIST OF REVISED PAGES

UNIT 3 ITS BASES SECTIONS

Replaced page B 3.8-3 *R2 with page B 3.8-3 *R3
Replaced page B 3.8-4 *R2 with page B 3.8-4 *R3
Replaced page B 3.8-5 *R2 with page B 3.8-5 *R3
Replaced page B 3.8-8 *R2 with page B 3.8-8 *R3
Replaced pages B 3.8-20 through B 3.8-83 *R2 with pages B 3.8-20 through B 3.8-85 *R3

BASES

BACKGROUND (continued)

pressure, or low water level. After the DG has started, it automatically ties to its respective bus after offsite power is tripped as a consequence of 4.16 kV shutdown board undervoltage or degraded voltage, independent of or coincident with a LOCA signal. The DGs also start and operate in the standby mode without tying to the 4.16 kV shutdown board on a LOCA signal alone. Following the trip of offsite power, an under or degraded voltage activated load shed logic strips all loads from the 4.16 kV Shutdown Board except transformer feeds. When the DG is tied to the 4.16 kV shutdown board, large loads are then sequentially connected to its respective 4.16 kV shutdown board by individual pump timers. The individual pump timers control the permissive and starting signals to motor breakers to prevent overloading the DG.

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

Certain required plant loads are returned to service in a predetermined sequence in order to prevent overloading of the DGs in the process. Within 40 seconds after the initiating signal (DG breaker closure with accident signal) is received, all automatic and permanently connected loads needed to recover the unit or maintain it in a safe condition are returned to service.

Ratings for the DGs satisfy the intent of Safety Guide 9 (Ref. 3). The DGs have the following ratings (Non-derated for intake air temperature ≤ 90°F/Derated for either intake air temperature >90°F or a combination of intake air temperature >90°F and engine cooling water outlet temperature >190°F) (Reference 12):

a. 2600/2550 kW – continuous,

b. 2860/2800 kW – 0 to 2 hours (Short Time Steady State),

(continued)

BASES

BACKGROUND (continued)

c. 2850/2815 kW – 0 to 3 minutes (Cold Engine Instantaneous),

d. 3050/3025 kW – >3 minutes (Hot Engine Instantaneous).

APPLICABLE SAFETY ANALYSES

The initial conditions of DBA and transient analyses in the FSAR, Chapter 6 (Ref. 4) and Chapter 14 (Ref. 5), assume ESF systems are OPERABLE. The AC electrical power sources are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System (RCS), and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

The OPERABILITY of the AC electrical power sources is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining the onsite or offsite AC sources OPERABLE during accident conditions in the event of:

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

b. A postulated worst case single failure.

AC sources satisfy Criterion 3 of the NRC Policy Statement (Ref. 15).

LCO

Two qualified circuits between the offsite transmission network and the onsite Class 1E Distribution System, four separate and independent Unit 3 DGs (3A, 3B, 3C, and 3D), and the Unit 1 and 2 DG(s) needed to support required Standby Gas Treatment (SGT) trains and Control Room Emergency Ventilation System (CREVS) trains are required to be OPERABLE. Two divisions of 480 V load shed logic and two divisions of CAS logic are required to be OPERABLE to support Unit 3 DG OPERABILITY and post-accident loads. Unit 1 and 2 Technical Specifications will require the

(continued)

BASES

LCO (continued)

operability of all Unit 1 and 2 DGs and provide appropriate compensatory actions for inoperable Unit 1 and 2 DGs in support of Unit 1 and 2 operations. To support the operation of Unit 3, the Unit 3 LCO for AC Sources - Operating also requires the necessary Unit 1 and 2 DG(s) to support SGT and CREVS required by LCO 3.8.7, Distribution Systems - Operating, for supplying the Unit 1 and 2 4.16 kV shutdown boards. These requirements ensure availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an abnormal operational transient or a postulated DBA.

Qualified offsite circuits are those that are described in the FSAR, and are part of the licensing basis for the unit. Each offsite circuit must be capable of maintaining rated frequency and voltage, and accepting required loads during an accident, while connected to the 4.16 kV shutdown boards. An offsite circuit is considered OPERABLE if the offsite source is available to 3EA and 3EB or 3EC and 3ED 4.16 kV shutdown boards.

Each offsite circuit consists of incoming breakers to each 4.16 kV shutdown board from unit boards, which are fed from transformers (via start buses as appropriate). Specific circuits and limitations for considering the offsite circuit qualified are described below. Qualified circuits are one or more of the following:

1. From the 500 kV switchyard (with no credit for the two 500 kV Trinity lines), through unit station service transformer (USST) 3B to 4.16 kV unit board 3A and/or 3B. Each unit board feeds two of the Unit 3 4.16 kV shutdown boards (3EA and 3EB or 3EC and 3ED).

2. From the Trinity 161 kV transmission system, through common station service transformer (CSST) A or B to start bus 1A or 1B, then to a 4.16 kV unit board. That unit board feeds two of the Unit 3 4.16 kV shutdown boards (3EA and 3EB or 3EC and 3ED).

(continued)

BASES

LCO (continued)

shutdown boards is required to have the capability to be connected to at least one division of 4.16 kV shutdown boards to be considered OPERABLE.

The inability to supply qualified offsite power to an individual 4.16 kV shutdown board from a 4.16 kV shutdown bus constitutes the failure of only one offsite circuit as long as offsite power is available to the other division's shutdown boards. Thus, if one 4.16 kV shutdown board or complete division of shutdown boards (i.e., 3EA and 3EB or 3EC and 3ED) does not have a qualified offsite circuit available, then only one offsite circuit would be inoperable. If one or more shutdown boards in each division (i.e., 3EA or 3EB and 3EC or 3ED) or all four shutdown boards do not have a qualified offsite circuit available, then both (2) offsite circuits would be inoperable.

APPLICABILITY

The AC sources are required to be OPERABLE with Unit 3 in MODES 1, 2, and 3 to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of abnormal operational transients; and

b. Adequate core cooling is provided and containment OPERABILITY and other vital functions are maintained in the event of a postulated DBA.

The AC power requirements for Unit 3 in MODES 4 and 5 are covered in LCO 3.8.2, "AC Sources—Shutdown."

ACTIONS

A.1

To ensure a highly reliable power source remains with one required offsite circuit inoperable, it is necessary to verify the availability of the remaining required offsite circuit on a more frequent basis. This action ensures proper circuit continuity for the offsite AC electrical power supply to the onsite distribution network and

(continued)

BASES

ACTIONS (continued)

J.1

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

K.1

Required Action K.1 is intended to provide assurance that a loss of offsite power, during the period that a required Unit 1 and 2 DG is inoperable, does not result in a complete loss of safety function of critical systems (i.e., SGT or CREVS). These features consist of SGT or CREVS trains redundant to trains supported by the inoperable Unit 1 and 2 DG.

The Completion Time is intended to allow the operator time to evaluate and repair any discovered inoperabilities. This Completion Time also allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." In this Required Action the Completion Time only begins on discovery that both:

a. An inoperable required Unit 1 and 2 DG exists; and

b. An SGT or CREVS train supported by another DG, is inoperable.

If, at any time during the existence of this Condition (a required Unit 1 and 2 DG inoperable), a required SGT or CREVS train subsequently becomes inoperable, this Completion Time begins to be tracked.

Discovering a required Unit 1 and 2 DG inoperable coincident with an inoperable SGT or CREVS train, or both, that are associated with the OPERABLE DGs results in starting the Completion Time for the Required Action. Four hours from the discovery of these events existing concurrently is acceptable because it minimizes risk while allowing time for

(continued)

BASES

ACTIONS

K.1 (continued)

restoration before subjecting the unit to transients associated with shutdown.

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

K.2

In Condition K, the remaining OPERABLE DGs and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System to support operation of Unit 3. The 30 day Completion Time is commensurate with the importance of the affected system considering the low probability of a DBA in these conditions and the availability of the remaining power sources. If the inoperable Unit 1 and 2 DG cannot be restored to OPERABLE status within the associated Completion Time, the associated SGT or CREVS subsystem must be declared inoperable, and the ACTIONS in the appropriate system Specification taken.

SURVEILLANCE REQUIREMENTS

The AC sources are designed to permit inspection and testing of all important areas and features, especially those that have a standby function. Periodic component tests are supplemented by extensive functional tests (under simulated accident conditions). The SRs for demonstrating the OPERABILITY of the DGs meet the intent of Safety Guide 9 (Ref. 3), as addressed by References 13 and 14.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

Where the SRs discussed herein specify voltage and frequency tolerances, the following summary is applicable. The minimum steady state output voltage of 3740 V is 90% of the nominal 4160 V output voltage. This value, which is specified in ANSI C84.1 (Ref. 9), allows for voltage drop to the terminals of 4000 V motors whose minimum operating voltage is specified as 90% or 3600 V. It also allows for voltage drops to motors and other equipment down through the 120 V level where minimum operating voltage is also usually specified as 90% of name plate rating. The specified maximum steady state output voltage of 4580 V is equal to the maximum operating voltage specified for 4000 V motors. It ensures that for a lightly loaded distribution system, the voltage at the terminals of 4000 V motors is no more than the maximum rated operating voltages. The specified minimum and maximum frequencies of the DG are 58.8 Hz and 61.2 Hz, respectively. These values are equal to ± 2% of the 60 Hz nominal frequency and are derived from the recommendations found in Safety Guide 9 (Ref. 3).

SR 3.8.1.1 and SR 3.8.1.4

These SRs help to ensure the availability of the standby electrical power supply to mitigate DBAs and transients and maintain the unit in a safe shutdown condition.

To minimize the wear on moving parts that do not get lubricated when the engine is not running, these SRs have been modified by a Note to indicate that all DG starts for these surveillances may be preceded by an engine prelube period and followed by a warmup prior to loading.

For the purposes of this testing, the DGs are started from standby conditions. Standby conditions for a DG mean that the diesel engine coolant and oil are being continuously circulated and temperature is being maintained consistent with manufacturer recommendations.

In order to reduce stress and wear on diesel engines, a modified start may be utilized for SR 3.8.1.1 in which the starting speed of DGs is limited, engine warmup is allowed at this lower speed, and the DGs are gradually accelerated

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.1 and SR 3.8.1.4 (continued)

to synchronous speed prior to loading. These start procedures are the intent of the Note.

SR 3.8.1.4 requires that, at a 184 day Frequency, the DG starts from standby conditions and achieves required voltage and frequency within 10 seconds. The 10 second start requirement supports the assumptions in the design basis LOCA analysis of FSAR, Section 14.6.3 (Ref. 10). The 10 second start requirement is not applicable to SR 3.8.1.1 (see the Note for SR 3.8.1.1), when a modified start procedure as described above is used. If a modified start is not used, the 10 second start requirement of SR 3.8.1.4 applies.

Since SR 3.8.1.4 does require a 10 second start, it is more restrictive than SR 3.8.1.1, and it may be performed in lieu of SR 3.8.1.1. This procedure is the intent of Note 1 of SR 3.8.1.1.

The 31 day Frequency for SR 3.8.1.1 is consistent with Safety Guide 9 (Ref. 3). The 184 day Frequency for SR 3.8.1.4 is a reduction in cold testing consistent with Generic Letter 84-15 (Ref. 7). These Frequencies provide adequate assurance of DG OPERABILITY, while minimizing degradation resulting from testing.

SR 3.8.1.2

This Surveillance demonstrates that the DGs are capable of synchronizing and accepting greater than 90 percent of the continuous rating. A minimum run time of 60 minutes is required to stabilize engine temperatures, while minimizing the time that the DG is connected to the offsite source.

Although no power factor requirements are established by this SR, the DG is normally operated at a power factor between 0.8 lagging and 1.0.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.2 (continued)

The 31 day Frequency for this Surveillance is consistent with Safety Guide 9 (Ref. 3).

Note 1 modifies this Surveillance to indicate that diesel engine runs for this Surveillance may include gradual loading, as recommended by the manufacturer, so that mechanical stress and wear on the diesel engine are minimized.

Note 2 modifies this Surveillance by stating that momentary transients because of changing bus loads do not invalidate this test. Similarly, momentary power factor transients above the limit do not invalidate the test.

Note 3 indicates that this Surveillance should be conducted on only one DG at a time in order to avoid common cause failures that might result from offsite circuit or grid perturbations.

Note 4 stipulates a prerequisite requirement for performance of this SR. A successful DG start must precede this test to credit satisfactory performance.

SR 3.8.1.3

This Surveillance demonstrates that each required fuel oil transfer pump operates and transfers fuel oil from its associated 7-day storage tank to its associated engine fuel oil tank. It is required to support continuous operation of standby power sources. This Surveillance provides assurance that the fuel oil transfer pump is OPERABLE, the fuel oil piping system is intact, the fuel delivery piping is not obstructed, and the controls and control systems for automatic fuel transfer systems are OPERABLE.

The design of fuel transfer systems is such that pumps that transfer the fuel oil operate automatically in order to maintain an adequate volume of fuel oil in the engine tank during or following DG operation. A 31 day Frequency is appropriate, since proper operation of fuel transfer systems is an inherent part of DG OPERABILITY.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.4

See SR 3.8.1.1.

SR 3.8.1.5

Each DG is provided with an engine overspeed trip to prevent damage to the engine. Recovery from the transient caused by the loss of a large load could cause diesel engine overspeed, which, if excessive, might result in a trip of the engine. This Surveillance demonstrates the DG load response characteristics and capability to reject the largest single load without exceeding predetermined voltage and frequency and while maintaining a specified margin to the overspeed trip. The largest single load for each DG is a residual heat removal pump (2000 hp). This Surveillance may be accomplished by:

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

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

As required by IEEE-308 (Ref. 11), the load rejection test is acceptable if the increase in diesel speed does not exceed 75% of the difference between synchronous speed and the overspeed trip setpoint, or 15% above synchronous speed, whichever is lower. This represents 66.75 Hz, equivalent to 75% of the difference between nominal speed and the overspeed trip setpoint.

The voltage tolerances specified in this SR are based on the degraded voltage and overvoltage relay settings. The frequency tolerances specified in this SR are derived from Safety Guide 9 (Ref. 3) recommendations for response during load sequence intervals. The voltage and frequency specified are consistent with the design range of the equipment powered by the DG. SR 3.8.1.5.a corresponds to the maximum frequency excursion, while SR 3.8.1.5.b and 3.8.1.5.c are steady state voltage and frequency values to which the system must recover following load rejection. The

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.5 (continued)

18 month Frequency is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 8).

This SR is modified by a Note. In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, the Note requires that, if synchronized to offsite power, testing must be performed using a power factor ≤ 0.9. This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience.

SR 3.8.1.6

This Surveillance demonstrates that the DG automatically starts from the design basis actuation signal (LOCA signal). This test will also verify the start of the Unit 1 and 2 DGs aligned to the SGT and CREV Systems on an accident signal from Unit 3. In order to minimize the number of DGs involved in testing, demonstration of automatic starts of the Unit 1 and 2 DGs on an accident signal from Unit 3 may be performed in conjunction with testing to demonstrate automatic starts of the Unit 1 and 2 DGs on an accident signal from Unit 1 or 2. Operating experience has shown that these components usually pass the SR when performed at the 18 month Frequency. Therefore, the Frequency is acceptable from a reliability standpoint.

To minimize wear and tear on the DGs, this SR has been modified by a Note which permits DG starts to be preceded by an engine prelube period followed by a warmup period.

SR 3.8.1.7

Demonstration once per 18 months that the DGs can start and run continuously at full load capability for an interval of not less than 24 hours—22 hours of which is at a load equivalent to the continuous rating of the DG, and 2 hours of which is at a load equivalent to the 105 percent to 110 percent of the continuous duty rating of the DG. The DG starts for this Surveillance can be performed either from standby or hot conditions. The provisions for prelube and

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.7 (continued)

warmup, discussed in SR 3.8.1.1 and for gradual loading, discussed in SR 3.8.1.2, are applicable to this SR.

In order to ensure that the DG is tested under load conditions that are as close to design conditions as possible, testing must be performed using a power factor ≤ 0.9. This power factor is chosen to be representative of the actual design basis inductive loading that the DG could experience. A load band is provided to avoid routine overloading of the DG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY.

The 18 month Frequency is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 8).

This Surveillance has been modified by a Note that states that momentary transients due to changing bus loads do not invalidate this test. Similarly, momentary power factor transients above the limit do not invalidate the test.

SR 3.8.1.8

Under accident conditions (and loss of offsite power) loads are sequentially connected to the shutdown boards by automatic individual pump timers. The individual pump timers control the permissive and starting signals to motor breakers to prevent overloading of the DGs due to high motor starting currents. This SR is demonstrated by performance of SR 3.3.5.1.5 for the Core Spray and LPCI pump timers, SR 3.7.2.3 for the EECW pump timers, and SR 3.8.1.9.b for the 480 V load shed logic timers. The allowable values for these timers ensure that sufficient time exists for the DG to restore frequency and voltage prior to applying the next load and that safety analysis assumptions regarding ESF equipment time delays are not violated. Reference 2 provides a summary of the automatic loading of ESF shutdown boards.

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.9 (Ref. 8).

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.9

In the event of a DBA coincident with a loss of offsite power, the DGs are required to supply the necessary power to ESF systems so that the fuel, RCS, and containment design limits are not exceeded.

This Surveillance demonstrates the as designed operation of the standby power sources during a loss of offsite power actuation test signal in conjunction with an ECCS initiation signal. This test verifies all actions encountered from the loss of offsite power in conjunction with an ECCS initiation signal, including shedding of the nonessential loads and energization of the 4.16 kV shutdown boards and respective loads from the DG. It further demonstrates the capability of the DG to automatically achieve the required voltage and frequency within the specified time.

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

The Frequency of 18 months takes into consideration plant conditions required to perform the Surveillance and is intended to be consistent with an expected fuel cycle length of 18 months.

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

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.9 (continued)

being continuously circulated and temperature maintained consistent with manufacturer recommendations.

SR 3.8.1.10

This Surveillance is provided to direct that the appropriate Surveillances for the required Unit 1 and 2 DGs are governed by the Unit 1 and 2 Technical Specifications. Performance of the applicable Unit 1 and 2 Surveillances will satisfy any Unit 1 and 2 requirements, as well as this Unit 3 Surveillance requirement. The Frequency required by the applicable Unit 1 and 2 SR also governs performance of that SR for both Units.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.
2. FSAR, Chapter 8.
3. Safety Guide 9.
4. FSAR, Chapter 6.
5. FSAR, Chapter 14.
6. Regulatory Guide 1.93.
7. Generic Letter 84-15.
8. Regulatory Guide 1.9.
9. ANSI C84.1, 1982.
10. FSAR, Section 14.6.3.
11. IEEE Standard 308.
12. FSAR, Section 8.5, Table 8.5-6.
13. FSAR, Section 8.5.2.

(continued)

BASES

REFERENCES (continued)

14. TVA Design Criteria BFN-50-7082.

15. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.2 AC Sources—Shutdown

BASES

BACKGROUND

A description of the AC sources is provided in the Bases for LCO 3.8.1, "AC Sources—Operating."

APPLICABLE SAFETY ANALYSES

The OPERABILITY of the minimum AC sources during MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment ensures that:

a. The facility can be maintained in the shutdown or refueling condition for extended periods;

b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and

c. Adequate AC electrical power is provided to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident.

In general, when the unit is shut down the Technical Specifications requirements ensure that the unit has the capability to mitigate the consequences of postulated accidents. However, assuming a single failure and concurrent loss of all offsite or loss of all onsite power is not required. The rationale for this is based on the fact that many Design Basis Accidents (DBAs) that are analyzed in MODES 1, 2, and 3 have no specific analyses in MODES 4 and 5. Worst case bounding events are deemed not credible in MODES 4 and 5 because the energy contained within the reactor pressure boundary, reactor coolant temperature and pressure, and corresponding stresses result in the probabilities of occurrences significantly reduced or eliminated, and minimal consequences. These deviations from DBA analysis assumptions and design requirements during shutdown conditions are allowed by the LCO for required systems.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

During MODES 1, 2, and 3, various deviations from the analysis assumptions and design requirements are allowed within the ACTIONS. This allowance is in recognition that certain testing and maintenance activities must be conducted, provided an acceptable level of risk is not exceeded. During MODES 4 and 5, performance of a significant number of required testing and maintenance activities is also required. In MODES 4 and 5, the activities are generally planned and administratively controlled. Relaxations from typical MODES 1, 2, and 3 LCO requirements are acceptable during shutdown MODES, based on:

a. The fact that time in an outage is limited. This is a risk prudent goal as well as a utility economic consideration.

b. Requiring appropriate compensatory measures for certain conditions. These may include administrative controls, reliance on systems that do not necessarily meet typical design requirements applied to systems credited in operation MODE analyses, or both.

c. Prudent utility consideration of the risk associated with multiple activities that could affect multiple systems.

d. Maintaining, to the extent practical, the ability to perform required functions (even if not meeting MODES 1, 2, and 3 OPERABILITY requirements) with systems assumed to function during an event.

In the event of an accident during shutdown, this LCO ensures the capability of supporting systems necessary for avoiding immediate difficulty, assuming either a loss of all offsite power or a loss of all onsite (diesel generator (DG)) power.

The AC sources satisfy Criterion 3 of the NRC Policy Statement (Ref. 1).

LCO

One offsite circuit capable of supplying the onsite Class 1E power distribution subsystem(s) of LCO 3.8.8, "Distribution Systems—Shutdown," ensures that all required loads are

(continued)

BASES

LCO (continued)

powered from offsite power. Two Unit 3 DGs and Unit 1 and 2 DGs required to support OPERABLE SGT and CREV Systems OPERABLE, each associated with a Distribution System Engineered Safety Feature (ESF) 4.16 kV shutdown board required OPERABLE by LCO 3.8.8, ensures that a diverse LCO power source is available for providing electrical power support assuming a loss of the offsite circuit. Together, OPERABILITY of the required offsite circuit and DGs ensures the availability of sufficient AC sources to operate the plant in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents and reactor vessel draindown).

The qualified offsite circuit(s) must be capable of maintaining rated frequency and voltage while connected to their respective 4.16 kV shutdown boards, and of accepting required loads during an accident. Qualified offsite circuits are those that are described in the FSAR and are part of the licensing basis for the unit. An offsite circuit is considered OPERABLE if the offsite source is available to one or more required 4.16 kV shutdown boards, through its normal supply breaker.

The offsite circuit consists of incoming breakers from one 4.16 kV unit board to each 4.16 kV shutdown board required by LCO 3.8.8. Each unit board is fed from transformers, via start buses as appropriate. Specific circuits and limitations for considering the offsite circuit qualified are described below.

1. From the 500 kV switchyard (with no credit for the two 500 kV Trinity lines), through unit station service transformer (USST) 3B to 4.16 kV unit board 3A and/or 3B. Each unit board feeds two of the Unit 3 4.16 kV shutdown boards (3EA and 3EB or 3EC and 3ED).

2. From the Trinity 161 kV transmission system, through common station service transformer (CSST) A or B to start bus 1A or 1B, then to a 4.16 kV unit board. That unit board feeds two of the Unit 3 4.16 kV shutdown boards (3EA and 3EB or 3EC and 3ED).

(continued)

BASES

LCO (continued)

3. From the Athens 161 kV transmission system, through CSST A or B to start bus 1A or 1B, and then to a 4.16 kV unit board. That unit board feeds two of the Unit 3 4.16 kV shutdown boards (3EA and 3EB or 3EC and 3ED).

For the Athens 161 kV offsite power to be considered as one of the qualified offsite power supplies, the following restrictions must also be met:

a. The 161 kV capacitor bank must be available for the Athens 161 kV line.

b. Credit for offsite power from the Athens 161 kV line may be taken by only one unit at one time. However, more than one unit may be aligned to the Athens line without invalidating the offsite power supply for the unit claiming it.

For the Trinity 161 kV offsite power to be considered as one of the qualified offsite power supplies, the following restrictions must also be met:

a. For the Trinity 161 kV line to be considered as one of the qualified offsite power supplies by only one unit, either the 161 kV capacitor bank must be available or the Trinity Inter-Tie transformer must be in service with 161 kV line nominal voltage $\geq$ 165 kV.

b. The Trinity 161 kV line may be considered as one of the qualified offsite power supplies by two separate units at any one time, provided that both CSST A and B are available and either the 161 kV capacitor bank is

(continued)

BASES

LCO (continued)

available or the Athens line and Trinity Inter-Tie transformer are in service with 161 kV line nominal voltage ≥ 165 kV.

c. The Trinity 161 kV line may be considered as one of the qualified offsite power supplies by three separate units at any one time, provided that both CSST A and B are available and either the 161 kV capacitor bank is available or the Athens line and Trinity Inter-Tie transformer are in service with 161 kV line nominal voltage ≥ 165 kV.

The only requirements for the position of the 161 kV bus 1 and bus 2 cross-tie breakers (924 and 928) are those implied by the restrictions on claiming Athens and Trinity as offsite power supplies.

The required DGs must be capable of starting, accelerating to rated speed and voltage, connecting to respective 4.16 kV shutdown boards on detection of bus undervoltage, and accepting required loads. This sequence must be accomplished within 10 seconds. Each DG must also be capable of accepting required loads within the assumed loading sequence intervals, and must continue to operate until offsite power can be restored to the 4.16 kV shutdown boards.

Proper sequencing of loads, including tripping of nonessential loads, is a required function for DG OPERABILITY.

APPLICABILITY

The AC sources are required to be OPERABLE in MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment to provide assurance that:

a. Systems providing adequate coolant inventory makeup are available for the irradiated fuel assemblies in the core in case of an inadvertent draindown of the reactor vessel;

b. Systems needed to mitigate a fuel handling accident are available;

(continued)

BASES

APPLICABILITY (continued)

c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

AC power requirements for MODES 1, 2, and 3 are covered in LCO 3.8.1.

ACTIONS

A.1

With the required offsite circuit inoperable, the remaining AC sources available may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for draining the reactor vessel. By the allowance of the option to declare required features inoperable that are supported by the inoperable AC source, appropriate restrictions can be implemented in accordance with the affected required feature(s) LCOs' ACTIONS.

Pursuant to LCO 3.0.6, the Distribution System ACTIONS would not be entered even if all AC sources to it are inoperable, resulting in de-energization. Therefore, the Required Actions of Condition A have been modified by a Note to indicate that when Condition A is entered with no qualified AC power to any required 4.16 kV shutdown board, ACTIONS for LCO 3.8.8 must be immediately entered. This Note allows Condition A to provide requirements for the loss of the offsite circuit whether or not a 4.16 kV shutdown board is made inoperable. LCO 3.8.8 provides the appropriate restrictions for the situation involving an inoperable 4.16 kV shutdown board.

A.2.1, A.2.2, A.2.3, A.2.4, B.1.1, B.1.2, B.1.3, and B.1.4

With no offsite circuit available or one or more DGs inoperable, the option still exists to declare all required features inoperable. However, since this option may involve undesired administrative efforts, the allowance for

(continued)

BASES

ACTIONS

A.2.1, A.2.2, A.2.3, A.2.4, B.1.1, B.1.2, B.1.3, and B.1.4 (continued)

sufficiently conservative actions is made. It is, therefore, required to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies in the secondary containment, and activities that could result in inadvertent draining of the reactor vessel.

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC sources and to continue this action until restoration is accomplished in order to provide the necessary AC power to the plant safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required AC electrical power sources should be completed as quickly as possible in order to minimize the time during which the plant safety systems may be without sufficient power.

C.1

Required Action C.1 is intended to provide assurance that a loss of offsite power, during the period that a required Unit 1 and 2 DG is inoperable, does not result in a complete loss of safety function of critical systems (i.e., SGT or CREVS). These features consist of SGT or CREVS trains redundant to trains supported by the inoperable Unit 1 and 2 DG.

The 30 day completion time takes into account the operability of the redundant required features and their offsite and DG power availability. Additionally, the 30 day completion time takes into account the capacity and capability of the remaining AC sources, reasonable time for repairs, and low probability of an event occurring during this period. If the redundant required feature(s) is(are) not OPERABLE, the second completion time requires immediately declaring the required feature(s), supported by

(continued)

BASES

ACTIONS

C.1 (continued)

the inoperable AC source, inoperable. This results in taking the appropriate Actions in the supported system specification for the inoperable function.

SURVEILLANCE REQUIREMENTS

SR 3.8.2.1

SR 3.8.2.1 requires the SRs from LCO 3.8.1 that are necessary for ensuring the OPERABILITY of the Unit 3 AC sources in other than MODES 1, 2, and 3. Refer to the corresponding Bases for LCO 3.8.1 for a discussion of each SR.

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE DG(s) from being paralleled with the offsite power network or otherwise rendered inoperable during the performance of SRs, and to preclude deenergizing a required 4.16 kV shutdown board or disconnecting a required offsite circuit during performance of SRs. With limited AC sources available, a single event could compromise both the required circuit and the DG. It is the intent that these SRs must still be capable of being met, but actual performance is not required during periods when the DG and offsite circuit is required to be OPERABLE.

SR 3.8.2.2

This Surveillance is provided to direct that the appropriate Surveillances for the required Unit 1 and 2 DGs are governed by the Unit 1 and 2 Technical Specifications. Performance of the applicable Unit 1 and 2 Surveillances will satisfy any Unit 1 and 2 requirements, as well as satisfying this Unit 3 Surveillance requirement. The Frequency required by the applicable Unit 1 and 2 SR also governs performance of that SR for both Units.

(continued)

BASES (continued)

REFERENCES

1. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air

BASES

BACKGROUND

Each diesel generator (DG) is provided with three interconnected storage tanks having a minimum usable fuel oil volume (35,280 gallons) sufficient to operate that DG for a period of 7 days while the DG is supplying maximum post loss of coolant accident (LOCA) load demand discussed in FSAR, Section 8.5.3.4 (Ref. 1). A transfer pump is located at the fuel oil storage tanks which can supply fuel oil from two 71,000-gallon fuel oil storage tanks to the 7-day storage tanks. In addition, it is possible to transfer fuel from one 7-day storage tank to any other by using transfer pumps. This onsite fuel oil capacity is sufficient to operate the DGs for longer than the time to replenish the onsite supply from outside sources.

Fuel oil is transferred from the 7-day storage tank to the day tank by either of two transfer pumps associated with each diesel generator. This is accomplished automatically by level switches on the day tank. Redundancy of pumps and piping precludes the failure of one pump, or the rupture of any pipe, valve, or tank to result in the loss of more than one DG. All 7-day tanks are embedded in the substructure of the Standby Diesel Generator Building.

For proper operation of the standby DGs, it is necessary to ensure the proper quality of the fuel oil. The fuel oil property monitored is the total particulate concentration. Periodic testing of the stored fuel oil total particulate concentration is a method to monitor the potential degradation related to long term storage and the potential impact to fuel filter plugging as a result of high particulate levels.

The DG lubrication system is designed to provide sufficient lubrication to permit proper operation of its associated DG under all loading conditions. The system is required to circulate the lube oil to the diesel engine working surfaces and to remove excess heat generated by friction during operation. Each engine oil sump contains an inventory capable of supporting a minimum of 7 days of operation.

(continued)

BASES

BACKGROUND (continued)

The 175-gallon and 150-gallon capacities listed in Condition B are based upon the DG seven-day consumption and six-day consumption of lube oil, respectively. The total lube oil system capacity is 465 gallons, of which, 235 gallons are useable (i.e., 230 gallons are not useable). If the seven-day and six-day capacities are added to the non-useable capacity, a minimum value of lube oil capacity can be established for purposes of this LCO. Therefore, 405 gallons are required to ensure the seven-day requirement (i.e., 230 + 175); while, 380 gallons (i.e., 230 + 150) are required to ensure the six-day requirement. Note: actual lube oil consumption is 0.98 gal/hr or 23.52 gal/day - 25 gal/day was conservatively chosen to establish the seven-day and six-day requirements.

This supply is sufficient to allow the operator to replenish lube oil from outside sources.

Each DG has two fully redundant air start systems either of which is fully capable of starting the engine. Each air start system has adequate capacity for at least one start attempt on the DG without recharging of its air receivers. The air compressors may be cross-tied without affecting operability of either air start system. For DG operability, only one of the air start systems is required. The associated DG must be declared inoperable if both air start systems are inoperable.

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in FSAR, Chapter 6 (Ref. 3), and Chapter 14 (Ref. 4), assume Engineered Safety Feature (ESF) systems are OPERABLE. The DGs are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.5, Emergency Core Cooling System (ECCS) and Reactor Core Isolation Cooling (RCIC) System; and Section 3.6, Containment Systems.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

Since diesel fuel oil, lube oil, and starting air subsystems support the operation of the standby AC power sources, they satisfy Criterion 3 of the NRC Policy Statement (Ref. 5).

LCO

Stored diesel fuel oil is required to have sufficient supply for 7 days of full load operation. It is also required to meet specific standards for quality. Additionally, sufficient lube oil supply must be available to ensure the capability to operate at full load for 7 days. This requirement, in conjunction with an ability to obtain replacement supplies within 7 days, supports the availability of DGs required to shut down the reactor and to maintain it in a safe condition for an abnormal operational transient or a postulated DBA with loss of offsite power. DG day tank fuel oil requirements, as well as transfer capability from the 7-day storage tank to the day tank, are addressed in LCO 3.8.1, "AC Sources—Operating," and LCO 3.8.2, "AC Sources—Shutdown."

One of the two redundant starting air systems is required to have a minimum capacity for one DG start attempt without recharging the air start receivers. The associated DG must be declared inoperable if both air start systems are inoperable.

APPLICABILITY

The AC sources (LCO 3.8.1 and LCO 3.8.2) are required to ensure the availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an abnormal operational transient or a postulated DBA. Because stored diesel fuel oil, lube oil, and starting air subsystem support LCO 3.8.1 and LCO 3.8.2, stored diesel fuel oil, lube oil, and starting air are required to be within limits when the associated DG is required to be OPERABLE.

(continued)

BASES (continued)

ACTIONS

The ACTIONS Table is modified by a Note indicating that separate Condition entry is allowed for each DG. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable DG subsystem. Complying with the Required Actions for one inoperable DG subsystem may allow for continued operation, and subsequent inoperable DG subsystem(s) governed by separate Condition entry and application of associated Required Actions.

A.1

In this condition, the 7 day fuel oil supply for a DG is not available. However, the Condition is restricted to fuel oil level reductions that maintain at least a 6 day supply. These circumstances may be caused by events such as:

a. Full load operation required for an inadvertent start while at minimum required level; or

b. Feed and bleed operations that may be necessitated by increasing particulate levels or any number of other oil quality degradations.

This restriction allows sufficient time for obtaining the requisite replacement volume and performing the analyses required prior to addition of the fuel oil to the tank. A period of 48 hours is considered sufficient to complete restoration of the required level prior to declaring the DG inoperable. This period is acceptable based on the remaining capacity (> 6 days), the fact that procedures will be initiated to obtain replenishment, and the low probability of an event during this brief period.

B.1

With lube oil inventory < 175 gal, sufficient lube oil to support 7 days of continuous DG operation at full load conditions may not be available. However, the Condition is restricted to lube oil volume reductions that maintain at least a 6 day supply. This restriction allows sufficient time for obtaining the requisite replacement volume. A period of 48 hours is considered sufficient to complete

(continued)

BASES

ACTIONS

B.1 (continued)

restoration of the required volume prior to declaring the DG inoperable. This period is acceptable based on the remaining capacity (> 6 days), the low rate of usage, the fact that procedures will be initiated to obtain replenishment, and the low probability of an event during this brief period.

C.1

This Condition is entered as a result of a failure to meet the acceptance criterion for particulates. Normally, trending of particulate levels allows sufficient time to correct high particulate levels prior to reaching the limit of acceptability. Poor sample procedures (bottom sampling), contaminated sampling equipment, and errors in laboratory analysis can produce failures that do not follow a trend. Since the presence of particulates does not mean failure of the fuel oil to burn properly in the diesel engine, since particulate concentration is unlikely to change significantly between Surveillance Frequency intervals, and since proper engine performance has been recently demonstrated (within 31 days), it is prudent to allow a brief period prior to declaring the associated DG inoperable. The 7 day Completion Time allows for further evaluation, re-sampling, and re-analysis of the DG fuel oil.

D.1

Only one of the two redundant air starting systems is required to support associated DG operability. With the starting air receiver pressure < 165 psig in the required starting air system, sufficient capacity to start the associated DG may not exist. The associated DG may be incapable of performing its intended function and must be immediately declared inoperable. This declaration also requires entry into applicable Conditions and Required Actions for an inoperable DG, LCO 3.8.1, "AC Sources—Operating."

(continued)

BASES

ACTIONS (continued)

E.1

With a Required Action and associated Completion Time not met, or the stored diesel fuel oil, lube oil, or starting air subsystem inoperable for reasons other than addressed by Conditions A through D, the associated DG may be incapable of performing its intended function and must be immediately declared inoperable.

SURVEILLANCE REQUIREMENTS

SR 3.8.3.1

This SR provides verification that there is an adequate inventory of fuel oil in the storage tanks to support each DG's operation for 7 days at full load. The 7 day period is sufficient time to place the unit in a safe shutdown condition and to bring in replenishment fuel from an offsite location.

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

SR 3.8.3.2

This Surveillance ensures that sufficient lubricating oil inventory is available to support at least 7 days of full load operation for each DG. The 175 gal requirement is based on the DG manufacturer's consumption values for the run time of the DG. Implicit in this SR is the requirement to verify the capability to transfer the lube oil from its storage location to the DG, when the DG lube oil sump does not hold adequate inventory for 7 days of full load operation without the level reaching the manufacturer's recommended minimum level.

A 31 day Frequency is adequate to ensure that a sufficient lube oil supply is onsite, since DG starts and run time are closely monitored by the plant staff.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.3.3

This SR verifies that the required fuel oil testing is performed in accordance with the Diesel Fuel Oil Testing Program. Tests are a means of monitoring the potential degradation related to long term storage and the potential impact to fuel filter plugging as a result of high particulate levels. Specific sampling requirements, frequencies, and additional information are discussed in detail in the Diesel Fuel Oil Testing Program.

SR 3.8.3.4

This Surveillance ensures that, without the aid of the refill compressor, sufficient air start capacity for each DG is available. The system design requirements provide for at least one start cycle from one of two redundant air start systems without recharging. A start cycle is defined by the DG vendor, but usually is measured in terms of time (seconds of cranking) or engine cranking speed. The pressure specified in this SR is the lowest pressure at which at least one start attempt can be accomplished using one of two redundant air start systems.

The 31 day Frequency takes into account the capacity, capability, redundancy, and diversity of the AC sources and other indications available in the control room, including alarms, to alert the operator to below normal air start pressure.

REFERENCES

1. FSAR, Section 8.5.3.4.
2. Regulatory Guide 1.137.
3. FSAR, Chapter 6.
4. FSAR, Chapter 14.
5. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.4 DC Sources—Operating

BASES

BACKGROUND

The DC electrical power system provides the AC emergency power system with control power. It also provides both motive and control power to selected safety related equipment. As required by 10 CFR 50, Appendix A, GDC 17 (Ref. 1), the DC electrical power system is designed to have sufficient independence, redundancy, and testability to perform its safety functions, assuming a single failure. The DC electrical power system also conforms to the recommendations of Regulatory Guide 1.6 (Ref. 2) and meets the intent of IEEE-308 (Ref. 3).

Three separate DC Source Systems consist of:

1. Three 250 VDC Unit DC subsystems, together with the associated charger, circuitry, switches, indicators, and alarms. Each Unit DC battery board can be supplied from its own battery charger or from the spare charger. The three Unit batteries have engineered safety feature loads for the three units distributed among them so that redundant subsystems on each unit have separate normal and alternate power supplies. The Unit DC battery boards also supply control power for the bus-tie board, the cooling tower switchgear, three Unit 3 shutdown boards, and the alternate feeder to Unit 1 and 2 shutdown boards and one Unit 3 shutdown board. The battery boards, motor-operated valve boards, and distribution panels supply nominal 250 VDC power to their loads without interruption unless the supply battery is discharged and power to the charger is lost. All transfers from normal to alternate sources are done manually.

2. One 250 VDC shutdown board subsystem supplies control power for 4.16 kV shutdown board 3EB. The DC shutdown board subsystem consists of a battery together with the associated charger, circuitry, switches, indicators, and alarms. The shutdown board DC subsystem can receive power from its own battery, battery charger, or from the spare charger. Normal 250 VDC control power for 4.16 kV shutdown board 3EB is supplied by the

(continued)

BASES

BACKGROUND (continued)

shutdown board DC subsystem with an alternate supply from one of the Unit DC battery boards through a manual transfer switch. Separations between redundant control power circuits are maintained external to and within the switchgear.

3. The diesel generator (DG) DC subsystems provide control and instrumentation power for their respective DG. Each DG DC subsystem is energized by one 125 V battery and one of two 125 V battery chargers per 125 V subsystem.

During normal operation, the DC loads are powered from the battery chargers with the batteries floating on the system. In case of loss of normal power to the battery charger, the DC loads are automatically powered from the batteries.

The DC power distribution system is described in more detail in Bases for LCO 3.8.7, "Distribution System—Operating," and LCO 3.8.8, "Distribution System—Shutdown."

Each Unit and Shutdown Board battery has adequate storage capacity to carry the required load continuously for approximately 30 minutes (Ref. 4).

Each diesel battery has adequate storage capacity to carry required loads. These include control and logic power, governor booster pumps, generator relay protection, generator field flashing, and the motor-driven fuel pumps. The governor booster pumps and generator field flashing require power for only a relatively short time during a diesel start.

Each Unit and Shutdown Board DC battery subsystem is separately housed in a ventilated room apart from its charger and distribution centers. Each subsystem is located

(continued)

BASES

BACKGROUND (continued)

in an area separated physically and electrically from the other subsystems to ensure that a single failure in one subsystem does not cause a failure in a redundant subsystem. Each diesel battery is located in the room with the diesel generator it serves. One of its chargers is also in the room; the other is immediately outside the door in the Diesel Generator Building hallway.

The batteries for Unit DC, Shutdown Board DC, and DG DC electrical power subsystems are sized to produce required capacity at 80% of nameplate rating, corresponding to warranted capacity at end of life cycles and the 100% design demand. The minimum design voltage limit for the Unit DC and Shutdown Board DC subsystems is 210 V. The minimum design voltage limit for the DG DC subsystems is 105 V.

Each battery charger for a DC electrical power subsystem has ample power output capacity for the steady state operation of connected loads required during normal operation, while at the same time maintaining its battery bank fully charged. Each battery charger has sufficient capacity to restore the battery from the design minimum charge to its fully charged state within 12 hours while supplying normal steady state loads (Ref. 4).

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter 6 (Ref. 5) and Chapter 14 (Ref. 5), assume that Engineered Safety Feature (ESF) systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the DGs, emergency auxiliaries, and control and switching during all MODES of operation. The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining DC sources OPERABLE during accident conditions in the event of:

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

b. A postulated worst case single failure.

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

The DC sources satisfy Criterion 3 of the NRC Policy Statement (Ref. 11).

LCO

The DC Electrical Power System—with: 1) three Unit DC subsystems, each consisting of one 250 V battery, one battery charger, and the corresponding control equipment and interconnecting cabling supplying power to the associated Unit battery board; 2) one shutdown board DC subsystem (and the Unit 1 and 2 shutdown board DC subsystems needed to support OPERABILITY of the SGT and CREV Systems), consisting of one 250 V battery, its associated charger, and the corresponding control equipment and interconnecting cabling supplying power to the associated DC shutdown board; and 3) four Unit 3 and two Unit 1 and 2 DG DC subsystems each consisting of one battery bank, one battery charger, and the corresponding control equipment and interconnecting cabling, is required to be OPERABLE to ensure the availability of the required power to shut down the reactor and maintain it in a safe condition after an abnormal operational transient or a postulated DBA. Loss of any DC electrical power subsystem does not prevent the minimum safety function from being performed (Ref. 4).

APPLICABILITY

The DC electrical power sources are required to be OPERABLE in MODES 1, 2, and 3 to ensure safe unit operation and to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of abnormal operational transients; and

b. Adequate core cooling is provided, and containment integrity and other vital functions are maintained in the event of a postulated DBA.

The DC electrical power requirements for MODES 4 and 5 are addressed in the Bases for LCO 3.8.5, "DC Sources—Shutdown."

(continued)

BASES (continued)

ACTIONS

A.1

Condition A represents one Unit or Shutdown Board DC subsystem with a loss of ability to completely respond to an event, and a potential loss of ability to remain energized during normal operation. It is therefore imperative that the operator's attention focus on stabilizing the unit, minimizing the potential for complete loss of DC power to the affected division. The 7 day limit is consistent with the allowed time for an inoperable Unit DC Board or Shutdown Board Distribution Panel.

If one Unit or Shutdown Board DC electrical power subsystem is inoperable (e.g., inoperable battery, inoperable battery charger(s), or inoperable battery charger and associated inoperable battery), the remaining Unit or Shutdown Board DC electrical power subsystems have the capacity to support a safe shutdown and cooldown of all three units in the event of a loss of offsite power and a DBA on one Unit. Since a subsequent worst case single failure could, however, result in the loss of minimum necessary DC electrical subsystems to mitigate a worst case accident, continued power operation should not exceed 7 days. The loss of one shutdown board electrical power subsystem affects normal control power supply for the 480 V and 4.16 kV shutdown board(s) which it supplies. Loss of uninterrupted control power to these shutdown boards may result in loss of those engineered safety features supplied by these boards. Therefore, 7 days is considered a reasonable time to effect repairs and perform required testing of the unit or shutdown board DC electrical power subsystem, recognizes the ability to connect alternate sources to support continued operation or accident mitigation, and, if the unit or shutdown board DC electrical power subsystem is not restored to OPERABLE status, to prepare to effect an orderly and safe unit shutdown.

B.1 and B.2

If the Unit or Shutdown Board DC electrical power subsystem cannot be restored to OPERABLE status within the required Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the unit

(continued)

BASES

ACTIONS

B.1 and B.2 (continued)

must be brought to at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems. The Completion Time to bring the unit to MODE 4 is consistent with the time required in Regulatory Guide 1.93 (Ref. 6).

C.1

If a DG DC electrical power subsystem is inoperable, the associated DG may be incapable of performing its intended function and must be immediately declared inoperable. This declaration also requires entry into applicable Conditions and Required Actions for an inoperable DG, LCO 3.8.1, "AC Sources—Operating."

D.1

Required Action D.1 is intended to provide assurance that a loss of a required Unit 1 and 2 Shutdown Board DC electrical power subsystem does not result in a complete loss of safety function of critical systems (i.e., SGT or CREVS). With one of the required Unit 1 and 2 Shutdown Board DC electrical power subsystems inoperable, the SGT or CREVS train supported by that shutdown board is inoperable. Therefore, the associated SGT or CREVS subsystem must be declared inoperable immediately, and the ACTIONS in the appropriate system Specification taken.

SURVEILLANCE REQUIREMENTS

SR 3.8.4.1

Verifying battery terminal voltage while on float charge for the batteries helps to ensure the effectiveness of the charging system and the ability of the batteries to perform their intended function. Float charge is the condition in which the charger is supplying the continuous charge required to overcome the internal losses of a battery (or battery cell) and maintain the battery (or a battery cell)

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.1 (continued)

in a fully charged state, while supplying adequate power to the connected DC loads. The voltage requirements are based on the nominal design voltage of the battery and are consistent with the initial voltages assumed in the battery sizing calculations. The 7 day Frequency is consistent with manufacturer recommendations and IEEE-450 (Ref. 7).

SR 3.8.4.2 and SR 3.8.4.5

Battery charger capability requirements are based on the design capacity of the chargers (Ref. 4). According to Regulatory Guide 1.32 (Ref. 8), the battery charger supply is required to be based on the largest combined demands of the various steady state loads and the charging capacity to restore the battery from the design minimum charge state to the fully charged state, irrespective of the status of the unit during these demand occurrences. The minimum required amperes and verification of the charger's ability to recharge the battery ensures that these requirements can be satisfied.

SR 3.8.4.2 verifies that the chargers are capable of charging the batteries after their designed duty cycle testing and ensures that the chargers will perform their design function. This SR is modified by a Note that allows performance of SR 3.8.4.5 in lieu of this Surveillance requirement. SR 3.8.4.5 verifies that the chargers are capable of charging the batteries after each discharge test and ensures that the chargers are capable of performing at maximum output. SR 3.8.4.2 is performed at the same frequency as the 18 month service test (SR 3.8.4.3), while SR 3.8.4.5 is performed following the 60 month battery discharge test (SR 3.8.4.4).

SR 3.8.4.5 is modified by a Note. The Note is added to this SR to acknowledge that credit may be taken for unplanned events that satisfy the Surveillance.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.4.3

A battery service test is a special test of the battery's capability, as found, to satisfy the design requirements (battery duty cycle) of the DC electrical power system. The discharge rate and test length corresponds to the design duty cycle requirements as specified in Reference 4.

The Frequency of 18 months is consistent with the recommendations of Regulatory Guide 1.32 (Ref. 8) and Regulatory Guide 1.129 (Ref. 9), which state, in part, that the battery service test should be performed with intervals between tests not to exceed 18 months.

This SR is modified by a Note that allows the performance of a modified performance discharge test in lieu of a service test once per 60 months. The modified performance discharge test is a simulated duty cycle consisting of just two rates; the one minute rate published for the battery or the largest current load of the duty cycle, followed by the test rate employed for the performance test, both of which envelope the duty cycle of the service test. Since the ampere-hours removed by a rated one minute discharge represents a very small portion of the battery capacity, the test rate can be changed to that for the performance test without compromising the results of the performance discharge test. The battery terminal voltage for the modified performance discharge test should remain above the minimum battery terminal voltage specified in the battery service test for the duration of time equal to that of the service test.

A modified discharge test is a test of the battery capacity and its ability to provide a high rate, short duration load (usually the highest rate of the duty cycle). This will often confirm the battery's ability to meet the critical period of the load duty cycle, in addition to determining its percentage of rated capacity. Initial conditions for the modified performance discharge test should be identical to those specified for a service test.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued

SR 3.8.4.4

A battery performance discharge test is a test of constant current capacity of a battery, normally done in the as found condition, after having been in service, to detect any change in the capacity determined by the acceptance test. The test is intended to determine overall battery degradation due to age and usage.

A battery modified performance discharge test is described in the Bases for SR 3.8.4.3. Either the battery performance discharge test or the modified performance discharge test is acceptable for satisfying SR 3.8.4.4; however, only the modified performance discharge test may be used to satisfy SR 3.8.4.4 while satisfying the requirements of SR 3.8.4.3 at the same time.

The acceptance criteria for this Surveillance is consistent with IEEE-450 (Ref. 7) and IEEE-485 (Ref. 10). These references recommend that the battery be replaced if its capacity is below 80% of the manufacturer's rating. A capacity of 80% shows that the battery rate of deterioration is increasing, even if there is ample capacity to meet the load requirements.

The Frequency for this test is normally 60 months. If the battery shows degradation, or if the battery has reached 85% of its expected life and capacity is < 100% of the manufacturer's rating, the Surveillance Frequency is reduced to 12 months. However, if the battery shows no degradation but has reached 85% of its expected life, the Surveillance Frequency is only reduced to 24 months for batteries that retain capacity ≥ 100% of the manufacturer's rating. Degradation is indicated, according to IEEE-450 (Ref. 7), when the battery capacity drops by more than 10% relative to its capacity on the previous performance test or when it is 10% below the manufacturer's rating. All these Frequencies are consistent with the recommendations in IEEE-450 (Ref. 7).

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.

2. Regulatory Guide 1.6.

(continued)

BASES

REFERENCES (continued)

3. IEEE Standard 308.

4. FSAR, Sections 8.5 and 8.6.

5. FSAR, Chapters 6 and 14.

6. Regulatory Guide 1.93.

7. IEEE Standard 450-1995.

8. Regulatory Guide 1.32, February 1977.

9. Regulatory Guide 1.129, December 1974.

10. IEEE Standard 485, 1983.

11. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.5 DC Sources – Shutdown

BASES

BACKGROUND

A description of the DC sources is provided in the Bases for LCO 3.8.4, "DC Sources – Operating."

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident and transient analyses in the FSAR, Chapter 6 (Ref. 1) and Chapter 14 (Ref. 2), assume that Engineered Safety Feature systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the diesel generators (DGs), emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum DC electrical power sources during MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment ensures that:

a. The facility can be maintained in the shutdown or refueling condition for extended periods;

b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and

c. Adequate DC electrical power is provided to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident.

The DC sources satisfy Criterion 3 of the NRC Policy Statement (Ref. 3).

(continued)

BASES (continued)

LCO

The DC Electrical Power Systems—with: 1) each Unit DC subsystem, supporting Unit battery boards required OPERABLE by LCO 3.8.8, consisting of one 250 V battery, one battery charger, and the corresponding control equipment and interconnecting cabling supplying power to the associated Unit battery board; 2) each shutdown board DC subsystem, supporting DC shutdown boards required OPERABLE by LCO 3.8.8, consisting of one 250 V battery, its associated charger, and the corresponding control equipment and interconnecting cabling supplying power to the associated DC shutdown board; and 3) each DG DC subsystem supporting DGs required OPERABLE for 4.16 kV shutdown boards required OPERABLE by LCO 3.8.8, consisting of one 125 V battery, one battery charger, and the corresponding control equipment and interconnecting cabling. This requirement ensures the availability of sufficient DC electrical power sources to operate the unit in a safe manner and to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents and inadvertent reactor vessel draindown).

APPLICABILITY

The DC electrical power sources required to be OPERABLE in MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment provide assurance that:

a. Required features to provide adequate coolant inventory makeup are available for the irradiated fuel assemblies in the core in case of an inadvertent draindown of the reactor vessel;

b. Required features needed to mitigate a fuel handling accident are available;

c. Required features necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

(continued)

BASES

APPLICABILITY (continued)

The DC electrical power requirements for MODES 1, 2, and 3 are covered in LCO 3.8.4.

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4

If more than one DC distribution subsystem is required according to LCO 3.8.8, the DC subsystems remaining OPERABLE with one or more DC power sources inoperable may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for draining the reactor vessel. By allowance of the option to declare required features inoperable with associated DC power sources inoperable, appropriate restrictions are implemented in accordance with the affected system LCOs' ACTIONS. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and any activities that could result in inadvertent draining of the reactor vessel).

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required DC electrical power subsystems and to continue this action until restoration is accomplished in order to provide the necessary DC electrical power to the plant safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required DC electrical power subsystems should be completed as quickly as possible in order to minimize the time during which the plant safety systems may be without sufficient power.

(continued)

BASES (continued)

SURVEILLANCE REQUIREMENTS

SR 3.8.5.1

SR 3.8.5.1 requires performance of all Surveillances required by SR 3.8.4.1 through SR 3.8.4.5. Therefore, see the corresponding Bases for LCO 3.8.4 for a discussion of each SR.

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE DC sources from being discharged below their capability to provide the required power supply or otherwise rendering them inoperable during the performance of SRs. It is the intent that these SRs must still be capable of being met, but actual performance is not required, unless required to support an operating unit per Section 3.8.4.

REFERENCES

1. FSAR, Chapter 6.
2. FSAR, Chapter 14.
3. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.6 Battery Cell Parameters

BASES

BACKGROUND

This LCO delineates the limits on electrolyte temperature, level, float voltage, and specific gravity for the DC electrical power subsystems batteries. At BFN, these batteries were designed to IEEE-279 Standards (Ref. 4). However, the batteries have been analyzed and meet IEEE-450 Standards (Ref. 3). A discussion of these batteries and their OPERABILITY requirements is provided in the Bases for LCO 3.8.4, "DC Sources— Operating," and LCO 3.8.5, "DC Sources—Shutdown."

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in FSAR, Chapter 6 (Ref. 1) and Chapter 14 (Ref. 2), assume Engineered Safety Feature systems are OPERABLE. The DC electrical power subsystems provide normal and emergency DC electrical power for the diesel generators (DGs), emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC subsystems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining at least one division of DC sources OPERABLE during accident conditions, in the event of:

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

b. A postulated worst case single failure.

Since battery cell parameters support the operation of the DC electrical power subsystems, they satisfy Criterion 3 of the NRC Policy Statement (Ref. 5).

LCO

Battery cell parameters must remain within acceptable limits to ensure availability of the required DC power to shut down the reactor and maintain it in a safe condition after an

(continued)

BASES

LCO (continued)

anticipated operational occurrence or a postulated DBA. Electrolyte limits are conservatively established, allowing continued DC electrical system function even with Category A and B limits not met.

APPLICABILITY

The battery cell parameters are required solely for the support of the associated DC electrical power subsystem. Therefore, battery electrolyte is only required when the DC power source is required to be OPERABLE. Refer to the Applicability discussions in Bases for LCO 3.8.4 and LCO 3.8.5.

ACTIONS

A Note has been added providing that, for this LCO, separate Condition entry is allowed for each battery. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable battery. Complying with the Required Actions for battery cell parameters allows for restoration and continued operation, and subsequent out of limit battery cell parameters may be governed by separate Condition entry and application of associated Required Action.

A.1, A.2, and A.3

With parameters of one or more cells in one or more batteries not within limits (i.e., Category A limits not met or Category B limits not met, or Category A and B limits not met) but within the Category C limits specified in Table 3.8.6-1, the battery is degraded but there is still sufficient capacity to perform the intended function. Therefore, the affected battery is not required to be considered inoperable solely as a result of Category A or B limits not met, and continued operation is permitted for a limited period.

The pilot cell electrolyte level and float voltage are required to be verified to meet the Category C limits within 1 hour (Required Action A.1). This check provides a quick indication of the status of the remainder of the battery

(continued)

BASES

ACTIONS

A.1, A.2, and A.3 (continued)

cells. One hour provides time to inspect the electrolyte level and to confirm the float voltage of the pilot cells. One hour is considered a reasonable amount of time to perform the required verification.

Verification that the Category C limits are met (Required Action A.2) provides assurance that during the time needed to restore the parameters to the Category A and B limits, the battery is still capable of performing its intended function. A period of 24 hours is allowed to complete the initial verification because specific gravity measurements must be obtained for each connected cell. Taking into consideration both the time required to perform the required verification and the assurance that the battery cell parameters are not severely degraded, this time is considered reasonable. The verification is repeated at 7 day intervals until the parameters are restored to Category A and B limits. This periodic verification is consistent with the normal Frequency of pilot cell Surveillances.

Continued operation is only permitted for 31 days before battery cell parameters must be restored to within Category A and B limits. Taking into consideration that, while battery capacity is degraded, sufficient capacity exists to perform the intended function and to allow time to fully restore the battery cell parameters to normal limits, this time is acceptable for operation prior to declaring the associated DC battery inoperable.

B.1

When any battery parameter is outside the Category C limit for any connected cell, sufficient capacity to supply the maximum expected load requirement is not ensured and the corresponding DC electrical power subsystem must be declared inoperable. Additionally, other potentially extreme conditions, such as not completing the Required Actions of Condition A within the required Completion Time or average electrolyte temperature of representative cells falling below 60°F for each Unit and Shutdown Board battery (except Shutdown Board battery 3EB) and 40°F for Shutdown Board battery 3EB and each DG battery, also are cause for

(continued)

BASES

ACTIONS

B.1 (continued)

immediately declaring the associated DC electrical power subsystem inoperable.

SURVEILLANCE REQUIREMENTS

SR 3.8.6.1

This SR verifies that Category A battery cell parameters are consistent with IEEE-450 (Ref. 3), which recommends regular battery inspections (at least one per month) including voltage, specific gravity, and electrolyte temperature of pilot cells.

SR 3.8.6.2

The 92 day inspection of specific gravity and voltage is consistent with IEEE-450 (Ref. 3).

SR 3.8.6.3

This Surveillance verification that the average temperature of representative cells is within limits is consistent with a recommendation of IEEE-450 (Ref. 3) that states that the temperature of electrolytes in representative (10 percent of) cells should be determined on a quarterly basis.

Lower than normal temperatures act to inhibit or reduce battery capacity. This SR ensures that the operating temperatures remain within an acceptable operating range. This limit is based on manufacturer's recommendations.

Table 3.8.6-1

This table delineates the limits on electrolyte level, float voltage, and specific gravity for three different categories. The meaning of each category is discussed below.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

Table 3.8.6-1 (continued)

Category A defines the normal parameter limit for each designed pilot cell in each battery. The cells selected as pilot cells are those whose temperature, voltage, and electrolyte specific gravity approximate the state of charge of the entire battery.

The Category A limits specified for electrolyte level are based on manufacturer's recommendations and are consistent with the guidance in IEEE-450 (Ref. 3), with the extra ¼ inch allowance above the high water level indication for operating margin to account for temperature and charge effects. In addition to this allowance, footnote a to Table 3.8.6-1 permits the electrolyte level to be above the specified maximum level during equalizing charge, provided it is not overflowing. These limits ensure that the plates suffer no physical damage, and that adequate electron transfer capability is maintained in the event of transient conditions. IEEE-450 (Ref. 3) recommends that electrolyte level readings should be made only after the battery has been at float charge for at least 72 hours.

The Category A limit specified for float voltage is ≥ 2.13 V per cell. This value is based on the recommendation of IEEE-450 (Ref. 3), which states that prolonged operation of cells below 2.13 V can reduce the life expectancy of cells. The Category A limit specified for specific gravity for each pilot cell is ≥ 1.200 (0.015 below the manufacturer's fully charged nominal specific gravity or a battery charging current that had stabilized at a low value). This value is characteristic of a charged cell with adequate capacity. According to IEEE-450 (Ref. 3), the specific gravity readings are based on a temperature of 77°F (25°C).

The specific gravity readings are corrected for actual electrolyte temperature. For each 3°F (1.67°C) above 77°F (25°C), 1 point (0.001) is added to the reading; 1 point is subtracted for each 3°F below 77°F. The specific gravity of the electrolyte in a cell increases with a loss of water due to electrolysis or evaporation.

Category B defines the normal parameter limits for each connected cell. The term "connected cell" excludes any battery cell that may be jumpered out.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

Table 3.8.6-1 (continued)

The Category B limits specified for electrolyte level and float voltage are the same as those specified for Category A and have been discussed above. The Category B limit specified for specific gravity for each connected cell is ≥ 1.195 (0.020 below the manufacturer's fully charged, nominal specific gravity) with the average of all connected cells 1.205 (0.010 below the manufacturer's fully charged, nominal specific gravity). These values are based on manufacturer's recommendations. The minimum specific gravity value required for each cell ensures that the effects of a highly charged or newly installed cell do not mask overall degradation of the battery.

Category C defines the limits for each connected cell. These values, although reduced, provide assurance that sufficient capacity exists to perform the intended function and maintain a margin of safety. When any battery parameter is outside the Category C limits, the assurance of sufficient capacity described above no longer exists, and the battery must be declared inoperable.

The Category C limit specified for electrolyte level (above the top of the plates and not overflowing) ensures that the plates suffer no physical damage and maintain adequate electron transfer capability. The Category C Allowable Value for voltage is based on IEEE-450 (Ref. 3), which states that a cell voltage of 2.07 V or below, under float conditions and not caused by elevated temperature of the cell, indicates internal cell problems and may require cell replacement.

The Category C limit on average specific gravity ≥ 1.195, is based on manufacturer's recommendations (0.020 below the manufacturer's recommended fully charged, nominal specific gravity). In addition to that limit, it is required that the specific gravity for each connected cell must be no less than 0.020 below the average of all connected cells. This limit ensures that the effect of a highly charged or new cell does not mask overall degradation of the battery.

The footnotes to Table 3.8.6-1 that apply to specific gravity are applicable to Category A, B, and C specific

(continued)

BASES

SURVEILLANCE REQUIREMENTS

Table 3.8.6-1 (continued)

gravity. Footnote (b) of Table 3.8.6-1 requires the above mentioned correction for electrolyte temperature.

Because of specific gravity gradients that are produced during the recharging process, delays of several days may occur while waiting for the specific gravity to stabilize. A stabilized charger current is an acceptable alternative to specific gravity measurement for determining the state of charge of the designated pilot cell. This phenomenon is discussed in IEEE-450 (Ref. 3). Footnote (c) to Table 3.8.6-1 allows the float charge current to be used as an alternate to specific gravity for up to 7 days following a battery recharge. Within 7 days, each connected cell's specific gravity must be measured to confirm the state of charge. Following a minor battery recharge (such as equalizing charge that does not follow a deep discharge) specific gravity gradients are not significant, and confirming measurements may be made in less than 7 days. Footnote (d) to Table 3.8.6-1 allows alternate values recommended by the manufacturer to be used for specific gravity as appropriate (Ref. 6). For the DG and Shutdown batteries, up to 10 cells for each DG battery and up to 20 cells for each Shutdown battery can have specific gravities of 1.180 to 1.200 provided the demonstrated battery capacity at the last discharge test is ≥ 81.2 percent. For the Unit batteries, up to 12 cells for each battery can have specific gravities of 1.180 to 1.200 provided the demonstrated battery capacity at the last discharge test is ≥ 80.7 percent.

REFERENCES

1. FSAR, Chapter 6.

2. FSAR, Chapter 14.

3. IEEE Standard 450, 1987.

4. IEEE Standard 279.

5. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

6. Vendor Technical Manual for C&D Standby Batteries and Battery Chargers (BFN-VTM-C173-0010)

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.7 Distribution Systems—Operating

BASES

BACKGROUND

The onsite Class 1E AC and DC electrical power distribution system is divided into redundant and independent AC and DC electrical power distribution subsystems.

The primary AC distribution system consists of four Unit 3 4.16 kV shutdown boards each having an offsite source of power as well as a dedicated onsite diesel generator (DG) source. Each 4.16 kV shutdown board is normally connected to the 3B unit station service transformer (USST) via a 4.16 kV unit board. If no offsite source is available, the onsite emergency DGs supply power to the 4.16 kV shutdown boards.

The secondary plant distribution system includes 480 VAC shutdown boards and associated load centers, and transformers.

There are three Unit DC and five Shutdown Board 250 V DC electrical power distribution subsystems that support the necessary power for Unit 3 ESF functions.

The list of all distribution boards is presented in Table B 3.8.7-1.

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter 6 (Ref. 1) and Chapter 14 (Ref. 2), assume ESF systems are OPERABLE. The AC and DC electrical power distribution systems are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.5, Emergency Core

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

Cooling System (ECCS) and Reactor Core Isolation Cooling (RCIC) System; and Section 3.6 Containment Systems.

The OPERABILITY of the AC and DC electrical power distribution subsystems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining distribution systems OPERABLE during accident conditions in the event of:

a. An assumed loss of all offsite power or all onsite AC electrical power sources; and

b. A postulated worst case single failure.

The AC and DC electrical power distribution system satisfies Criterion 3 of the NRC Policy Statement (Ref. 4).

LCO

The required electrical power distribution subsystems listed in Table B 3.8.7-1 ensure the availability of AC and DC electrical power for the systems required to shut down the reactor and maintain it in a safe condition after an abnormal operational transient or a postulated DBA. The AC and DC electrical power distribution subsystems are required to be OPERABLE.

Maintaining the AC and DC electrical power distribution subsystems OPERABLE ensures that the redundancy incorporated into the design of ESF is not defeated. Therefore, a single failure within any system or within the electrical power distribution subsystems will not prevent safe shutdown of the reactor.

The AC electrical power distribution subsystems require the associated buses and electrical circuits to be energized to their proper voltages. In addition, for the D or E RMOV Boards to be OPERABLE, they must be able to auto-transfer on loss of voltage. This feature ensures that the failure of one Diesel Generator will not result in the loss of an RHR subsystem. OPERABLE DC electrical power distribution subsystems require the associated buses to be energized to their proper voltage from either the associated battery or charger.

(continued)

BASES

LCO (continued)

The Unit 3 480 V RMOV boards 3A, 3B, and 3C are not specifically listed in Table B 3.8.7-1. Should one of these boards become inoperable due to a failure not affecting the operability of a board listed in Table B 3.8.7-1, the individual loads on the board would be considered inoperable and the appropriate conditions and required actions of the LCOs governing the individual loads would be entered. If however, one or more of the 3A, 3B, or 3C RMOV boards are inoperable due to a failure also affecting the operability of 3A or 3B 480 V shutdown board; the conditions and required actions are not required to be entered since LCO 3.0.6 allows this exception, and the required actions for the inoperable 480 V shutdown board are sufficient. In addition, the alternate supply breakers to 480 V RMOV boards 3A, 3B, and 3C must be open. This prevents a single malfunction causing a failure of a redundant subsystem and a loss of safety function. If any alternate breakers for the 3A, 3B, or 3C 480 V RMOV boards are closed, the affected systems/components which are not powered from its normal source are inoperable.

The 480 V shutdown boards and diesel auxiliary boards can be placed on their alternate feeder breakers and considered OPERABLE as long as the restrictions on the associated drawings are met. In addition, tie breakers between redundant safety related DC power distribution subsystems, if they exist, must be open. This prevents any electrical malfunction in any DC power distribution subsystem from propagating to the redundant subsystem, which could cause the failure of a redundant DC subsystem and a loss of essential safety function(s). If any DC tie breakers are closed, the affected redundant DC electrical power distribution subsystems are considered inoperable. This applies to the onsite, safety related, redundant DC electrical power distribution subsystems.

The Unit DC Boards are sized to accommodate alternate loads normally supplied by the Shutdown DC Distribution Panels with no effect on OPERABILITY.

APPLICABILITY

The electrical power distribution subsystems are required to be OPERABLE in MODES 1, 2, and 3 to ensure that:

(continued)

BASES

APPLICABILITY (continued)

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of abnormal operational transients; and

b. Adequate core cooling is provided, and containment OPERABILITY and other vital functions are maintained in the event of a postulated DBA.

Electrical power distribution subsystem requirements for MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment are covered in the Bases for LCO 3.8.8, "Distribution Systems—Shutdown."

ACTIONS

A.1

With one Unit 3 4.16 kV shutdown board inoperable, the remaining Unit 3 4.16 kV shutdown boards are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because another single failure in the remaining three 4.16 kV shutdown boards could result in the minimum required ESF functions not being supported. Therefore, the 4.16 kV shutdown board must be restored to OPERABLE status within 5 days.

The Condition A postulated worst scenario is one 4.16 kV shutdown board without AC power (i.e., no offsite power to the 4.16 kV shutdown board and the associated DG inoperable). In this condition, ESF capabilities are not at their maximum, however, they remain adequate. The four 4.16 kV shutdown boards have ESF loads for Unit 3 distributed among them so that an additional single failure will not result in a loss of safety function (e.g., one RHR pump on each board). Therefore, loss of two shutdown boards still leaves two RHR pumps. The 5 day time limit before requiring a unit shutdown in this Condition is acceptable because:

a. The remaining 4.16 kV shutdown boards have AC power available.

(continued)

BASES

ACTIONS

A.1 (continued)

b. The potential for an event in conjunction with a single failure of a redundant component in the 4.16 kV shutdown board with AC power. (The redundant component is verified OPERABLE in accordance with Specification 5.5.11, "Safety Function Determination Program (SFDP).")

The second Completion Time for Required Action A.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition A is entered while, for instance, a Unit DC board is inoperable and subsequently returned OPERABLE, this LCO may already have been not met for up to 7 days. This situation could lead to a total duration of 12 days, since initial failure of the LCO, to restore the 4.16 kV shutdown board. At this time a Unit DC board could again become inoperable, and the 4.16 kV shutdown board could be restored OPERABLE. This could continue indefinitely.

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

Pursuant to LCO 3.0.6, the Distribution System Actions B, C, D, or G would not be entered even if the 4.16 kV shutdown board was inoperable, resulting in de-energization of a 480 V board. Therefore, the Required Actions of Condition A are modified by a Note to indicate that when Condition A is entered with no power source to a required 480 V board, Actions B, C, D, or G must be immediately entered. This allows Condition A to provide requirements for the loss of the 4.16 kV shutdown board without regard to whether a 480 V shutdown board is de-energized. Actions B, C, D, or G provide the appropriate restrictions for a de-energized 480 V board.

(continued)

BASES

ACTIONS (continued)

A.2

With a shutdown board inoperable, the associated DG would have no power distribution mechanism and would hence also be inoperable. Required actions for an inoperable DG are included in LCO 3.8.1.

B.1

With one Unit 3 480 V shutdown board inoperable, the remaining 480 V shutdown board is capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition assuming no single failure. The overall reliability is reduced because a single failure in the remaining 480 V shutdown board could result in the minimum required ESF functions not being supported. Therefore, the inoperable 480 V shutdown board must be restored to OPERABLE status within 8 hours.

The Condition B postulated worst case scenario is one division (480 V shutdown board) without AC power (i.e., no offsite power to the division and the associated DG inoperable). In this condition, the unit is more vulnerable to a complete loss of AC power. It is, therefore, imperative that the unit operators' attention be focused on minimizing the potential for loss of power to the remaining division by stabilizing the unit, and on restoring power to the affected division. The 8 hour time period before requiring a unit shutdown is acceptable because:

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

b. The potential for an event in conjunction with a single failure of a redundant component in the division with AC power is minimal. (The redundant component is verified OPERABLE in accordance with Specification 5.5.11, "Safety Function Determination Program (SFDP).")

(continued)

BASES

ACTIONS

B.1 (continued)

The second Completion Time (12 days) for Required Action B.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable in any single contiguous occurrence of failing to meet the LCO. If Condition B is entered while, for instance, a 4.16 kV shutdown board is inoperable and subsequently restored OPERABLE, the LCO may already have been not met for up to 5 days. This situation could lead to a total duration of 5 days and 8 hours, since initial failure of the LCO, to restore the 480 V shutdown board. At this time, a 4.16 kV shutdown board could again become inoperable, and the 480 V shutdown board could be restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This allowance results in establishing the "time zero" at the time the LCO was initially not met, instead of at the time Condition B was entered. The 12 day Completion Time is an acceptable limitation on this potential of failing to meet the LCO indefinitely.

Pursuant to LCO 3.0.6, the Distribution System Action C would not be entered even if the 480 V shutdown board was inoperable, resulting in de-energization of a 480 V RMOV board. Therefore, the Required Actions of Condition B are modified by a Note to indicate that when Condition B is entered with no power source to a required 480 V RMOV board, Action C must be immediately entered. This allows Condition B to provide requirements for the loss of the 480 V shutdown board without regard to whether a 480 V RMOV board is de-energized. Action C provides the appropriate restrictions for a de-energized 480 V RMOV board.

C.1

With 480 V RMOV Board D or E inoperable the respective RHR subsystem supported by each affected board is inoperable for LPCI. The overall reliability is reduced because of the loss of one LPCI/RHR subsystem. In this condition, the remaining OPERABLE ECCS subsystems provide adequate core cooling during a LOCA. However, overall ECCS reliability is

(continued)

BASES

ACTIONS

C.1 (continued)

reduced, because a single failure in one of the remaining OPERABLE subsystems, concurrent with a LOCA, may result in the ECCS not being able to perform its intended safety function. Therefore, the associated RHR subsystem must be declared inoperable immediately, and the actions in the appropriate system specification taken.

D.1

With one Unit 3 480 V diesel auxiliary board inoperable, the remaining 480 V diesel auxiliary board is capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition assuming no single failure. The overall reliability is reduced because a single failure in the remaining 480 V diesel auxiliary board could result in the minimum required ESF functions not being supported. Therefore, the 480 V diesel auxiliary board must be restored to OPERABLE status within 5 days.

The Condition D postulated worst scenario is one 480 V diesel auxiliary board without AC power (i.e., no offsite power to the diesel auxiliary board). In this Condition, the Unit 3 DGs are more vulnerable to a complete loss of AC power. These boards can be fed from either 480 V Shutdown board 3A or 3B. Thus, each auxiliary board has access to two DGs. Therefore, the 5 day time limit before requiring a unit shutdown in this Condition is acceptable because:

a. The remaining diesel auxiliary board has an alternate source of AC power in addition to the normal source and their dedicated DG.

b. The potential for an event in conjunction with a single failure of a redundant component in the 480 V diesel auxiliary board with AC power is minimal. (The redundant component is verified OPERABLE in accordance with Specification 5.5.11, "Safety Function Determination Program (SFDP).")

(continued)

BASES

ACTIONS

D.1 (continued)

The second Completion Time (12 days) for Required Action D.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable in any single contiguous occurrence of failing to meet the LCO. If Condition D is entered while, for instance, a 4.16 kV shutdown board is inoperable and subsequently restored OPERABLE, the LCO may already have been not met for up to 5 days. This situation could lead to a total duration of 10 days, since initial failure of the LCO, to restore the 480 V DG auxiliary board. At this time, a 4.16 kV shutdown board could again become inoperable, and the 480 V DG auxiliary board could be restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This allowance results in establishing the "time zero" at the time the LCO was initially not met, instead of at the time Condition D was entered. The 12 day Completion Time is an acceptable limitation on this potential of failing to meet the LCO indefinitely.

E.1

With one Unit DC board or Shutdown Board DC Distribution Panel 3EB inoperable, the remaining boards are capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition, assuming no single failure. The overall reliability is reduced, however, because a single failure in the remaining boards could result in the minimum required ESF functions not being supported. Therefore, the required Unit DC board or Shutdown Board DC Distribution Panel 3EB must be restored to OPERABLE status within 7 days by powering it from the associated battery or charger.

Condition E represents one Unit DC board or Shutdown Board DC Distribution Panel 3EB without adequate DC power, potentially with both the battery significantly degraded and the associated charger nonfunctioning. In this situation the plant is significantly more vulnerable to a partial loss of DC power. However, the three Unit DC boards have ESF

(continued)

BASES

ACTIONS

E.1 (continued)

loads for the three BFN units distributed among them so that redundant subsystems on each unit have separate normal and alternate power supplies. The 7 day Completion Time is partially based on this and reflects a reasonable time to assess unit status as a function of the inoperable Unit DC board or Shutdown Board DC Distribution Panel 3EB and, if not restored to OPERABLE status, to prepare to effect an orderly and safe shutdown.

The second Completion Time for Required Action E.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failing to meet the LCO. If Condition E is entered while, for instance, a 4.16 kV shutdown board is inoperable and subsequently restored OPERABLE, the LCO may already have been not met for up to 5 days. This situation could lead to a total duration of 12 days, since initial failure of the LCO, to restore the Unit DC board or the Shutdown Board DC Distribution Panel. At this time, a 4.16 kV shutdown board could again become inoperable, and the Unit DC board or the Shutdown Board DC Distribution Panel could be restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This allowance results in establishing the "time zero" at the time the LCO was initially not met, instead of at the time Condition E was entered. The 12 day Completion Time is an acceptable limitation on this potential of failing to meet the LCO indefinitely.

F.1

With one division of 4.16 kV shutdown boards inoperable, the remaining division of shutdown boards is capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition assuming no single failure. The overall reliability is reduced because a single failure in the remaining 4.16 kV shutdown boards could result in the minimum required ESF functions not being supported.

(continued)

BASES

ACTIONS

F.1 (continued)

Therefore, one of the inoperable 4.16 kV shutdown boards must be restored to OPERABLE status within 8 hours.

The Condition F postulated worst case scenario is one division of 4.16 kV shutdown board without AC power (i.e., no offsite power to the division and the associated DGs inoperable). In this condition, the unit is more vulnerable to a complete loss of AC power. It is, therefore, imperative that the unit operators' attention be focused on minimizing the potential for loss of power to the remaining division by stabilizing the unit, and on restoring power to the affected division. The 8 hour time period before requiring a unit shutdown is acceptable because:

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

b. The potential for an event in conjunction with a single failure of a redundant component in the division with AC power is minimal. (The redundant component is verified OPERABLE in accordance with Specification 5.5.11, "Safety Function Determination Program (SFDP).")

The second Completion Time (12 days) for Required Action F.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable in any single contiguous occurrence of failing to meet the LCO. If Condition F is entered while, for instance, a 480 V DG auxiliary board is inoperable and subsequently restored OPERABLE, the LCO may already have been not met for up to 5 days. This situation could lead to a total duration of 5 days and 8 hours, since initial failure of the LCO, to restore the 480 V shutdown board. At this time, a 480 V DG auxiliary board could again become inoperable, and a 4.16 kV shutdown board could be restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock."

(continued)

BASES

ACTIONS

F.1 (continued)

This allowance results in establishing the "time zero" at the time the LCO was initially not met, instead of at the time Condition F was entered. The 12 day Completion Time is an acceptable limitation on this potential of failing to meet the LCO indefinitely.

Pursuant to LCO 3.0.6, the Distribution System Actions B, C, D, or G would not be entered even if the 4.16 kV shutdown boards were inoperable, resulting in de-energization of a 480 V board. Therefore, the Required Actions of Condition F are modified by a Note to indicate that when Condition F is entered with no AC source to the 4.16 kV shutdown boards, Actions B, C, D, or G must be immediately entered. This allows Condition F to provide requirement for the loss of the 4.16 kV shutdown boards without regard to whether 480 V board is de-energized. Actions B, C, D, or G provide the appropriate restrictions for a de-energized 480 V board.

G.1

Required Action G.1 is intended to provide assurance that a loss of one or more required Unit 1 or 2 AC or DC boards does not result in a complete loss of safety function of critical systems (i.e., SGT or CREVS). With one or more of the required boards inoperable, the SGT or CREVS train supported by each affected board is inoperable. Therefore, the associated SGT or CREVS subsystem must be declared inoperable immediately, and the ACTIONS in the appropriate system Specification taken.

H.1 and H.2

If the inoperable distribution subsystem cannot be restored to OPERABLE status within the associated Completion Time, the unit must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

(continued)

BASES

ACTIONS (continued)

I.1

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

SURVEILLANCE REQUIREMENTS

SR 3.8.7.1

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

REFERENCES

1. FSAR, Chapter 6.

2. FSAR, Chapter 14.

3. Regulatory Guide 1.93, December 1974.

4. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

Table B 3.8.7-1 (page 1 of 1)
AC and DC Electrical Power Distribution Systems

TYPE	VOLTAGE	ELECTRICAL POWER DISTRIBUTION SUBSYSTEMS
AC safety boards	4160 V	Shutdown Board 3EA Shutdown Board 3EB Shutdown Board 3EC Shutdown Board 3ED Shutdown Board A or B Shutdown Board D or B
	480 V	Shutdown Board 1A Shutdown Board 3A Shutdown Board 3B RMOV Board 3D RMOV Board 3E SGT Board Diesel Auxiliary Board A Diesel Auxiliary Board B Diesel Auxiliary Board 3EA Diesel Auxiliary Board 3EB
DC boards	250 V	Unit DC Board 1 Unit DC Board 2 Unit DC Board 3 Shutdown Board DC Distribution Panel A or B Shutdown Board DC Distribution Panel D or B Shutdown Board DC Distribution Panel 3EB

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.8 Distribution Systems – Shutdown

BASES

BACKGROUND

A description of the AC and DC electrical power distribution system is provided in the Bases for LCO 3.8.7, "Distribution Systems – Operating."

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident and transient analyses in the FSAR, Chapter 6 (Ref. 1) and Chapter 14 (Ref. 2), assume Engineered Safety Feature (ESF) systems are OPERABLE. The AC and DC electrical power distribution systems are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System, and containment design limits are not exceeded.

The OPERABILITY of the AC and DC electrical power distribution system is consistent with the initial assumptions of the accident analyses and the requirements for the supported systems' OPERABILITY.

The OPERABILITY of the minimum AC and DC electrical power sources and associated power distribution subsystems during MODES 4 and 5, and during movement of irradiated fuel assemblies in the secondary containment ensures that:

a. The facility can be maintained in the shutdown or refueling condition for extended periods;

b. Sufficient instrumentation and control capability is available for monitoring and maintaining the unit status; and

c. Adequate power is provided to mitigate events postulated during shutdown, such as an inadvertent draindown of the vessel or a fuel handling accident.

The AC and DC electrical power distribution systems satisfy Criterion 3 of the NRC Policy Statement (Ref. 3).

(continued)

BASES (continued)

LCO

Various combinations of subsystems, equipment, and components are required OPERABLE by other LCOs, depending on the specific plant condition. Implicit in those requirements is the required OPERABILITY of necessary support required features. This LCO explicitly requires energization of the portions of the electrical distribution system necessary to support OPERABILITY of Technical Specifications required systems, equipment, and components – both specifically addressed by their own LCO, and implicitly required by the definition of OPERABILITY.

In addition, some components that may be required by Unit 3 receive power through the Unit 1 and 2 electrical power distribution subsystems (e.g., Standby Gas Treatment (SGT) System, and Control Room Emergency Ventilation System (CREVS)). Therefore, the Unit 1 and 2 AC and DC electrical power distribution subsystems needed to support the required equipment must also be OPERABLE.

For a unit in MODE 4 or 5, the AC and DC boards can be placed on their alternate feeder breakers and considered OPERABLE as long as the restrictions on the associated drawings are met.

Maintaining these portions of the distribution system energized ensures the availability of sufficient power to operate the plant in a safe manner to mitigate the consequences of postulated events during shutdown (e.g., fuel handling accidents and inadvertent reactor vessel draindown).

APPLICABILITY

The AC and DC electrical power distribution subsystems required to be OPERABLE in MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment provide assurance that:

a. Systems to provide adequate coolant inventory makeup are available for the irradiated fuel in the core in case of an inadvertent draindown of the reactor vessel;

b. Systems needed to mitigate a fuel handling accident are available;

(continued)

BASES

APPLICABILITY (continued)

c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

The AC and DC electrical power distribution subsystem requirements for MODES 1, 2, and 3 are covered in LCO 3.8.7.

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, A.2.4, and A.2.5

Although redundant required features may require redundant divisions of electrical power distribution subsystems to be OPERABLE, one OPERABLE distribution subsystem division may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for draining the reactor vessel. By allowing the option to declare required features associated with an inoperable distribution subsystem inoperable, appropriate restrictions are implemented in accordance with the affected distribution subsystem LCO's Required Actions. In many instances this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made, (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies in the secondary containment, and any activities that could result in inadvertent draining of the reactor vessel).

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC and DC electrical power distribution subsystems and to continue this action until restoration is accomplished in order to provide the necessary power to the plant safety systems.

(continued)

BASES

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, A.2.4, and A.2.5 (continued)

Notwithstanding performance of the above conservative Required Actions, a required residual heat removal-shutdown cooling (RHR-SDC) subsystem may be inoperable. In this case, Required Actions A.2.1 through A.2.4 do not adequately address the concerns relating to coolant circulation and heat removal. Pursuant to LCO 3.0.6, the RHR-SDC ACTIONS would not be entered. Therefore, Required Action A.2.5 is provided to direct declaring RHR-SDC inoperable, which results in taking the appropriate RHR-SDC ACTIONS.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required distribution subsystems should be completed as quickly as possible in order to minimize the time the plant safety systems may be without power.

SURVEILLANCE REQUIREMENTS

SR 3.8.8.1

This Surveillance verifies that the AC and DC electrical power distribution subsystem is functioning properly, with the buses energized. The verification of proper voltage availability on the buses ensures that the required power is readily available for motive as well as control functions for critical system loads connected to these buses. This may be performed by verification of an absence of low voltage alarm. The 7 day Frequency takes into account the redundant capability of the electrical power distribution subsystems, as well as other indications available in the control room that alert the operator to subsystem malfunctions.

REFERENCES

1. FSAR, Chapter 6.

2. FSAR, Chapter 14.

3. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

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SECTION 3.8
LIST OF REVISED PAGES

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REV. 1 3
Specification 3.8.1

A1

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3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 Auxiliary Electrical System	4.9 Auxiliary Electrical System
Applicability	**Applicability**
Applies to all the auxiliary electrical power system.	Applies to the periodic testing requirements of the auxiliary electrical system.
Objective	**Objective**
To assure an adequate supply of electrical power for operation of those systems required for safety.	Verify the OPERABILITY of the auxiliary electrical system.
Specification	**Specification**
A. Auxiliary Electrical Equipment	A. Auxiliary Electrical System

Applicability 1. PRIOR TO STARTUP from a COLD CONDITION, the following must be satisfied:

LCO 3.8.1.b a. Diesel generators A, B, C, and D OPERABLE.

See Justification for Changes for ~~BFN ISTS 3.8.4 + 3.8.7~~ on pg 3.9/4.9-5,6,7 b. Requirements 3.9.A.3 through 3.9.A.6 are met.

LCO 3.8.1.a c. At least two of the following offsite power sources are available:

(1) The 500-kV system is available to the units 1 and 2 shutdown boards through the unit 1 station-service transformer TUSS/1B with no credit taken for the two 500-kV Trinity lines. If the unit 2 station-service transformer is the second choice, a minimum of two 500-kV lines must be available.

LA1

A5 Proposed SR Note

1. Diesel Generators

Proposed SR 3.8.1.16

a. Each diesel generator shall be manually started and loaded to demonstrate operation readiness in accordance with the frequency specified in Table 4. ~~on a staggered test basis.~~ The test shall continue for at least one-hour period at 100 or greater of the continuous rating of the diesel generator, and the operation of the diesel fuel oil transfer pumps shall be demonstrated. Also, the diesel generator starting air compressor shall be checked for operation and its ability to recharge air receivers.

M5 SR 3.8.1.2 1

L9 SR 3.8.1.3 2

Proposed Notes 1-4 to SR 3.8.1.3 2

A2

LA3

A2 LA2

SR 3.8.1.4 3

See Justification for Changes for BFN ISTS 3.8.3

L9 SR 3.8.1.8 7

L7

Once per 18 months, each diesel generator will be tested at a load of at least 2800 KW to demonstrate full load carrying capability for

~~3.9/4.9 AUXILIARY ELECTRICAL SYSTEM~~

~~LIMITING CONDITIONS FOR OPERATION~~ (A1)

~~3.9.A. Auxiliary Electrical Equipment~~

~~3.9.A.1.c. (Cont'd)~~ (LA1)

~~(2) The 500-kV system is available to the units 1 and 2 shutdown boards through the unit 2 station-service transformer TUSS 2B with no credit taken for the two 500-kV Trinity lines. If the unit 1 station-service transformer is the second choice, a minimum of two 500-kV lines must be available.~~

~~(3) The Trinity 161-kV line is available to the units 1 and 2 shutdown boards through both common station-service transformers.~~

~~Notes for (3):~~

~~(a) If unit 3 is claiming the Trinity line as an offsite source, see unit 3 technical specifications, Section 3.9.A.1.c.2.~~

~~(b) If unit 1 is in cold shutdown, only one common station-service transformer is required.~~

~~SURVEILLANCE REQUIREMENTS~~

~~4.9.A. Auxiliary Electrical System~~

~~4.9.A.1.a. (Cont'd)~~

SR 3.8.1.~~8~~ 7 (L9) → an interval of not less than 24 hours.

SR 3.8.1.~~8~~ 4 (M5) → The diesel generator fast starts (10 seconds) from standby conditions shall be performed once per 184 days in these surveillance tests. All other engine starts for the purpose of this test may be preceeded by an engine idle start.

SR 3.8.1.~~7~~ 1 Note → (LR2)

~~See Justification for changes to BFN ISTS Section 5.0~~ → ~~Additional reporting requirements due to failures are noted in Table 4.9.A.~~ (L10)

(LA4) → ~~All diesel generator starts shall be logged.~~

b. SR 3.8.1.~~10~~ 9 Once per operating cycle, a test will be conducted simulating a loss of offsite power and similar conditions that would exist with the presence of an actual safety-injection signal to demonstrate the following:

SR 3.8.1.~~10~~ 9 a + b (1) Deenergization of the emergency buses and load shedding from the emergency buses.

SR 3.8.1.~~10~~ 9 .c (2) The diesel starts from ambient condition on the auto-start signal, energizes the emergency buses with permanently connected loads, energizes the auto-connected emergency loads through

(M5) in 10 sec

REV. 3

~~3.9/4.9 AUXILIARY ELECTRICAL SYSTEM~~

See Justification for Changes for BFN ISTS 3.8.5.1

Specification 3.8.1

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~~LIMITING CONDITIONS FOR OPERATION~~ (A1)

~~SURVEILLANCE REQUIREMENTS~~

~~3.9.A. Auxiliary Electrical Equipment~~

3. Buses and Boards Available

a. The respective start bus is energized for each common station-service transformer designated as an offsite power source.

(LA1)

b. The 4-kV bus tie board is energized and capable of supplying power to the Units 1 and 2 shutdown boards if a cooling tower transformer is designated as an offsite power source.

c. The units 1 and 2 4-kV shutdown boards are energized.

See Justification for Changes for BFN ISTS 3.8.7

~~4.9.A. Auxiliary Electrical System~~

~~3. Logic Systems~~

a. Both divisions of the common accident signal logic system shall be tested every 18 months to demonstrate that it will function on actuation of the core spray system of each reactor to provide an automatic start signal to all 4 units 1 and 2 diesel generators.

SR 3.8.1.~~7~~ 6

9 b. Once every 18 months, the condition under which the 480-V load shedding logic system is required shall be simulated using pendant test switches and/or pushbutton test switches to demonstrate that the load shedding logic system would initiate load shedding signals on the diesel auxiliary boards, RMOV boards, and the 480-V shutdown boards.

SR 3.8.1.~~10~~.b

(LA5)

(LA6)

(MB)

Proposed SR 3.8.1.~~9~~ 8

Insert Proposed SR 3.8.1.5

(M5)

~~3.9.B Operation With Inoperable Equipment~~

8. From and after the date that one of the 250-V shutdown board batteries and/or its associated battery board is found to be INOPERABLE for any reason, continued REACTOR POWER OPERATION IS permissible during the succeeding five days in accordance with 3.9.B.7.

See Justification for Changes for BFN ISTS 3.8.4 + 3.8.7

ACTIONS C + D

9. When one division of the logic system is INOPERABLE, continued REACTOR POWER OPERATION is permissible under this condition for seven days, provided the CSCS requirements listed in specification 3.9.B.3 are satisfied. The NRC shall be notified within 24 hours of the situation, the precautions to be taken during this period, and the plans to return the failed component to an OPERABLE state.

LB

LA7

L11

A1 ~~10. (deleted)~~

11. The following limiting conditions for operation exist for the undervoltage relays which start the diesel generators on the 4-kV shutdown boards.

See Justification for Changes for BFN ISTS 3.3.8.1

TABLE 4.9.A

Diesel Generator Reliability

No. of Failures in last 20 valid tests*	No. of Failures in last 100 valid tests*	Reliability Actions
≤ 1	-	Test at least once per 31 days
≥ 2	-	Test at least once per 7 days**
≥ 3	≥ 6	Within 30 days, prepare a report for NRC audit, in accordance with Section 6.9.2.7.
≥ 5	≥11	Declare the diesel generator INOPERABLE and perform a requalification test for the affected diesel generator pursuant to the attachment to this table.

* Criteria for determining number of failures and number of valid tests shall be in accordance with Regulatory Position C.2.e of Regulatory Guide 1.108, Revision 1, August 1977, except that the number of tests and failures are determined on a per diesel generator basis. For the purposes of this test schedule, only valid tests conducted after the Operating License issuance date shall be included in the computation of the "last 20 valid tests". Entry into this test schedule shall be made at the 31 day test frequency.

**This test frequency shall be maintained until seven consecutive failure free demands have been performed and the number of failures in the last 20 valid demands has been reduced on one or less.

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AUG 19 198

L10

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Specification 3.8.1

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LA3 LTO

ATTACHMENT TO TABLE 4.9.A
DIESEL GENERATOR REQUALIFICATION PROGRAM

(1) Perform seven consecutive successful demands without a failure within 30 days of diesel generator being restored to operable status and fourteen consecutive successful demands without a failure within 75 days of diesel generator of being restored to OPERABLE status.

(2) If a failure occurs during the first seven tests in the requalification test program, perform seven successful demands without an additional failure within 30 days of diesel generator of being restored to OPERABLE status and fourteen consecutive successful demands without a failure within 75 days of being restored to OPERABLE status.

(3) If a failure occurs during the second seven tests (tests 8 through 14) of (1) above, perform fourteen consecutive successful demands without an additional failure within 75 days of the failure which occurred during the requalification testing.

(4) Following the second failure during the requalification test program, be in at least HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours.

(5) During requalification testing the diesel generator should not be tested more frequently than at 24-hour intervals.

After a diesel generator has been successfully requalified, subsequent repeated requalification tests will not be required for that diesel generator under the following conditions:

(a) The number of failures in the last 20 valid demands is less than 5.

(b) The number of failures in the last 100 valid demands is less than 11.

(c) In the event that, following successful requalification of a diesel generator, the number of failures is still in excess of the remedial action criteria (a and/or b above) the following exception will be allowed until the diesel generator is no longer in violation of the remedial action criteria (a and/or b above).

Requalification testing will not be required provided that after each valid demand the number of failures in the last 20 and/or 100 valid demands <u>has not increased</u>. Once the diesel generator is no longer in violation of the remedial action criteria above the provisions of those criteria alone will prevail.

AMENDMENT NO. 153

Rev. 3

Specification 3.8.2

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~~3.9/4.9 AUXILIARY ELECTRICAL SYSTEM~~

~~LIMITING CONDITIONS FOR OPERATION~~ (A1) ~~SURVEILLANCE REQUIREMENTS~~

~~3.9.D. Diesel Generators Required for Units 1, 2, and 3 Shared Systems~~

~~4.9.D. Diesel Generators Required for Units 1, 2, and 3 Shared Systems~~

Action A Required Action B.1

3. If Specification 3.9.D.2 cannot be met, the affected equipment shall be declared inoperable.

(M2) Proposed Required Action ~~B.2.1 - B.2.4~~

B.1.1 - B.1.4

~~3.9/4.9 AUXILIARY ELECTRICAL SYSTEM~~

~~LIMITING CONDITIONS FOR OPERATION~~ (A1) ~~SURVEILLANCE REQUIREMENTS~~

~~3.9.B. Operation With Inoperable Equipment~~ ~~4.9.B. Operation With Inoperable Equipment~~

See Justification for changes for BFN ISTS 3.8.1

5. When one of the shutdown buses is INOPERABLE, REACTOR POWER OPERATION is permissible for a period of 7 days.

5. When a shutdown bus is found to be INOPERABLE, all 1 and 2 diesel generators shall be proven OPERABLE within 24 hours.

6. When one of the 480-V diesel auxiliary boards becomes INOPERABLE, REACTOR POWER OPERATION is permissible for a period of 5 days.

6. When one units 1 and 2 diesel auxiliary board is found to be INOPERABLE, each unit 1 and 2 diesel generator shall be proven OPERABLE within 24 hours, and power availability for the remaining diesel auxiliary board shall be verified within 1 hour and at least once per 8 hours thereafter.

See Justification for Changes for BFN ISTS 3.8.7 in this Section

ACTION A 1st Part

7. From and after the date that one of the three 250-V unit batteries and/or its associated battery board is found to be INOPERABLE for any reason, continued REACTOR POWER OPERATION is permissable during the succeding 7 days. Except for routine surveillance testing, NRC shall be notified within 24 hours of the situation, the precautions to be taken during this period, and the plans to return the failed component to an OPERABLE state.

See Justification for Changes for BFN ISTS 3.8.7 in this Section

LA2

L4

~~3.9/4.9 AUXILIARY ELECTRICAL SYSTEM~~

A1

~~LIMITING CONDITIONS FOR OPERATION~~ | ~~SURVEILLANCE REQUIREMENTS~~

~~3.9.B Operation With Inoperable Equipment~~

OR M5

ACTION A 2nd part

8. From and after the date that one of the 250-V shutdown board batteries and/or its associated battery board is found to be INOPERABLE for any reason, continued REACTOR POWER OPERATION IS permissible during the succeeding ~~five~~ days in accordance with 3.9.B.7.

A2

Proposed ACTION C

7 L1

LA2 L4

See Justification for Changes for BFN ISTS 3.8.7 in This Section

9. When one division of the logic system is INOPERABLE, continued REACTOR POWER OPERATION is permissible under this condition for seven days, provided the CSCS requirements listed in specification 3.9.B.3 are satisfied. The NRC shall be notified within 24 hours of the situation, the precautions to be taken during this period, and the plans to return the failed component to an OPERABLE state.

See Justification for Changes for BFN ISTS 3.8.1

10. (deleted)

11. The following limiting conditions for operation exist for the undervoltage relays which start the diesel generators on the 4-kV shutdown boards.

See Justification for Changes for BFN ISTS 3.3.8.1 in Section 3.3

M4 Proposed Action D

REV. X2 3

NOV 18

~~3.9/4.9 AUXILIARY ELECTRICAL SYSTEM~~

~~LIMITING CONDITIONS FOR OPERATION~~

See Justification for Changes for BFN ISTS 3.8.1

Specification 3.8.7

~~SURVEILLANCE REQUIREMENTS~~

A1

~~3.9.B. Operation With Inoperable Equipment~~

5. When one of the shutdown buses is INOPERABLE, REACTOR POWER OPERATION is permissible for a period of 7 days.

6. When one of the 480-V diesel auxiliary boards becomes INOPERABLE, REACTOR POWER OPERATION is permissible for a period of 5 days.

ACTION C D

AND 12 days from discovery of failure to meet LCO

M1

7. From and after the date that one of the three 250-V unit batteries and/or its associated battery board is found to be INOPERABLE for any reason, continued REACTOR POWER OPERATION is permissable during the succeding 7 days. Except for routine surveillance testing, NRC shall be notified within 24 hours of the situation, the precautions to be taken during this period, and the plans to return the failed component to an OPERABLE state.

ACTION D E (1st part)

L5 LA2

~~4.9.B. Operation With Inoperable Equipment~~

5. When a shutdown bus is found to be INOPERABLE, all 1 and 2 diesel generators shall be proven OPERABLE within 2 hours.

6. When one units 1 and 2 diesel auxiliary board is found to be INOPERABLE, each unit 1 and 2 diesel generator shall be prove OPERABLE within 24 hours and power availability for the remaining diesel auxiliary board shall be verified within 1 hour and at least once per 8 hours thereafter.

L2

See Justification for changes for BFN ISTS 3.8.4 in this Section

M1

and 12 days from discovery of failure to meet LCO.

~~3.9/4.9 AUXILIARY ELECTRICAL SYSTEM~~

~~LIMITING CONDITIONS FOR OPERATION~~ (A1) ~~SURVEILLANCE REQUIREMENTS~~

~~3.9.B OPERATION WITH INOPERABLE EQUIPMENT~~

(OR) (M3)

8. From and after the date that one of the 250-V shutdown board batteries and/or its associated battery board is found to be INOPERABLE for any reason, continued REACTOR POWER OPERATION IS permissible during the succeeding five days in accordance with 3.9/B.7.

ACTION (2nd mode) E

(L4) 7

(LA2) (L5)

See Justification for Changes for BFN ISTS 3.8.4 IN This Section

9. When one division of the logic system is INOPERABLE, continued REACTOR POWER OPERATION is permissible under this condition for seven days, provided the CSCS requirements listed in specification 3.9.B.3 are satisfied. The NRC shall be notified within 24 hours of the situation, the precautions to be taken during this period, and the plans to return the failed component to an OPERABLE state.

See Justification for Changes for BFN ISTS 3.8.1

(A1) ~~10. (deleted)~~

11. The following limiting conditions for operation exist for the undervoltage relays which start the diesel generators on the 4-kV shutdown boards.

See Justification for Changes for BFN ISTS 3.3.8.1 IN SECTION 3.3

(M3) Proposed Action ~~G~~ H I

(M5) Proposed ACTION E F G

(M6) Proposed Action F

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A1

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 AUXILIARY ELECTRICAL SYSTEM	4.9 AUXILIARY ELECTRICAL SYSTEM
Applicability Applies to all the auxiliary electrical power system.	Applicability Applies to the periodic testing requirements of the auxiliary electrical system.
Objective To assure an adequate supply of electrical power for operation of those systems required for safety.	Objective Verify the OPERABILITY of the auxiliary electrical system.
Specification	Specification
A. Auxiliary Electrical Equipment	A. Auxiliary Electrical System
Applicab. 1, 4 — 1. PRIOR TO STARTUP from a COLD CONDITION, the following must be satisfied:	A5 Proposed SR Note — 1. Diesel Generators — Proposed SR 3.8.1.11 (10)
LCO 3.8.1.b — a. Diesel generators A, B, C, and D OPERABLE.	M5 SR 3.8.1.2 (1) — L9 SR 3.8.1.2 (2) — Proposed Notes 1-4 to SR 3.8.1.3 (2) — A2 — a. Each diesel generator shall be manually started and loaded to demonstrate operational readiness in accordance with the frequency specified in Table 4.9.A on a staggered test basis. The test shall continue for at least a one-hour period at 100% or greater of the continuous rating of the diesel generator, and the operation of the diesel fuel oil transfer pumps shall be demonstrated. Also the diesel generator starting air compressor shall be checked for operation and its ability to recharge air receivers.
(See Justification for Changes for BFN ISTS on ~~3.8.4 & 3.8.7~~ Pg. 3.9/4.9-5,6,7) — b. Requirements 3.9.A.3 through 3.9.A.6 are met.	LA3 — A2 — A2
LCO 3.8.1.a — c. At least two of the following offsite power sources are available: (1) The 500-kV system is available to the units 1 and 2 shutdown boards through the unit 1 station-service transformer TUSS 1B with no credit taken for the two 500-kV Trinity lines. If the unit 2 station-service transformer is the second source, a minimum of two 500-kV lines must be available.	SR 3.8.1.14 (3) — (See Justification for Changes for BFN ISTS 3.8.3) — SR 3.8.1.8 (7) — L9 — L7 — Once per 18 months, each diesel generator will be tested at a load of at least 2800 KW to demonstrate full load carrying capability for

LA1

3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

~~LIMITING CONDITIONS FOR OPERATION~~

3.9.A. Auxiliary Electrical Equipment

A1

~~3.9.A.1.c. (Cont'd)~~

LA1

(2) The 500 kV system is available to the units 1 and 2 shutdown boards through the unit 2 station-service transformer TUSS 2B with no credit taken for the two 500-kV Trinity lines. If the unit 1 station-service transformer is the second choice, a minimum of two 500-kV lines must be available.

(3) The Trinity 161-kV line is available to the units 1 and 2 shutdown boards through both common station-service transformers.

NOTES FOR (3):

(a) If unit 3 is claiming the Trinity line as an offsite source, see unit 3 technical specifications, Section 3.9.A.1.c.2.

(b) If unit 1 is in cold shutdown, only one common station-service transformer is required.

~~SURVEILLANCE REQUIREMENTS~~

4.9.A. Auxiliary Electrical Syst.

~~4.9.A.1.a. (Cont'd)~~

SR 3.8.1.~~8~~ 7 — an interval of not less than 24 hours.

L9

SR 3.8.1.~~8~~ 4 — The diesel generator fast starts (10 seconds) from standby conditions shall be performed once per 184 days in these surveillance tests. All other engine starts for the purpose of this test may be preceeded by an engine idle start.

M5

SR 3.8.1.~~2~~ 1 Note

LA3 — ~~See justification for changes to BFN 1&2 Section 5.0~~ ~~Additional reporting requirements due to failures are noted in Table 4.9.A.~~

L10

LA4 — ~~All diesel generator starts shall be logged.~~

SR 3.8.1.~~10~~ 9 b. Once per operating cycle, a test will be conducted simulating a loss of offsite power and similar conditions that would exist with the presence of an actual safety-injection signal to demonstrate the following:

SR 3.8.1.~~10~~ 9 a+b (1) Deenergization of the emergency buses and load shedding from the emergency buses.

SR 3.8.1.~~10~~ 9 .c (2) The diesel starts from ambient condition on the auto-start signal, energizes the emergency buses with permanently connected loads, energizes the auto-connected

M5 — in 10 sec

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~~3.9/4.9 AUXILIARY ELECTRICAL SYSTEM~~ (See Justification for Changes for BFN ISTS 3.3.5.1)

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~~LIMITING CONDITIONS FOR OPERATION~~

~~3.9 A. Auxiliary Electrical Equipment~~

3. Buses and Boards Available

a. The respective start bus is energized for each common station-service transformer designated as an offsite power source.

LA1

b. The 4-kV bus tie board is energized and capable of supplying power to the units 1 and 2 shutdown boards if a cooling tower transformer is designated as an offsite power source.

c. The units 1 and 2 4-kV shutdown boards are energized.

(See Justification for Changes for BFN ISTS 3.8.7)

~~SURVEILLANCE REQUIREMENTS~~

A1 ~~4.9 A. Auxiliary Electrical System~~

~~2. Logic Systems~~

a. Both divisions of the common accident signal logic system shall be tested every 18 months to demonstrate that it will function on actuation of the core spray system of each reactor to provide an automatic start signal to all 4 units 1 and 2 diesel generators.

SR 3.8.1.~~7~~ 6

SR 3.8.1.~~10~~ 9 b. Once every 18 months, the condition under which the 480-volt load shedding logic system is required shall be simulated using pendant test switches and/or pushbutton test switches to demonstrate that the load shedding logic system would initiate load shedding signals on the diesel auxiliary boards, RMOV boards, and the 480-V shutdown boards.

LA5

LA6

M8

Proposed SR 3.8.1.~~9~~ 8

Insert M5

Proposed SR 3.8.1.5

~~3.9.B Operation With Inoperable Equipment~~

8. From and after the date that one of the 250-V shutdown board batteries and/or its associated battery board is found to be INOPERABLE for any reason, continued REACTOR POWER OPERATION is permissible during the succeeding five days in accordance with 3.9.B.7.

See Justification for Changes for BFN ISTS 3.8.4 + 3.8.7

ACTIONS C + D

9. When one division of the logic system is INOPERABLE, continued REACTOR POWER OPERATION is permissible under this condition for seven days, provided the CSCS requirements listed in Specification 3.9.B.3 are satisfied. ~~The NRC shall be notified within 24 hours of the situation, the precautions to be taken during this period, and the plans to return the failed component to an OPERABLE state.~~

(L8) (LA7) (L11)

(A1) ~~10. (deleted)~~

11. The following limiting conditions for operation exist for the undervoltage relays which start the diesel generators on the 4-kV shutdown boards.

See Justification for Changes for BFN ISTS 3.3.8.1

Diesel Generator Reliability

No. of Failures in last 20 valid tests*	No. of Failures in last 100 valid tests*	Reliability Actions
≤ 1	-	Test at least once per 31 days
≥ 2	-	Test at least once per 7 days**
≥ 3	≥ 6	Within 30 days, prepare a report for NRC audit, in accordance with Section 6.9.2.7
≥ 5	≥11	Declare the diesel generator INOPERABLE and perform a requalification test for the affected diesel generator pursuant to the attachment to this table.

* Criteria for determining number of failures and number of valid tests shall be in accordance with Regulatory Position C.2.e of Regulatory Guide 1.108, Revision 1, August 1977, except that the number of tests and failures are determined on a per diesel generator basis. For the purposes of this test schedule, only valid tests conducted after the Operating License issuance date shall be included in the computation of the "last 20 valid tests". Entry into this test schedule shall be made at the 31 day test frequency.

**This test frequency shall be maintained until seven consecutive failure free demands have been performed and the number of failures in the last 20 valid demands has been reduced on one or less.

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L10

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ATTACHMENT TO TABLE 4.9.A
DIESEL GENERATOR REQUALIFICATION PROGRAM

(1) Perform seven consecutive successful demands without a failure within 30 days of diesel generator being restored to operable status and fourteen consecutive successful demands without a failure within 75 days of diesel generator of being restored to OPERABLE status.

(2) If a failure occurs during the first seven tests in the requalification test program, perform seven successful demands without an additional failure within 30 days of diesel generator of being restored to OPERABLE status and fourteen consecutive successful demands without a failure within 75 days of being restored to OPERABLE status.

(3) If a failure occurs during the second seven tests (tests 8 through 14) of (1) above, perform fourteen consecutive successful demands without an additional failure within 75 days of the failure which occurred during the requalification testing.

(4) Following the second failure during the requalification test program, be in at least HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours.

(5) During requalification testing the diesel generator should not be tested more frequently than at 24-hour intervals.

After a diesel generator has been successfully requalified, subsequent repeated requalification tests will not be required for that diesel generator under the following conditions:

(a) The number of failures in the last 20 valid demands is less than 5.

(b) The number of failures in the last 100 valid demands is less than 11.

(c) In the event that, following successful requalification of a diesel generator, the number of failures is still in excess of the remedial action criteria (a and/or b above) the following exception will be allowed until the diesel generator is no longer in violation of the remedial action criteria (a and/or b above).

Requalification testing will not be required provided that after each valid demand the number of failures in the last 20 and/or 100 valid demands <u>has not increased</u>. Once the diesel generator is no longer in violation of the remedial action criteria above the provisions of those criteria alone will prevail.

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~~3.9/4.9 AUXILIARY ELECTRICAL SYSTEM~~

~~LIMITING CONDITIONS FOR OPERATION~~

~~3.9.D. Diesel Generators Required for Units 1, 2, and 3 Shared Systems~~

A1

ACTION A Required Action B.1

3. If Specification 3.9.D.2 cannot be met, the affected equipment shall be declared inoperable.

M2 Proposed Required Action ~~B.2.1 - B.2.4~~

B.1.1 - B.1.4

~~SURVEILLANCE REQUIREMENTS~~

~~4.9.D. Diesel Generators Required for Units 1, 2, and 3 Shared Syste~~

~~3.9/4.9 AUXILIARY ELECTRICAL SYSTEM~~

Specification 3.8.4

~~LIMITING CONDITIONS FOR OPERATION~~

~~SURVEILLANCE REQUIREMENTS~~

A1

~~3.9.B. Operation With Inoperable Equipment~~

5. When one of the shutdown buses is INOPERABLE, REACTOR POWER OPERATION is permissible for a period of 7 days.

See Justification for changes for BFN ISTS 3.8.1

6. When one of the 480-V diesel auxiliary boards becomes INOPERABLE, REACTOR POWER OPERATION is permissible for a period of 5 days.

SEE JUSTIFICATION FOR CHANGES FOR BFN ISTS 3.8.7 IN THIS SECTION

ACTION A 1st part 7. From and after the date that one of the three 250-V unit batteries and/or its associated battery board is found to be INOPERABLE for any reason, continued REACTOR POWER OPERATION is permissible during the succeeding 7 days. Except for routine surveillance testing, NRC shall be notified within 24 hours of the situation, the precautions to be taken during this period, and the plans to return the failed component to an OPERABLE state.

LA2

L4

~~4.9.B. Operation With Inoperable Equipment~~

5. When a shutdown bus is found to be INOPERABLE, all 1 and 2 diesel generators shall be proven OPERABLE within 24 hours.

6. When one units 1 and 2 diesel auxiliary board is found to be INOPERABLE, each unit 1 and 2 diesel generator shall be proven OPERABLE within 24 hours, and power availability for the remaining diesel auxiliary board shall be verified within 1 hour and at least once per 8 hours thereafter.

SEE JUSTIFICATION FOR CHANGES FOR BFN ISTS 3.8.7 IN THIS SECTION

~~3.9/4.9 AUXILIARY ELECTRICAL SYSTEMS~~

~~LIMITING CONDITIONS FOR OPERATION~~ (A1) ~~SURVEILLANCE REQUIREMENTS~~

~~3.9.B Operation With Inoperable Equipment~~

OR (M5)

ACTION A 2nd part

8. From and after the date that one of the 250-V shutdown board batteries and/or its associated battery board is found to be INOPERABLE for any reason, continued REACTOR POWER OPERATION is permissible during the succeeding ~~five~~ days in accordance with 3.9.B.7.

SEE JUSTIFICATION FOR CHANGES FOR BFN ISTS 3.8.7 IN THIS SECTION

(A2) Proposed ACTION C

(7) (L1)

(LA2) (L4)

9. When one division of the logic system is INOPERABLE, continued REACTOR POWER OPERATION is permissible under this condition for seven days, provided the CSCS requirements listed in Specification 3.9.B.3 are satisfied. The NRC shall be notified within 24 hours of the situation, the precautions to be taken during this period, and the plans to return the failed component to an OPERABLE state.

SEE JUSTIFICATION FOR CHANGES FOR BFN ISTS 3.8.1

10. (deleted)

11. The following limiting conditions for operation exist for the undervoltage relays which start the diesel generators on the 4-kV shutdown boards.

SEE JUSTIFICATION FOR CHANGES FOR BFN ISTS 3.3.8.1 IN SECTION 3.3

(M4) Proposed ACTION D

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~~3.9/4.9 AUXILIARY ELECTRICAL SYSTEMS~~

See Justification for Changes for BFN ISTS 3.8.1

~~LIMITING CONDITIONS FOR OPERATION~~

~~SURVEILLANCE REQUIREMENTS~~

A1

~~3.9.B. Operation With Inoperable Equipment~~

5. When one of the shutdown buses is INOPERABLE, REACTOR POWER OPERATION is permissible for a period of 7 days.

6. When one of the 480-V diesel auxiliary boards becomes INOPERABLE, REACTOR POWER OPERATION is permissible for a period of 5 days.

ACTION C & D

AND 12 days from discovery of failure to meet LCO

M1

7. From and after the date that one of the three 250-V unit batteries and/or its associated battery board is found to be INOPERABLE for any reason, continued REACTOR POWER OPERATION is permissible during the succeeding 7 days. Except for routine surveillance testing, NRC shall be notified within 24 hours of the situation, the precautions to be taken during this period, and the plans to return the failed component to an OPERABLE state.

ACTION D E (1st part)

L5

~~LA2~~

and 12 days from discovery of failure to meet LCO

M1

~~4.9.B. Operation With Inoperable Equipment~~

5. When a shutdown bus is found to be INOPERABLE, all 1 and 2 diesel generators shall be proven OPERABLE within 24 hours.

6. ~~When one units 1 and 2 diesel auxiliary board is found to be INOPERABLE, each unit 1 and 2 diesel generator shall be proven OPERABLE within 24 hours, and power availability for the remaining diesel auxiliary board shall be verified within 1 hour and at least once per 8 hours thereafter.~~

L2

SEE JUSTIFICATION FOR CHANGE FOR BFN ISTS 3.8.4 IN THIS SECTION

~~3.9.B Operation With Inoperable Equipment~~

(OR) (M3)

ACTION ~~D~~ E (2nd part)

8. From and after the date that one of the 250-V shutdown board batteries and/or its associated battery board is found to be INOPERABLE for any reason, continued REACTOR POWER OPERATION is permissible during the succeeding five days in accordance with 3.9.B.7.

SEE JUSTIFICATION FOR CHANGE FOR BFN ISTS 3.8.4 IN THIS SECTION

(L4) (7) (~~L42~~ 9) (L5)

9. When one division of the logic system is INOPERABLE, continued REACTOR POWER OPERATION is permissible under this condition for seven days, provided the CSCS requirements listed in Specification 3.9.B.3 are satisfied. The NRC shall be notified within 24 hours of the situation, the precautions to be taken during this period, and the plans to return the failed component to an OPERABLE state.

SEE JUSTIFICATION FOR CHANGES FOR BFN ISTS 3.8.1

(A1) ~~10. (deleted)~~

11. The following limiting conditions for operation exist for the undervoltage relays which start the diesel generators on the 4-kV shutdown boards.

SEE JUSTIFICATION FOR CHANGES FOR BFN ISTS 3.3.8.1 IN SECTION 3.3

(M3) Proposed ACTION ~~H~~ I

(M5) Proposed ACTION ~~E~~ FG

(M6) Proposed Action F

BROWNS FERRY NUCLEAR PLANT - IMPROVED TECHNICAL SPECIFICATIONS
SECTION 3.8
LIST OF REVISED PAGES

UNIT 3 CURRENT TECH SPECS SECTIONS

Replaced Section 3.8.1, page 2 of 21 (3.9/4.9-1) Rev 1 with page 2 of 21 (3.9/4.9-1) Rev 3
Replaced Section 3.8.1, page 3 of 21 (3.9/4.9-2) Rev 1 with page 3 of 21 (3.9/4.9-2) Rev 3
Replaced Section 3.8.1, page 6 of 21 (3.9/4.9-5) Rev 1 with page 6 of 21 (3.9/4.9-5) Rev 3
Replaced Section 3.8.1, page 11 of 21 (3.9/4.9-10) with page 11 of 21 (3.9/4.9-10) Rev 3
Replaced Section 3.8.1, page 15 of 21 (3.9/4.9-15) Rev 1 with page 15 of 21 (3.9/4.9-15) Rev 3
Replaced Section 3.8.1, page 16 of 21 (3.9/4.9-16) Rev 1 with page 16 of 21 (3.9/4.9-16) Rev 3
Replaced Section 3.8.2, page 4 of 7 (3.9/4.9-14b) Rev 1 with page 4 of 7 (3.9/4.9-14b) Rev 3
Replaced Section 3.8.4, page 4 of 5 (3.9/4.9-10) with page 4 of 5 (3.9/4.9-10) Rev 3
Replaced Section 3.8.7, page 6 of 7 (3.9/4.9-10) Rev 1 with page 6 of 7 (3.9/4.9-10) Rev 3

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Specification 3.8.1

A1

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3.9/4.9 AUXILIARY ELECTRICAL SYSTEM

LIMITING CONDITIONS FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.9 Auxiliary Electrical System	4.9 Auxiliary Electrical System
Applicability	**Applicability**
Applies to all the auxiliary electrical power system.	Applies to the periodic testing requirements of the auxiliary electrical system.
Objective	**Objective**
To assure an adequate supply of electrical power for operation of those systems required for safety.	Verify the OPERABILITY of the auxiliary electrical system.
Specification	**Specification**
A. Auxiliary Electrical Equipment	A. Auxiliary Electrical System

Applicability 1. PRIOR TO STARTUP from a COLD CONDITION, the following must be satisfied:

LCO 3.8.1.b a. Diesel generators 3A, 3B, 3C, and 3D OPERABLE.

See Justification for changes for BFN ISTS on ~~3.8.1 & 3.8.7~~ pg. 3.9/4.9-5,6,7 — b. Requirements 3.9.A.3 through 3.9.A.6 are met.

LCO 3.8.1.a c. At least two of the following offsite power sources are available:

(1) The 500-kV system is available to the unit 3 shutdown boards through the unit 3 station-service transformer TUSS 3B with no credit taken for the two 500-kV Trinity lines.

LA1

8 Proposed SR note

A5

1. Diesel Generators

Proposed SR 3.8.1.11

M5

SR 3.8.1.2

SR 3.8.1.3

L9

Proposed Notes 1-4 to SR 3.8.1.3

A2

LA3

a. Each diesel generator shall be manually started and loaded to demonstrate operational readiness in accordance with the frequency specified in Table 4.9.A on a staggered test basis. The test shall continue for at least a one-hour period at 100% or greater of the continuous rating of the diesel generator, and the operation of the diesel fuel oil transfer pumps shall be demonstrated. Also, the diesel generator starting air compressor shall be checked for operation and its ability to recharge air receivers.

A2 L8

3

SR 3.8.1.4

See Justification for changes for BFN ISTS 3.8.3

7

SR 3.8.1.8

L9

Once per 18 months, each diesel generator will be tested at a load of at least 2800 KW to demonstrate full load carrying capability

L7

~~3.9/4.9 AUXILIARY ELECTRICAL SYSTEMS~~

~~LIMITING CONDITIONS FOR OPERATION~~

~~3.9.A. Auxiliary Electrical Equipment~~ A1

~~3.9.A.1.c. (Cont'd)~~ LA1

(2) The Trinity 161-kV line is available to the unit 3 shutdown boards through a common station-service or cooling tower transformer.

NOTE FOR (2):

If units 1 and 2 are both in operation and claiming the Trinity line as an offsite source, TUSS 3B must be claimed as the other offsite source for unit 3.

(3) The Athens 161-kV line is available to unit 3 shutdown boards through a common station-service or cooling tower transformer.

NOTE FOR (3):

If either unit 1 or unit 2 is claiming the Athens line as an offsite source, it may not be claimed as an offsite source for unit 3.

~~SURVEILLANCE REQUIREMENTS~~

~~4.9.A. Auxiliary Electrical System~~

~~4.9.A.1.a. (Cont'd)~~

L9 SR 3.8.1.~~8~~ 7 for an interval of not less than 24 hours.

SR 3.8.1.~~8~~ 4 M5 The diesel generator fast starts (10 seconds) from standby conditions shall be performed once per 184 days in these surveillance tests. All other engine starts for the purpose of this test may be preceeded by an engine idle start.

SR 3.8.1.~~2~~ 1 Note

LA3 ~~See Justification for Changes to BFN ITS Section 5.0~~ ~~Additional reporting requirements due to failures are noted in Table 4.9.A.~~ L10

LA4 ~~All diesel generator starts shall be logged.~~

SR 3.8.1.~~10~~ 9 b. Once per operating cycle, a test will be conducted simulating a loss of offsite power and similar conditions that would exist with the presence of an actual safety-injection signal to demonstrate the following:

SR 3.8.1.~~10~~ 9 a + b (1) Deenergization of the emergency buses and load shedding from the emergency buses.

SR 3.8.1.~~10~~ 9 .c (2) The diesel starts from ambient condition on the auto-start signal, energizes the emergency buses with permanently connected loads, energizes the auto-connected emergency loads

M5 in 10 Sec

REV. # 3

Specification 3.8.1

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~~3.9/4.9 AUXILIARY ELECTRICAL SYSTEM~~

(See Justification for Changes for BFN ISTS 3.3.5.1)

~~LIMITING CONDITIONS FOR OPERATION~~

~~3.9.A. Auxiliary Electrical Equipment~~

3. Buses and Boards Available

a. The respective start bus is energized for each common station-service transformer designated as an offsite power source.

LA1

b. The 4-kV bus tie board is energized if a cooling tower transformer is designated as an offsite power source.

c. The 4-kV shutdown boards (3EA, 3EB, 3EC, 3ED) are energized.

d. The 480-V shutdown boards 3A and 3B are energized.

(See Justification for Changes for BFN ISTS 3.8.7)

~~SURVEILLANCE REQUIREMENTS~~

A1 ~~4.9.A. Auxiliary Electrical System~~

~~3. Logic Systems~~

a. Both divisions of the accident signal logic system shall be tested every 18 months to demonstrate that it will function on actuation of the core spray system of the reactor to provide an automatic start signal to all 4 diesel generators.

SR 3.8.1.~~7~~ 6

b. Once every 18 months, the condition under which the 480-volt load shedding logic system is required shall be simulated to demonstrate that the load shedding logic system would initiate load shedding signals on the diesel auxiliary boards, RMOV boards, and the 480-volt shutdown boards.

SR 3.8.1.~~10~~ 9.b

LA6

Proposed SR 3.8.1.~~9~~ 8

M8

M5 Insert Proposed SR 3.8.1.5

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~~3.9/4.9 AUXILIARY ELECTRICAL SYSTEM~~

Specification 3.8.1

~~LIMITING CONDITIONS FOR OPERATION~~

~~SURVEILLANCE REQUIREMENTS~~

~~3.9.B. Operation With Inoperable Equipment~~ (A1)

5. From and after the date that one of the 480-V diesel auxiliary boards becomes INOPERABLE, REACTOR POWER OPERATION is permissible for a period of 5 days.

See Justification for Changes for BFN ISTS 3.8.7

6. From and after the date that the 250-V shutdown board 3KB battery or one of the three 250-V unit batteries and/or its associated battery board is found to be INOPERABLE for any reason, continued REACTOR POWER OPERATION is permissible during the succeeding seven days. Except for routine surveillance testing, the NRC shall be notified within 24 hours of the situation, the precautions to be taken during this period, and the plans to return the failed component to an OPERABLE state.

See Justification for Changes for BFN ISTS 3.8.4

7. When one division of the logic system is INOPERABLE, continued REACTOR POWER OPERATION is permissible under this condition for seven days, provided the CSCS requirements listed in Specification 3.9.B.2 are satisfied. The NRC shall be notified within 24 hours of the situation, the precautions to be taken during this period, and the plans to return the failed component to an OPERABLE state.

ACTIONS C+D

L8

~~L47~~

L11

~~4.9.B. Operation With Inoperable Equipment~~

5. When one 480-V diesel auxiliary board is found INOPERABLE, each unit 3 diesel shall be verified OPERABLE within 24 hours, and power availability for the remaining diesel auxiliary board shall be verified within 1 hour and at least once per 8 hours thereafter.

TABLE 4.9.A

Diesel Generator Reliability

No. of Failures in last 20 valid tests*	No. of Failures in last 100 valid tests*	Reliability Actions
≤ 1	-	Test at least once per 31 days
≥ 2	-	Test at least once per 7 days**
≥ 3	≥ 6	Within 30 days, prepare a report for NRC audit, in accordance with Section 6.9.2.7.
≥ 5	≥11	Declare the diesel generator INOPERABLE and perform a requalification test for the affected diesel generator pursuant to the attachment to this table.

* Criteria for determining number of failures and number of valid tests shall be in accordance with Regulatory Position C.2.e of Regulatory Guide 1.108, Revision 1, August 1977, except that the number of tests and failures are determined on a per diesel generator basis. For the purposes of this test schedule, only valid tests conducted after the Operating License issuance date shall be included in the computation of the "last 20 valid tests". Entry into this test schedule shall be made at the 31 day test frequency.

**This test frequency shall be maintained until seven consecutive failure free demands have been performed and the number of failures in the last 20 valid demands has been reduced on one or less.

L10

L43

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Specification 3.9.1

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L43 L10

ATTACHMENT TO TABLE 4.9.A
DIESEL GENERATOR REQUALIFICATION PROGRAM

(1) Perform seven consecutive successful demands without a failure within 30 days of diesel generator being restored to operable status and fourteen consecutive successful demands without a failure within 75 days of diesel generator of being restored to OPERABLE status.

(2) If a failure occurs during the first seven tests in the requalification test program, perform seven successful demands without an additional failure within 30 days of diesel generator of being restored to OPERABLE status and fourteen consecutive successful demands without a failure within 75 days of being restored to OPERABLE status.

(3) If a failure occurs during the second seven tests (tests 8 through 14) of (1) above, perform fourteen consecutive successful demands without an additional failure within 75 days of the failure which occurred during the requalification testing.

(4) Following the second failure during the requalification test program, be in at least HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours.

(5) During requalification testing the diesel generator should not be tested more frequently than at 24-hour intervals.

After a diesel generator has been successfully requalified, subsequent repeated requalification tests will not be required for that diesel generator under the following conditions:

(a) The number of failures in the last 20 valid demands is less than 5.

(b) The number of failures in the last 100 valid demands is less than 11.

(c) In the event that, following successful requalification of a diesel generator, the number of failures is still in excess of the remedial action criteria (a and/or b above) the following exception will be allowed until the diesel generator is no longer in violation of the remedial action criteria (a and/or b above).

Requalification testing will not be required provided that after each valid demand the number of failures in the last 20 and/or 100 valid demands <u>has not increased</u>. Once the diesel generator is no longer in violation of the remedial action criteria above the provisions of those criteria alone will prevail.

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Specification 3.8.2

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~~3.9/4.9 AUXILIARY ELECTRICAL SYSTEMS~~

~~LIMITING CONDITIONS FOR OPERATION~~

~~3.9.D. Diesel Generators Required for Units 1, 2, and 3 Shared Systems~~

ACTION A Required Action B.1

3. If Specification 3.9.D.2 cannot be met, the affected equipment shall be declared inoperable.

M2 Proposed Required ACTION ~~B.2.1 - B.2.4~~ B.1.1 B.1.4

~~SURVEILLANCE REQUIREMENTS~~

~~4.9.D. Diesel Generators Required f Units 1, 2, and 3 Shared Sys~~

A1

~~3.9/4.9 ELECTRICAL SYSTEMS~~

~~LIMITING CONDITIONS FOR OPERATION~~

~~3.9.B. Operation With Inoperable Equipment~~

(A1)

5. From and after the date that one of the 480-V, diesel auxiliary boards becomes INOPERABLE, REACTOR POWER OPERATION is permissible for a period of 5 days.

See Justification for Changes for BFN ISTS 3.8.7 in this Section

ACTION A 1st Part

6. From and after the date that the 250-V shutdown board 3EB battery or one of the three 250-V unit batteries and/or its associated battery board is found to be INOPERABLE for any reason, continued REACTOR POWER OPERATION is permissible during the succeeding seven days. ~~Except for routine surveillance testing, the NRC shall be notified within 24 hours of the situation, the precautions to be taken during this period, and the plans to return the failed component to an OPERABLE state.~~

(LA2) (L4)

See Justification for Changes for BFN ISTS 3.8.7 in this Section

7. When one division of the logic system is INOPERABLE, continued REACTOR POWER OPERATION is permissible under this condition for seven days, provided the CSCS requirements listed in Specification 3.9.B.2 are satisfied. The NRC shall be notified within 24 hours of the situation, the precautions to be taken during this period, and the plans to return the failed component to an OPERABLE state.

See Justification for changes for BFN ISTS 3.8.1

~~4.9.B. Operation With Inoperable Equipment~~

5. When one 480-V diesel auxiliary board is found INOPERABLE, each unit 3 diesel shall be verified OPERABLE within 24 hours, and power availability for the remaining diesel auxiliary board shall be verified within 1 hour and at least once per 8 hours thereafter.

~~LIMITING CONDITIONS FOR OPERATION~~ (A1) ~~SURVEILLANCE REQUIREMENTS~~

3.9.B. ~~Operation With Inoperable Equipment~~

5. From and after the date that one of the 480-V, diesel auxiliary boards becomes INOPERABLE, REACTOR POWER OPERATION is permissible for a period of 5 days.

ACTION ~~C~~ D

4.9.B. ~~Operation With Inoperable Equipment~~

5. When one 480-V diesel auxiliary board is found INOPERABLE, each unit 3 diesel shall be verified OPERABLE within 24 hours, and power availability for the remaining diesel auxiliary board shall be verified within 1 hour and at least once per 8 hours thereafter.

L2

6. From and after the date that the 250-V shutdown board 3EB battery or one of the three 250-V unit batteries and/or its associated battery board is found to be INOPERABLE for any reason, continued REACTOR POWER OPERATION is permissible during the succeeding seven days. Except for routine surveillance testing, the NRC shall be notified within 24 hours of the situation, the precautions to be taken during this period, and the plans to return the failed component to an OPERABLE state.

ACTION ~~D~~ E 1st Part

See Justification for Changes for BFN ISTS 3.8.4

and 12 days from discovery of failure to meet LCO (M1)

L2

L5

7. When one division of the logic system is INOPERABLE, continued REACTOR POWER OPERATION is permissible under this condition for seven days, provided the CSCS requirements listed in Specification 3.9.B.2 are satisfied. The NRC shall be notified within 24 hours of the situation, the precautions to be taken during this period, and the plans to return the failed component to an OPERABLE state.

See Justification for Changes For BFN ISTS 3.8.1

BROWNS FERRY NUCLEAR PLANT - IMPROVED TECHNICAL SPECIFICATIONS
SECTION 3.8
LIST OF REVISED PAGES

JUSTIFICATION FOR CHANGES TO CURRENT TECH SPECS

Replaced Section 3.8.1, pages 1 of 11 through 11 of 11 Revision 2 with Section 3.8 1 pages 1 of 12 through 12 of 12 Revision 3
Replaced Section 3.8.2, pages 1 of 3 through 3 of 3 Revision 1 with Section 3.8 3 pages 1 of 3 through 3 of 3 Revision 3
Replaced Section 3.8.3, pages 1 of 3 through 3 of 3 Revision 2 with Section 3.8 3 pages 1 of 3 through 3 of 3 Revision 3
Replaced Section 3.8.4, pages 1 of 4 through 4 of 4 Revision 2 with Section 3.8 4 pages 1 of 4 through 4 of 4 Revision 3
Replaced Section 3.8.5, page 1 of 1 Revision 1 with Section 3.8.5 page 1 of 1 Revision 3
Replaced Section 3.8.6, pages 1 of 3 through 3 of 3 Revision 1 with Section 3.8 6 pages 1 of 3 through 3 of 3 Revision 3
Replaced Section 3.8.7, pages 1 of 7 through 7 of 7 Revision 2 with Section 3.8 7 pages 1 of 7 through 7 of 7 Revision 3
Replaced Section 3.8.8, pages 1 of 2 through 2 of 2 Revision 1 with Section 3.8 8 pages 1 of 2 through 2 of 2 Revision 3

ADMINISTRATIVE

A1 All reformatting and renumbering is in accordance with the BWR/4 Standard Technical Specifications (STS), NUREG-1433. As a result, the Technical Specifications (TS) should be more readily readable, and therefore understandable, by plant operators as well as other users. The reformatting, renumbering, and rewording process involves no technical changes to existing Technical Specifications.

Editorial rewording (either adding or deleting) is made consistent with NUREG-1433. During ISTS development certain wording preferences or English language conventions were adopted which resulted in no technical changes (either actual or interpretational) to the Technical Specifications. Additional information has also been added to more fully describe each subsection. This wording is consistent with the BWR Standard Technical Specifications, NUREG-1433. Since the design is already approved by the NRC, adding more detail does not result in a technical change.

A2 Notes 1, 2, 3, and 4 to proposed ITS SR 3.8.1.2 have been added. Note 1 to ITS SR 3.8.1.2 allows gradual loading. Note 2 to ITS SR 3.8.1.2 clarifies that momentary transients outside the load range do not invalidate this Surveillance. Note 3 to ITS SR 3.8.1.2 only allows the SR to be performed on one DG at a time, which is consistent with the CTS application of testing on a "staggered test basis". Note 4 to ITS SR 3.8.1.2 requires that the loading be immediately preceded by a successful performance of ITS SR 3.8.1.1 or ITS SR 3.8.1.4, with an intermediate warmup period. This is acceptable since the notes do not remove any testing requirements, reflect current approved testing methodology, and provide clarification which will ensure consistency and proper controls on testing. All of these changes are consistent with the BWR Standard Technical Specifications, NUREG-1433, and are considered administrative in nature.

A3 Not used.

A4 The Unit 3 DG requirements for Unit 1 and 2 TSs to support SGT and control room emergency ventilation are presented in proposed ITS 3.8.1.c. Unit 3 Technical Specifications will require the operability of all Unit 3 DGs and provide appropriate compensatory actions for inoperable Unit 3 DGs in support of Unit 3 operations. To support the operation of Unit 1 and 2, the Unit 1 and 2 LCO for AC Sources - Operating also requires the necessary Unit 3 DG(s) to support SGT and CREVS required by LCO 3.8.7, Distribution Systems - Operating, for supplying the Unit 3 4.16 kV shutdown boards. Since the Unit 1 and 2 CTS only impose Actions for an inoperable Unit 3 DG when Unit 3 is in cold shutdown, refueling or defueled, this presentation is consistent with current requirements. Therefore, the conversion is administrative.

A5 Certain equipment needed to meet Unit 1 and 2 accident analysis is powered from Unit 3 AC Sources. Current TS Surveillances only apply to the Unit 1 and 2 AC sources; the Unit 3 TS govern testing of the Unit 3 DGs. Consistent with the current approach, a proposed Note applicable to all SRs and SR 3.8.1.10 have been added to ensure Unit 3 sources are addressed in the Surveillances as they are in the LCO and ACTIONS. Therefore, this change is considered administrative.

A6 Not used.

A7 The Unit 1 and 2 DG requirements for Unit 3 TSs to support SGT and control room emergency ventilation are presented in ITS 3.8.1.c. Unit 1 and 2 Technical Specifications will require the operability of all Unit 1 and 2 DGs and provide appropriate compensatory actions for inoperable Unit 1 and 2 DGs in support of Unit 1 and 2 operations. To support the operation of Unit 3, the Unit 3 LCO for AC Sources - Operating also requires the necessary Unit 3 DG(s) to support SGT and CREVS required by LCO 3.8.7, Distribution Systems - Operating, for supplying the Unit 1 and 2 4.16 kV shutdown boards. Since the Unit 3 CTS only impose Actions for an inoperable Unit 1 and 2 DG when Unit 1 and 2 are in cold shutdown, refueling or defueled, this presentation is consistent with current requirements. Therefore, the conversion is administrative.

A8 Certain equipment needed to meet Unit 3 accident analysis is powered from Unit 1 and 2 AC Sources. Current TS Surveillances only apply to the Unit 3 AC sources; the Unit 1 and/or 2 TS govern testing of the Unit 1 and 2 DGs. Consistent with the current approach, a proposed Note applicable to all SRs and SR 3.8.1.10 have been added to ensure Unit 1 and 2 sources are addressed in the Surveillances as they are in the LCO and ACTIONS. Therefore, this change, is considered administrative.

TECHNICAL CHANGE - MORE RESTRICTIVE

The items identified as More Restrictive (MR) are those which contain requirements that are more restrictive than Current Technical Specifications. These MR requirements are based on the Standard Technical Specifications for BWR/4, NUREG-1433, modified to reflect BFN specific design, and have been determined to be appropriate and safe for BFN based on a review of current design bases.

M1 Proposed Specification 3.8.1, AC Sources - Operating, will be applicable in MODES 1 (Run), 2 (Startup), and 3 (Hot Shutdown) which is more restrictive than CTS 3.9.B. CTS 3.9.B requires action for inoperable equipment "Whenever the reactor is in Startup Mode or Run Mode and not in a cold condition." Thus CTS would not require the stated requirements in the Startup Mode prior to reaching 212 degrees F or in a Hot Shutdown condition, whereas the proposed TS will. The proposed change establishes requirements for OPERABILITY of AC Sources consistent with the OPERABILITY requirements for the functions that these AC sources are required to support including ECCS and Primary Containment Isolation System. This change is consistent with the BWR Standard Technical Specifications, NUREG-1433.

M2 Not used.

M3 Not used.

M4 CTS 3.9.A.2 allows one less AC power source than required for continuous operation, to startup from the Hot Standby Condition. By eliminating this explicit allowance in the ITS, the more restrictive proposed addition of LCO 3.0.4 will result in precluding this startup. This more restrictive change will assure that the required AC Sources are available prior to any reactor startup from any condition.

M5 Proposed SRs 3.8.1.1, 3.8.1.4, 3.8.1.5, and 3.8.1.9 add the acceptance criteria for voltage and frequency. These acceptance criteria are consistent with proper operation of the governor and voltage controls necessary to assure DG OPERABILITY. In addition, SR 3.8.1.9.c has an added DG start time requirement consistent with the accident analysis. Since these requirements are not stated in CTS, their addition is considered more restrictive.

M6 A new more restrictive requirement to be in MODE 3 (Hot Shutdown) within 12 hours of entry into the LCO has been added. This is more restrictive since before the only requirement was to be in mode 4 within 24 hours and now the operator must place the reactor in a shutdown condition within a shorter time period. This requirement is consistent with the BWR Standard Technical Specifications, NUREG-1433, and is appropriate for BFN since it adds an additional measure of control for safe shutdown of the reactor and can be achieved safely in the time allotted.

M7 Not used.

M8 Proposed SR 3.8.1.8 demonstrates proper operation for the DBA loading sequence which ensures that DGs (and offsite circuits) are not overloaded, and that the required loads are started in sufficient time to adequately support the assumed function. BFN TSs currently do not have a similar specific SR directly tied to DG operability. The CTS requirements for individual pump timer testing included in CTS Table 3.2.B and the SR requirement in CTS 4.9.A.1.b for load sequencing verify the interval between each timed load block is within the calibration tolerances for each individual timer and serve the same function, therefore this additional requirement is within the current BFN design.

M9 Condition G addresses the situation where both one required offsite circuit and one DG are inoperable and affect only one 4.16 kV shutdown board. The Note clarifies the applicability. The Required Action is to declare the affected 4.16 kV shutdown board inoperable immediately. This requires entry into the applicable Conditions and Required Actions of LCO 3.8.7, "Distribution Systems - Operating," which provides the appropriate restrictions for the affected 4.16 kV shutdown board. LCO 3.8.1 Conditions and Required Actions continue to apply until the required offsite circuit and DG are made OPERABLE.

TECHNICAL CHANGE - LESS RESTRICTIVE

"Generic"

LA1 The details of what constitutes OPERABILITY of an offsite power source have been relocated to the Bases. Thus, the LCO has been written to tell what is needed, but the details of the specific requirements for operability of an offsite power source and the boards needed to route the offsite power to the shutdown boards have been relocated to the Bases. Any references to the 4-kv bus tie board and cooling tower transformer have been deleted since this source of power is no longer qualified as an offsite power source. The details of having the start buses and shutdown buses 1 and 2 energized have been relocated to the Bases since this detail is used to support an operable offsite power source. Relocation of these items to the Bases is acceptable since the details of what constitutes operability are not necessary to establish

the requirement for operability. The LCO requirement for the operability of offsite power circuits is unaffected by the removal of these details. Thus the details can be moved to the Bases and controlled by the provisions of the proposed Bases Control Program in Section 5 of the Technical Specifications.

For MODE 1, 2, and 3 operation, all SGT and emergency ventilation trains, as well as all four Unit 1 and 2 DGs for Unit 1 and 2 and all four Unit 3 DGs for Unit 3, will be required to be OPERABLE. The details relating to system design (which DGs are associated with which Systems) are included in plant drawings which will be used to determine necessary power supplies. The 1/2A DG, 1/2B DG, and 1/2D DG listed in CTS 3.9.D are the same DGs as listed as DG A, B, and D elsewhere in CTS. The design features and system operation are also described in the FSAR. Thus, the LCO has been written to simply specify the required DGs be OPERABLE, but the details of the specific requirements for OPERABILITY have been relocated to the Bases. Changes to the current requirement to associate these required OPERABLE DGs with the required OPERABLE Systems will be controlled via changes to the Bases by the provisions of the proposed Bases Control Program in Section 5 of the Technical Specifications. Changes to the FSAR will be controlled by the provisions of 10 CFR 50.59. Relocation of these details to the Bases is acceptable since the inclusion of these details is not necessary to establish the LCO requirement.

LA2 Not used.

LA3 Deleted in response to NRC comment NUREG M/U LCO 3.8.1, Issue 25. Replaced by L10.

LA4 CTS 4.9.A.1.a requires all DG starts to be logged. The proposed change removes this specific requirement from TS. This is acceptable since inclusion of the details of what data to record is not necessary to establish the requirement for surveillance testing. Thus removal of this Surveillance from the Technical Specifications will have no effect on DG OPERABILITY.

LA5 This change involves the removal of specific details on how to perform a surveillance while leaving the actual requirement to perform testing unchanged. Removal of these details from the Technical Specifications is acceptable since their inclusion is not necessary in order to establish the testing requirements and test methods necessary to ensure operability.

LA6 This change involves the movement of descriptive details for the performance of CTS surveillance 4.9.A.3.b to the Bases. The purpose of this SR is inherent in the manner in which the test is performed and is described in the Bases for proposed ITS SR 3.8.1.9 (load shedding). Therefore, the description has been relocated to the Bases. This is acceptable since inclusion of the descriptive details is not necessary in order to establish the requirement to perform the SR. Changes to the Bases will be controlled by the provision of the proposed Bases Control Program in Section 5.0 of the proposed BFN ITS.

LA7 Deleted. Replaced by L11.

LA8 The descriptive details concerning testing of the CAS logic have been relocated to the Bases for proposed ITS SR 3.8.1.6. This provides a better location for details on where the accident signal originates. The requirement to perform the surveillance test is unaffected. Relocation of this information is acceptable since inclusion of the descriptive details is not necessary in order to establish the requirement to perform the SR. Changes to the Bases will be controlled by the provision of the proposed Bases Control Program in Section 5.0 of the proposed BFN ISTS.

"Specific"

L1 Proposed LCO 3.8.1, Condition A (one offsite source or one shutdown bus inoperable) will not include the requirement of CTS 4.9.B.1 (Units 1,2,3), 4.9.B.2 (Units 1,2), 4.9.B.3 (Unit 3), and 4.9.B.5 (Units 1,2) to demonstrate the OPERABILITY of the remaining DGs within 24 hours following loss of the power source. This change acknowledges that inoperability of an offsite circuit (or shutdown bus) is not indicative of a similar condition in the DG unless a common failure is suspected. Additionally, the periodic Frequencies specified to demonstrate DG OPERABILITY have been demonstrated adequate to provide a high degree of assurance that the DG is OPERABLE. Therefore, this change allows credit to be taken for the normal periodic Surveillance as a demonstration of DG OPERABILITY and reduces the challenges and wear to the DGs. Minimizing DG starts is recommended to avoid unnecessary DG wear, thereby enhancing overall DG reliability (refer to Generic Letter 84-15). This action is consistent with BWR STS, NUREG-1433, and the design of BFN.

L2 Not used.

L3 Proposed Required Action B.3.1 has been added to provide an allowance to avoid unnecessary testing of OPERABLE DGs when a DG is declared inoperable if it can be confirmed that no common cause failure has rendered more than one DG inoperable. This assurance can be ascertained in many cases by means other than the existing requirement to demonstrate DG operability by starting the DG. If an assessment can determine no common cause failure exists on the remaining OPERABLE DG(s), proposed Required Action B.3.1 eliminates the DG start. Minimizing DG starts is recommended to avoid unnecessary DG wear, thereby enhancing overall DG reliability (refer to Generic Letter 84-15). This action is consistent with BWR STS, NUREG-1433, and the design of BFN. This change is acceptable since the action to determine that the remaining DGs are not inoperable due to a common cause failure will ensure DG OPERABILITY is maintained and Required Action B.3.2 provides an alternate method to test the DG in the event this determination cannot be made without testing.

L4 The time to reach MODE 4, Cold Shutdown has been extended from 24 hours to 36 hours. This provides the necessary time to shut down and cool down the plant in a controlled and orderly manner that is within the capabilities of the unit, assuming the minimum required equipment is OPERABLE. This extra time reduces the potential for a unit upset that could challenge safety systems. This time is consistent with the BWR Standard Technical Specifications, NUREG 1433. The increased time allowed to reach MODE 4 is acceptable based on the small probability of an event during this time and the desire to minimize plant transients. The requested 12 hour extension will provide sufficient time for the unit to reach MODE 4 in an orderly manner. As a result, the potential for human error will be reduced. In addition, the unit is now required to be in MODE 3 within 12 hours (a shutdown condition). As such, any reduction in a margin of safety will be insignificant and offset by the benefit gained from providing sufficient time to reach MODE 4, thus avoiding potential plant transients from attempting to reach MODE 4 in the current time and the benefit of being subcritical (MODE 3) in a shorter required time.

L5 The following changes have been made to LCO 3.8.1:

a. Proposed ACTION E provides an out-of-service time of 24 hours, when two or more offsite circuits are concurrently inoperable, prior to requiring a unit shutdown, with a reduced allowance of 12 hours with a redundant component inoperable. The allowed completion times allow the operator time to evaluate and repair any discovered inoperabilities. With both of the required offsite circuits inoperable, sufficient onsite AC sources are available to maintain the unit in a safe shutdown condition in the event of a DBA or transient. Thus, the completion time provides a period of time to effect restoration of one of the offsite circuits

commensurate with the importance of maintaining an AC electrical power system capable of meeting its design criteria.

b. Proposed ACTION F provides an out-of-service time of 12 hours, when a DG and an offsite circuit are concurrently inoperable, prior to requiring a unit shutdown. The allowed completion times allow the operator time to evaluate and repair any discovered inoperabilities. The allowed completion time takes into account the capacity and capability of the remaining AC sources, reasonable time for repairs, and the low probability of a DBA occurring during this period.

c. Proposed ACTION H provides an out-of-service time of 2 hours, when two or more DGs are concurrently inoperable, prior to requiring a unit shutdown. The two hour completion time is acceptable since it provides a reasonable time for repairs considering the reduced capacity and capability of the remaining AC sources, the low probability of a DBA occurring during this period minimizes the risk associated with continued operation while making repairs, and any increase in risk is offset by the risk associated with an immediate controlled shutdown (due to potential grid disturbances: which could lead to a total loss of offsite AC power).

d. Proposed ACTION J provides a Required Action to enter LCO 3.0.3 immediately for conditions where all redundancy in the AC electrical power supplies has been lost. The NUREG ACTION I wording has been changed to reflect BFN specific plant details which clearly define the combinations of power sources for which this ACTION applies. The changes in the NUREG wording are administrative and serve only to incorporate plant specific details. In this case, any further losses in the AC electrical power system will cause a loss of function. Therefore, no additonal time is justified for continued operation and a shutdown per LCO 3.0.3 is warranted.

e. New restrictions have been added to proposed LCO 3.8.1 to limit the maximum time the requirements are not met (the second completion time of 14 days for the restoration actions for Actions A and B). The 14 day completion time provides a limit on the time allowed in a specified condition after discovery of failure to meet the LCO. This limit is considered reasonable for situations in which Conditions A and B are entered concurrently. The limit of 14 days is acceptable based on the the capacity and capability of the remaining AC sources, reasonable time for repairs, and the low probability of a DBA occurring during this period.

Currently, items a, b, c, and d would result in imposing an immediate plant shutdown in accordance with current 1.0.C.1 (proposed LCO 3.0.3). Items a, b, and c now provide for additional time for operation while effecting repairs, as discussed above. These new ACTIONS are consistent with the BWR Standard Technical Specifications, NUREG 1433, and with the recommendations of Regulatory Guide 1.93.

The proposed Completion Times to restore multiple, inoperable AC Sources to OPERABLE status prior to requiring a shutdown is acceptable based on the overall probability of an event requiring the inoperable AC Sources during this time period. Providing Completion Times will minimize the potential for plant transients that can occur during shutdown by providing some time to restore the affected AC Sources prior to requiring a shutdown. In addition, the NRC has previously evaluated these new times and approved them in Regulatory Guide 1.93. As such, any reduction in a margin of safety by the addition of these Completion Times will be offset by the benefit gained in avoiding an unnecessary plant transient by providing time to restore the inoperable AC Source.

L6 The requirements for operability in CTS 1.0.C.2 when an offsite or onsite power source is inoperable have been retained in LCO 3.8.1, in the form of proposed Required Actions A.2, B.2, E.1, and K.1. These proposed Required Actions are the same as the current requirements, except for the proposed Completion Times associated with these checks. Therefore, the movement of the current requirements to this LCO is strictly administrative. The addition of Completion Times to verify that redundant features are not inoperable (in proposed Required Actions A.2, B.2, E.1, and K.1 proposed to be 24, 4, 12, and 4 hours, respectively) will allow the operator time to evaluate and repair any discovered inoperabilities which minimizes the risk due to subjecting the unit to transients associated with shutdown. The proposed Completion Times also consider the capacity and capability of the remaining AC sources and the low probability of a DBA occurring during this period.

CTS 3.5.A.2, 3.5.B.3, 3.5.B.5, and 3.5.B.6, allow a specified restoration time for an inoperable CS or RHR pump, only if all DGs are OPERABLE; and 3.9.B.3 for Units 1 and 2 (3.9.B.2 for Unit 3) allows a specified restoration time for an inoperable DG only if all CS and RHR systems are OPERABLE. For example, if a CS pump and its associated DG are inoperable, the CTS require an immediate shutdown. The proposed ACTIONS only require the OPERABILITY of components redundant to the components supported by the inoperable AC source. This results in the ITS allowance for a component (e.g., RHR or CS pump) and its associated offsite circuit or DG to be concurrently inoperable without imposing immediate shutdown restrictions as in the CTS.

Additionally, the proposed Required Actions A.2, B.2, E.1, and K.1 provide another allowance to avoid an immediate forced shutdown when a DG or offsite circuit is inoperable concurrent with a required "feature" (i.e., system, subsystem, component) inoperability. Certain combinations of inoperable components may allow for satisfactory compensatory actions or have been justified for some allowed restoration time. By allowing "features" associated with the inoperable offsite circuit or DG to be declared inoperable, the appropriate ACTIONS can be taken. This can potentially eliminate unnecessary forced shutdowns, and the associated risk of plant transients, while maintaining ACTION provisions previously provided concerning the specific circumstances. This allows the individual component specification to determine the restriction on continued operation based upon the components that are inoperable and whose function is impaired due to the combination of power sources inoperable and individual component inoperabilities. This different approach does not reduce the level of safety and is within the analyses for BFN in the FSAR.

L7 The proposed 24-hour Surveillance reduces the required load, which is currently required to be greater than 2800 kW for the full 24 hours, to between 2680 kW and 2805 kW for the first 2 hours then between 2295 and 2550 kW for the remainder of the 24 hour test. DG 24-hour testing is recommended by Regulatory Guide 1.9 to be performed for 2 hours at 105 to 110% of the continuous rating. The remainder of the 24-hour run is not required to exceed the continuous rating of the DG. Additionally, in an NRC Safety Evaluation dated December 21, 1989, the NRC requested a long duration test be added to the Technical Specifications with load ranges consistent with those proposed in this change. NRC later acknowledged in NRC SER dated February 12, 1991 that the proposed testing of DGs at 2800 kW for the entire 24 hours is more conservative than the NRC requested earlier. The BFN DGs are designed with a 2-hour rating and continuous rating of -2800 kW and 2600 kW respectively. Therefore these changes are consistent with accepted NRC recommendations for this test. This change is acceptable since performance of testing as prescribed in the proposed surveillance will continue to adequately demonstrate the OPERABILITY of the DG while minimizing the potential degradation to the DG as a result of operating the DG above its continuous rating for an extended time period beyond that required to demonstrate its capabilities.

L8 This change removes the requirement for the RHR and CS systems to be operable as a condition for the allowance of a 7 day AOT in the event of inoperability of one division of logic. When one division of logic (480 V load shed or common accident signal) is inoperable, CTS 3.9.B.9 for Units 1 and 2 (3.9.B.7 for Unit 3) allows continued operation for 7 days provided all of the CS and RHR (LPCI and containment cooling) systems are operable. The requirement for all CS and RHR (LPCI and containment cooling) systems to be operable when a division of logic is inoperable

is overly conservative. This change is acceptable since the logic systems consist of two fully redundant divisions, either of which is capable of ensuring DG operability and neither logic operability impacts the operability of Core Spray or RHR. Loss of both divisions of logic would have to occur to impact DG operability, since each logic is 100% redundant to its companion logic. The inoperability of one division of logic is addressed by proposed Conditions C and D and loss of both logics is addressed by proposed Condition I of ITS section 3.8.1.

L9 The DG loading requirements have been reduced using the guidance provided by Regulatory Guide 1.9 R3. This regulatory guide recommends Load-Run testing at 2295 to 2550 kW (90-100% of the continuous rating) and Endurance and Margin testing at 2678 to 2805 kW (105-110% of the continuous rating) for 2 hours followed by 22 hours at 2295 to 2550 kW (90-100% of the continuous rating). Loading is required by current technical specifications to be 2600 kW or greater during Load-Run testing and 2800 kW or greater for Endurance and Margin testing. This change is acceptable since performance of testing as prescribed in the proposed surveillance will continue to adequately demonstrate the operability of the DG while minimizing the potential degradation to the DG as a result of operating the DG above its continuous rating for an extended time period beyond that required to demonstrate its capabilities.

L10 Current Technical Specification Table 4.9.A, which provided requirements for accelerated DG testing, has been deleted. BFN has implemented 10 CFR 50.65, Maintenance Rule, for the diesel generators. Under Maintenance Rule, DG reliability is monitored to ensure it is maintained within the reliability assumptions of BFN's Probability Safety Assessment. Deletion of the accelerated testing program and replacement with the monitoring and actions required by 10 CFR 50.65 is consistent with the guidance of Regulatory Guide 1.60 and will ensure continued DG reliability.

L11 CTS 3.9.B.9 for Units 1 and 2 (3.9.B.7 for Unit 3) requires the NRC to be notified within 24 hours when one division of the logic system is inoperable. This condition is not reportable to the NRC per 10 CFR 50.72, 50.73, or other 10 CFR requirements and as such is being removed from TS.

Relocated Specifications

R1 Current TS 4.9.A.1.d requires DG inspections in accordance with the manufacturer's recommendations once every 24 months. The proposed change relocates this specific inspection requirement to the Technical Requirements Manual. Although this type of surveillance is a good practice and does aid in improving long term reliability and performance of the DGs, this inspection does not verify or prove the DG will perform its required safety function. There is no credit taken for this inspection in the accident or transient analysis nor does the inspection verify proper DG response assumed in the accident or transient analysis. Performance of this inspection surveillance: 1) does not involve or affect instrumentation used to detect or indicate degradation of the reactor coolant pressure boundary, 2) is not a process variable, design feature, or operating restriction that is an initial condition of a DBA or transient analysis, 3) is not part of the primary success path that functions or actuates to mitigate a DBA or transient, and 4) is not credited with ensuring operability of a structure, system, or component which operating experience or PSA has shown to be significant to public health and safety. Therefore, the requirements specified in current Specification 4.9.A.1.d do not satisfy the NRC Final Policy Statement technical specification screening criteria and thus are not required by 10 CFR 50.36. Performance of this inspection will be relocated to the Technical Requirements Manual and controlled in accordance with 10 CFR 50.59.

ADMINISTRATIVE

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Editorial rewording (either adding or deleting) is made consistent with NUREG-1433. During ISTS development certain wording preferences or English language conventions were adopted which resulted in no technical changes (either actual or interpretational) to the Technical Specifications. Additional information has also been added to more fully describe each subsection. This wording is consistent with the BWR Standard Technical Specifications, NUREG-1433. Since the design is already approved by the NRC, adding more detail does not result in a technical change.

A2 The Applicability for AC Sources - Shutdown encompasses the Applicability for SGT and CREV Systems. The proposed Applicability is rewritten with no technical changes from the current 3.9.D required Applicability. Therefore, this change is an administrative presentation preference.

A3 This allowance need not be stated explicitly since it is encompassed by the proposed ITS definition of OPERABILITY.

A4 Not used

TECHNICAL CHANGE - MORE RESTRICTIVE

The items identified as More Restrictive (MR) are those which contain requirements that are more restrictive than Current Technical Specifications. These MR requirements are based on the Standard Technical Specifications for BWR/4, NUREG-1433, modified to reflect BFN specific design, and have been determined to be appropriate and safe for BFN based on a review of current design bases.

M1 Current TS 3.9.C applicability is during the COLD SHUTDOWN CONDITION with irradiated fuel in the reactor. The proposed LCO 3.8.2 applicability is more restrictive since it also applies during movement of irradiated fuel in the secondary containment, even when no irradiated fuel is in the reactor vessel. This is appropriate for BFN since it ensures AC Sources are required to be OPERABLE during this condition as necessary to provide assurance that systems needed to mitigate a fuel handling accident are available.

M2 ACTIONS A and B have been added to provide proper Required Actions to take when a required AC source is inoperable. Currently, no actions are provided (unless the inoperable DG is required to support SGT or CREVS). Note that the ECCS systems that are required OPERABLE while the unit is shutdown (and by current TS would be inoperable if its associated DG were inoperable), have no ACTIONS specified for inoperable components. Therefore, adding ACTIONS for inoperable DG(s), along with the ISTS revised definition of OPERABILITY which will no longer require associated components to be considered inoperable, still results in a more restrictive change; adding ACTIONS where none currently exist.

The new ACTIONS for one inoperable DG will require declaring the affected components inoperable (after 30 days, or immediately if any other redundant feature is inoperable) and taking the ACTIONS of the applicable system LCO (proposed Required Action A.1). The ACTIONS for more than one DG inoperable will require immediately declaring the affected components inoperable and taking the ACTIONS of the applicable system LCO (proposed Required Action B.1), or will allow the conservative option of immediately suspending CORE ALTERATIONS, OPDRVs and irradiated fuel movement in the secondary containment, and immediately initiating action to restore the inoperable source (proposed Required Actions B.2.1, B.2.2, B.2.3, and B.2.4).

In addition, a Surveillance Requirement for the required Unit 3 DGs (for Unit 1 and 2) and Unit 1 and 2 DGs (for Unit 3) has been added to ensure the OPERABILITY of the required AC sources. These new ACTIONS and Surveillances are additional restrictions on plant operation.

M3 Current requirements for AC sources while in shutdown MODES do not require offsite AC power to be OPERABLE, provided a third DG is OPERABLE. The proposed ITS LCO does not provide this flexibility; one offsite circuit is required with no option to replace it with a third DG. Eliminating this flexibility is more restrictive.

TECHNICAL CHANGE - LESS RESTRICTIVE

"Generic"

LA1 The details relating to system design (which DGs are associated with which Systems) are included in plant drawings which will be used to determine necessary power supplies. The 1/2A DG, 1/2B DG, and 1/2D DG listed in CTS 3.9.D are the same DGs as listed as DG A, B, and D elsewhere in CTS. The design features and system operation are also described in the FSAR. Thus, the LCO has been written to simply specify the required DGs be OPERABLE, but the details of the specific requirements for OPERABILITY have been relocated to the Bases. Changes to the current requirement to associate these required OPERABLE DGs with the required OPERABLE Systems will be controlled via changes to the Bases by the provisions of the proposed Bases Control Program in Section 5 of the Technical Specifications. Changes to the FSAR will be controlled by the provisions of 10 CFR 50.59. Relocation of these details to the Bases is acceptable since the inclusion of these details is not necessary to establish the LCO requirement.

"Specific"

L1 Many of the currently required Surveillances involve tests that would require the DG to be paralleled to offsite power. This condition (a required DG and the only required offsite circuit not remaining independent) presents an increased risk of a single fault resulting in a loss of one of the required divisions of ECCS due to a loss of all AC power. The NRC has previously recognized this and provided surveillance exceptions to avoid this condition, but the direction has not been consistently applied. In an effort to consistently address this concern and to avoid potential conflicting Technical Specifications, the Surveillances which would require the DG to be connected to the offsite source are excepted from performance requirements. This change does not take exception to the requirement for the DG to be capable of performing the particular function (just to the requirement to demonstrate the DG to be paralleled with offsite power while that source of power is being relied on to support meeting the LCO). Proposed SR 3.8.2.1 details these exceptions and is consistent with the methodology of NUREG-1433. This change is acceptable since the requirements to maintain OPERABILITY are retained and overall system reliability is enhanced.

JUSTIFICATION FOR CHANGES
BFN ISTS 3.8.3: DIESEL FUEL OIL, LUBE OIL, AND STARTING AIR

ADMINISTRATIVE

A1 All reformatting and renumbering is in accordance with the BWR/4 Standard Technical Specifications (STS), NUREG-1433. As a result, the Technical Specifications (TS) should be more readily readable, and therefore understandable, by plant operators as well as other users. The reformatting, renumbering, and rewording process involves no technical changes to existing Technical Specifications.

Editorial rewording (either adding or deleting) is made consistent with NUREG-1433. During ISTS development certain wording preferences or English language conventions were adopted which resulted in no technical changes (either actual or interpretational) to the Technical Specifications. Additional information has also been added to more fully describe each subsection. This wording is consistent with the BWR Standard Technical Specifications, NUREG-1433. Since the design is already approved by the NRC, adding more detail does not result in a technical change.

A2 The fuel oil, fuel transfer, and starting air requirements of current LCO 3/4.9.A and 3.9.A.6 have been moved to a new LCO 3.8.3. The Applicability of this new LCO is "when associated DG is required to be OPERABLE." This covers the current MODE 1, 2, 3, 4, and 5 requirements, and is actually more restrictive since the DG Applicability has been changed (in proposed LCO 3.8.2) to include certain MODE 4 and 5 conditions (see Justification for Changes for ITS 3.8.2 for further discussion). Proposed ACTIONS D and E direct that affected DG(s) be declared inoperable due to specific degradations in support systems. This declaration of inoperability is consistent with the presentation of the current requirements and is considered part of the editorial rewrite. These changes are considered administrative in nature. In addition, technical changes, both more and less restrictive have been made, as discussed in the "M" and "L" comments below.

A3 This requirement is being moved to Chapter 5.0 of the proposed Technical Specifications in accordance with the format of the BWR Standard Technical Specifications, NUREG 1433. A Surveillance Requirement is added (proposed SR 3.8.3.3) to clarify that the tests of the Diesel Fuel Oil Testing Program must also be completed and passed for determining OPERABILITY of the DGs. Since this is a presentation preference that maintains current requirements, this change is considered administrative.

A4 The phrase "staggered test basis" as applied in current technical specifications means that no more than one DG will be tested at a time and is not the same as the BFN ITS definition of STAGGERED TEST. The requirement to test only one DG at a time is maintained in BFN ITS by Note 4 of SR 3.8.1.2. Therefore, this change is considered administrative.

TECHNICAL CHANGE - MORE RESTRICTIVE

The items identified as More Restrictive (MR) are those which contain requirements that are more restrictive than Current Technical Specifications. These MR requirements are based on the Standard Technical Specifications for BWR/4, NUREG-1433, modified to reflect BFN specific design, and have been determined to be appropriate and safe for BFN based on a review of current design bases.

M1 Specific acceptance criteria for relating minimum air receiver pressure and minimum stored fuel oil volume to DG OPERABILITY are added. Current surveillances only require the parameter be checked, with no associated criteria specified. This imposes Technical Specification limitations that do not currently exist, and are therefore additional restrictions.

M2 A lube oil requirement has been added to LCO 3.8.3. This will ensure a 7 day supply of lube oil is available to all DGs. An appropriate ACTION (proposed ACTION B) and Surveillance Requirement (SR 3.8.3.2) have also been added. These changes are consistent with the BWR Standard Technical Specifications, NUREG 1433, and are additional restrictions on plant operation.

TECHNICAL CHANGE - LESS RESTRICTIVE

"Generic"

LA1 Current surveillance requirements for the DGs specify checking the starting air compressors for operation and ability to recharge the receivers. The proposed ITS retain the actual OPERABILITY related requirement of receiver air pressure (and add a more restrictive change by specifying the actual pressure limit - see M1 above). However, the method of maintaining the minimum required air pressure does not impact the operability of the DG as long as the starting air receivers have adequate pressure since the starting air system is only needed to initially start the DG. Removal from the Technical Specifications is acceptable since the details are not necessary in order to establish the surveillance testing requirement.

LA2 CTS 4.9.A.1.c requires DG fuel oil quantity to be logged. The proposed change removes this specific requirement from TS. This is acceptable since inclusion of the details of what data to record is not necessary to establish the requirement for surveillance testing. Thus removal of this Surveillance from the Technical Specifications will have no effect on DG OPERABILITY.

"Specific"

L1 The Surveillance Frequency for the starting air system checks has been changed from "frequency specified in Table 4.9.A (the DG test schedule table listed in the first part of the current Surveillance) to "31 days". The 31 day test interval is safe and appropriate for BFN since it provides assurance that DG air start pressure requirements will be maintained. This is because DG failures that result in a more frequent DG test frequency have no impact on these functions' ability to perform their intended function. Additionally, pressure alarms provide assurance that air start pressure is maintained within required limits.

L2 Not used.

L3 The proposed LCO 3.8.3, "Diesel Fuel Oil and Transfer, Lube Oil, and Starting Air," reformats some of the existing requirements by providing a separate LCO with requirements for each of the named parameters. Fuel oil and starting air requirements are currently presented as attributes of compliance with the DG LCO, via their presentation as Surveillances. These parameters, while supporting DG OPERABILITY, contain substantial margin in addition to the limits which would be absolutely necessary for DG OPERABILITY. Therefore, certain levels of degradation in these parameters are justified to extend the allowances for restoration (presented as proposed ACTIONS A and C). ACTION A allows 48 hours to restore fuel oil level in the storage tanks prior to declaring the DG inoperable, provided fuel oil level is sufficient for 6 days supply. ACTION C allows 7 days to restore fuel oil parameters to within limits prior to declaring the DG inoperable. This is acceptable for BFN since during the proposed extended periods for restoration of these parameters, the DG would still be capable of performing its intended function and the degradation is limited in both capacity and time to the degree that a substantial margin of safety exists.

ADMINISTRATIVE

A1 All reformatting and renumbering is in accordance with the BWR/4 Standard Technical Specifications (STS), NUREG-1433. As a result, the Technical Specifications (TS) should be more readily readable, and therefore understandable, by plant operators as well as other users. The reformatting, renumbering, and rewording process involves no technical changes to existing Technical Specifications. The proposed Technical Specifications place 250 Volt and 125 Volt DG battery hardware components (battery and charger) in the DC sources LCO (proposed LCO 3.8.4). The battery cell parameters and DC Distribution buses are in separate LCOs (proposed LCOs 3.8.6 and 3.8.7, respectively.)

Editorial rewording (either adding or deleting) is made consistent with NUREG-1433. During ISTS development certain wording preferences or English language conventions were adopted which resulted in no technical changes (either actual or interpretational) to the Technical Specifications. Additional information has also been added to more fully describe each subsection. This wording is consistent with the BWR Standard Technical Specifications, NUREG-1433. Since the design is already approved by the NRC, adding more detail does not result in a technical change.

A2 An explicit LCO statement is added for the DG 125 VDC subsystems. Current Surveillance 4.9.A requires surveillance of these subsystems, with an implied association with DG OPERABILITY. The ITS LCO clarifies this intent. Proposed ACTION C directs that affected DG(s) be declared inoperable due to specific degradations in the DG DC systems. This is an administrative change since it involves a change in presentation only.

TECHNICAL CHANGE - MORE RESTRICTIVE

The items identified as More Restrictive (MR) are those which contain requirements that are more restrictive than Current Technical Specifications. These MR requirements are based on the Standard Technical Specifications for BWR/4, NUREG-1433, modified to reflect BFN specific design, and have been determined to be appropriate and safe for BFN based on a review of current design bases.

M1 Proposed SRs 3.8.4.2 and 3.8.4.5 have been added for the unit, shutdown, and DG battery chargers for consistency with the BWR/4 Standard Technical Specifications. SR 3.8.4.2 verifies battery charger capability to recharge the batteries every 18 months, while SR 3.8.4.5 verifies battery charger capability to perform at maximum output every 60 months. The parameter values supplied in these SRs are based on the BFN battery design and are appropriate for the specific SRs in which

they are utilized. These new Surveillances are additional restrictions on plant operation.

M2 A new more restrictive requirement to be in MODE 3 (Hot Shutdown) within 12 hours of entry into the LCO has been added. This is more restrictive since before the only requirement was to be in mode 4 within 24 hours and now the operator must place the reactor in a shutdown condition within a shorter time period. This requirement is consistent with the BWR Standard Technical Specifications, NUREG-1433, and is appropriate for BFN since it adds an additional measure of control for safe shutdown of the reactor and can be achieved safely in the time allotted.

M3 Specific acceptance criteria for relating overall battery voltage and measured battery capacity to DC source subsystem OPERABILITY is added. Current surveillances only require the parameter be checked, with no associated criteria specified. This imposes Technical Specification limitations that do not currently exist, and are therefore additional restrictions.

M4 An explicit LCO statement (LCO 3.8.4.e) is added to require the unit shutdown board DC subsystems that support SGT and CREVS OPERABILITY to be OPERABLE. Proposed ACTION D specifically requires that the affected CREVS or SGT subsystem be declared inoperable when the required unit shutdown board DC subsystem is inoperable. This new restriction is intended to ensure appropriate action is taken for the system affected by an inoperable DC subsystem. This change is consistent with the intended presentation of the BWR Standard Technical Specifications, NUREG-1433.

M5 (Unit 1 and 2 only) Current Unit 1 and 2 Technical Specifications 3.9.B.7 & B.8 are written so that they allow one 250-V Unit Battery to be inoperable concurrent with one 250-V shutdown board battery. CTS 3.9.B.7 provides a 7 day LCO for the Unit Batteries and CTS 3.9.B.8 provides a 5 day LCO for the shutdown board batteries. However, this configuration (one Unit battery and one Shutdown Board battery inoperable) could result in a loss of ESF functions. The proposed Specifications have been modified to explicitly allow only one Unit Battery or Shutdown Board battery inoperable and as such is considered more restrictive. This is consistent with the CTS for Unit 3.

TECHNICAL CHANGE - LESS RESTRICTIVE

"Generic"

LA1 The details relating to system design and purpose have been relocated to the Bases. The design features and system operation are also described in the FSAR. Thus, the LCO has been written to require the 250 Volt DC battery and the 125 Volt DC DG battery subsystems, as described in comment A1 above. Relocating the specific system details to the Bases is acceptable since this information is not necessary in order to establish the LCO requirement. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program in Section 5 of the Technical Specifications. Changes to the FSAR will be controlled by the provisions of 10 CFR 50.59.

LA2 Deleted. Replaced by L4.

LA3 The proposed change removes requirement to log overall battery voltage and various battery parameters from TS. This is acceptable since inclusion of the details of what data to record is not necessary to establish the requirement for surveillance testing. Thus removal of this requirement from the Technical Specifications will have no effect on battery OPERABILITY.

"Specific"

L1 The allowed outage time for the Unit 1 and 2 Shutdown Board DC batteries has been increased from 5 to 7 days consistent with the Unit 3 Technical Specifications for Shutdown Battery 3EB and Units 1, 2, and 3 CTS for a unit battery. At BFN, there is a safety related 250 VDC unit battery located in each unit. The unit battery systems provide power for unit control functions, unit DC motor loads and alternate control power to the 4.16 kV and 480 V AC shutdown boards. The primary control power supplies to the 3A, 3C, and 3D 4.16kV ac shutdown boards and the Unit 3 480 V shutdown boards are also provided by the unit batteries. There are five safety related 250 V DC battery systems assigned as primary control power supplies to 4.16 kV AC shutdown boards A, B, C, D, 3EB, and 480 V shutdown boards 1A, 1B, 2A, and 2B. Alternate control power for these shutdown boards are provided from the Unit Batteries. Therefore, the impact on Unit 1 and 2 for a 4-kv shutdown board battery being inoperable is no more severe than a unit battery being out of service on Unit 1, 2, or 3 or shutdown board 3EB battery being inoperable on Unit 3. For these reasons, a seven day out of service time is appropriate for an inoperable 4-kv shutdown board battery on Units 1 and 2. This change is acceptable since the allowed outage time continues to ensure corrective action is taken to restore the inoperable battery with no significant reduction in margin of safety while allowing time for corrective action to be accomplished.

L2 The time to reach MODE 4, Cold Shutdown has been extended from 24 hours to 36 hours. This provides the necessary time to shut down and cool down the plant in a controlled and orderly manner that is within the capabilities of the unit, assuming the minimum required equipment is OPERABLE. This extra time reduces the potential for a unit upset that could challenge safety systems. This time is consistent with the BWR Standard Technical Specifications, NUREG 1433. The increased time allowed to reach MODE 4 is acceptable based on the small probability of an event during this time and the desire to minimize plant transients. The requested 12 hour extension will provide sufficient time for the unit to reach MODE 4 in an orderly manner. As a result, the potential for human error will be reduced. In addition, the unit is now required to be in MODE 3 within 12 hours (a shutdown condition). As such, any reduction in a margin of safety will be insignificant and offset by the benefit gained from providing sufficient time to reach MODE 4, thus avoiding potential plant transients from attempting to reach MODE 4 in the current time and the benefit of being subcritical (MODE 3) in a shorter required time.

L3 CTS 4.9.A.2.c requires a battery capacity test every 24 months. This battery capacity test is presented as proposed SR 3.8.4.4 at a Frequency of once per 60 months (12 months when battery shows degradation, and 24 months when battery has reached 85% of the expected life). However, a new Surveillance, proposed SR 3.8.4.3, introduces a battery service test every 18 months. The new service test will provide assurance that the battery remains capable of supporting the expected post-accident loads. The less frequent capacity test will continue to monitor overall battery capacity and allow trending of remaining capacity (with more frequent testing on signs of degradation or approaching end-of-life). These tests and their Frequencies are consistent with the recommendations of IEEE-450 for monitoring battery performance. This change is acceptable since the added service test ensures the battery will continue to be able to accomplish its required function.

L4 CTS 3.9.B.7 and B.8 for Units 1 and 2 (3.9.B.6 for Unit 3) requires NRC notification when a DC power source is inoperable for any reason other than routine surveillance testing. This condition is not reportable to the NRC per 10 CFR 50.72, 50.73, or other 10 CFR requirements and as such is being removed from TS.

TECHNICAL CHANGE - MORE RESTRICTIVE

The items identified as More Restrictive (MR) are those which contain requirements that are more restrictive than Current Technical Specifications. These MR requirements are based on the Standard Technical Specifications for BWR/4, NUREG-1433, modified to reflect BFN specific design, and have been determined to be appropriate and safe for BFN based on a review of current design bases.

M1 A new Specification is being added requiring the DC electric power subsystems, necessary to support the DC electrical power distribution subsystem(s) required by proposed LCO 3.8.8, Distribution Systems—Shutdown, to be OPERABLE. This ensures the DC sources needed to support equipment required to be operable when shutdown are available.

JUSTIFICATION FOR CHANGES
BFN ISTS 3.8.6 - BATTERY CELL PARAMETERS

ADMINISTRATIVE

A1 All reformatting and renumbering is in accordance with the BWR/4 Standard Technical Specifications (STS), NUREG-1433. As a result, the Technical Specifications (TS) should be more readily readable, and therefore understandable, by plant operators as well as other users. The reformatting, renumbering, and rewording process involves no technical changes to existing Technical Specifications.

Editorial rewording (either adding or deleting) is made consistent with NUREG-1433. During ISTS development certain wording preferences or English language conventions were adopted which resulted in no technical changes (either actual or interpretational) to the Technical Specifications. Additional information has also been added to more fully describe each subsection. This wording is consistent with the BWR Standard Technical Specifications, NUREG-1433. Since the design is already approved by the NRC, adding more detail does not result in a technical change.

TECHNICAL CHANGE - MORE RESTRICTIVE

The items identified as More Restrictive (MR) are those which contain requirements that are more restrictive than Current Technical Specifications. These MR requirements are based on the Standard Technical Specifications for BWR/4, NUREG-1433, modified to reflect BFN specific design, and have been determined to be appropriate and safe for BFN based on a review of current design bases.

M1 CTS does not have any battery cell parameter limits that affect the OPERABILITY of the batteries. The proposed battery cell parameter limits have been provided and placed into one Table, (proposed Table 3.8.6-1), which lists the limits for each pilot cell (Category A) and for each connected cell (Category B). Category C limits have also been added, as described below. The proposed SRs (SR 3.8.6.1 and 3.8.6.2) are worded to verify the appropriate limits (Category A or B) are met. Currently no limits are specified in Technical Specifications. To go along with the new limits, a 31 day Completion Time for restoring battery cell parameters has been provided (Required Action A.3). This Completion Time is considered acceptable since sufficient battery capacity exists to perform the intended function and to allow time to fully restore battery cell parameters to normal limits. This change is consistent with IEEE Battery Working Group (BWG) recommendations in a letter from B. M. Radimer (IEEE BWG) to S. K. Aggarwal (NRC) dated August 2, 1988.

To help support this new time, two additional requirements have been added. Required Action A.1 has been provided to verify pilot cell

electrolyte level and float voltage are within allowable limits (Category C limits) within 1 hour when Category A or B parameters are not within limits. This change provides a quick indication of the status of the remainder of the battery cells. Required Action A.2 has been provided to verify battery cell parameters for all the cells are within Category C limits within 24 hours when Category A or B parameters are not within limits. This change provides assurance the battery is still capable of performing its intended function. If Category C limits are not met, or the Category A and B limits are not restored within 31 days, proposed ACTION B requires the affected battery to be declared inoperable (and the appropriate ACTIONS of proposed LCOs 3.8.4 or 3.8.5 taken).

In addition, a Note has been added to the ACTIONS to provide more explicit instructions for proper application of the Actions for Technical Specification compliance. In conjunction with the proposed Specification 1.3 - "Completion Times," the Note ("Separate Condition entry is allowed for each . . .") and "one or more" provides direction consistent with the intent of the proposed Action.

A Surveillance is being added, consistent with the BWR Standard Technical Specifications. Proposed SR 3.8.6.3 requires a verification that electrolyte temperature is ≥ a specified limit for each battery every 92 days. This helps to ensure battery OPERABILITY.

The Applicability of this new LCO has been made "when associated DC electrical power subsystem is required to be OPERABLE." This covers the current MODES 1, 2, and 3, as well as new requirements for MODES 4 and 5 and fuel handling.

TECHNICAL CHANGES - LESS RESTRICTIVE

LA1 This change proposes to relocate the specifics of the current requirement to verify the electrolyte temperature of every fifth cell every 92 days. The proposed change will require the average temperature of representative cells to be within limits every 92 days. The details of "representative cells" are relocated to the Bases. Removal of these details from the Technical Specifications is acceptable since the inclusion of this information is not necessary in order to establish the requirement. Changes to the Bases will be controlled by the provisions of the Bases Control Program in the Section 5 of the Technical Specifications.

LA2 The requirement to log the battery parameters has been replaced with a requirement to verify adequate battery parameters (SR 3.8.6.1 and SR 3.8.6.2). This is acceptable since inclusion of the details of what data to record is not necessary to establish the requirement for surveillance testing. Thus removal of this Surveillance from the Technical Specifications will have no effect on battery OPERABILITY.

LA3 Not used.

JUSTIFICATION FOR CHANGES
BFN ISTS 3.8.7: DISTRIBUTION SYSTEMS—OPERATING

ADMINISTRATIVE

A1 All reformatting and renumbering is in accordance with the BWR/4 Standard Technical Specifications (STS), NUREG-1433. As a result, the Technical Specifications (TS) should be more readily readable, and therefore understandable, by plant operators as well as other users. The reformatting, renumbering, and rewording process involves no technical changes to existing Technical Specifications.

Editorial rewording (either adding or deleting) is made consistent with NUREG-1433. During ISTS development certain wording preferences or English language conventions were adopted which resulted in no technical changes (either actual or interpretational) to the Technical Specifications. Additional information has also been added to more fully describe each subsection. This wording is consistent with the BWR Standard Technical Specifications, NUREG-1433. Since the design is already approved by the NRC, adding more detail does not result in a technical change.

A2 With a Shutdown Board deenergized, the associated DG would also have to be inoperable. With this inoperability, proposed Required Action B.2 of ITS LCO 3.8.1 will perform this confirmation of the OPERABILITY of redundant features. Refer to LCO 3.8.1 for justification for changes to this ACTION.

TECHNICAL CHANGE - MORE RESTRICTIVE

The items identified as More Restrictive (MR) are those which contain requirements that are more restrictive than Current Technical Specifications. These MR requirements are based on the Standard Technical Specifications for BWR/4, NUREG-1433, modified to reflect BFN specific design, and have been determined to be appropriate and safe for BFN based on a review of current design bases.

M1 The proposed Required Actions will be modified to include a limit on the maximum time allowed for any combination of required AC/DC distribution subsystems to be inoperable during any single continuous occurrence of failing to meet the LCO. This new restriction is intended to prevent excessive allowed out of service times for an AC/DC distribution subsystem as a result of sequential inoperabilities of different AC/DC distribution subsystems. This change is consistent with the intended presentation of the BWR Standard Technical Specifications, NUREG-1433.

M2 A new more restrictive requirement to be in MODE 3 (Hot Shutdown) within 12 hours of entry into the LCO has been added. This is more restrictive since before the only requirement was to be in mode 4 within 24 hours and now the operator must place the reactor in a shutdown condition within a shorter time period. In the case of CTS 3.9.B.12 for Units 1 and 2 (3.9.B.10 for Unit 3), the requirement to be in Hot Standby in 12 hours has been changed to a more restrictive requirement to be in Hot Shutdown in 12 hours. These requirements are consistent with the BWR Standard Technical Specifications, NUREG-1433, and are appropriate for BFN since they add an additional measure of control for safe shutdown of the reactor and can be achieved safely in the time allotted.

M3 Proposed ACTION I requires entry into LCO 3.0.3 immediately when two or more electrical power distribution subsystems are inoperable. This condition corresponds to a level of degradation in the electrical power distribution subsystems that causes a required safety function to be lost. In this case no additional time is justified for continued operation and a controlled shutdown must commence.

Unit 1 and 2 only: Current Unit 1 and 2 Technical Specifications 3.9.B.7 & B.8 are written so that they allow one 250-V Unit Battery to be inoperable concurrent with one 250-V shutdown board battery. CTS 3.9.B.7 provides a 7 day LCO for the Unit Batteries and CTS 3.9.B.8 provides a 5 day LCO for the shutdown board batteries. However, this configuration (one Unit battery and one Shutdown Board battery inoperable) could result in a loss of ESF functions. The proposed Specifications have been modified to explicitly allow only one Unit Battery or Shutdown Board battery inoperable and as such is considered more restrictive. This is consistent with the CTS for Unit 3.

M4 CTS 4.9.A.4.d require the 4.16 kV Shutdown Board voltages to be recorded every 12 hours. However, no explicit periodic verification is required for the other required boards. A more restrictive change is made by providing an explicit periodic Surveillance Requirement that applies to all the AC and DC distribution subsystems. The surveillance verifies that the AC and DC electrical power distribution systems are functioning properly, with all required circuit breakers closed and buses energized to the proper voltage. This ensures that power is readily available for motive as well as control functions for critical system loads connected to these buses. The 7 day Frequency takes into consideration the redundant capability of the AC and DC electrical power distribution subsystems, and other indications in the control room that alert the operator to system malfunctions. The removal of the requirement to record shutdown board voltage every 12 hours is addressed by justification LA3 below.

M5 An explicit LCO statement is added to require the applicable unit distribution boards needed to support SGT and CREVS to be OPERABLE. Proposed ACTION G specifically requires that the affected CREVS or SGT subsystem be declared inoperable when a required Unit 2 or 3 AC or DC Board is inoperable. This new restriction is intended to ensure appropriate action is taken for the system affected by an inoperable board. This change is consistent with the intended presentation of the BWR Standard Technical Specifications, NUREG-1433.

M6 The Condition F postulated worst case scenario is one division of 4.16 kV shutdown board without AC power. In this condition, the unit is more vulnerable to a complete loss of AC power. It is, therefore, imperative that the unit operators' attention be focused on minimizing the potential for loss of power to the remaining division by stabilizing the unit, and on restoring power to the affected division. The 8 hour time period before requiring a unit shutdown is acceptable because:

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

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

The second Completion Time (12 days) establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable in any single contiguous occurrence of failing to meet the LCO. This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This allowance results in establishing the "time zero" at the time the LCO was initially not met, instead of at the time Condition F was entered. The 12 day Completion Time is an acceptable limitation on the potential of failing to meet the LCO indefinitely.

TECHNICAL CHANGE - LESS RESTRICTIVE

"Generic"

LA1 The details relating to system design and purpose and what "OPERABLE" means (i.e., "energized") have been relocated to the Bases. The design features and system operation are also described in the FSAR. This change is acceptable since inclusion of these details is not necessary in order to establish the LCO requirement. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program in Section 5 of the Technical Specifications. Changes to the FSAR will be controlled by the provisions of 10 CFR 50.59.

LA2 Deleted. Replaced by L5.

LA3 CTS 4.9.A.4.d require the 4.16 kV Shutdown Board voltages to be recorded every 12 hours. The proposed change removes this specific requirement from TS. This is acceptable since inclusion of the details of what data to record is not necessary to establish the requirement for surveillance testing. Thus removal of this Surveillance from the Technical Specifications will have no effect on shutdown board OPERABILITY.

LA4 CTS 3.9.A.3.h for Units 1 and 2 (3.9.A.3.g for Unit 3) specifies that RMOV boards D and E be energized and that motor generator sets DN, DA, EN, and EA be in service. These details are used to support the requirements for an OPERABLE D or E RMOV board. These boards supply power to the RHR loop injection valves and recirculation pump discharge valves and are designed to automatically transfer to their alternate power supply.

The requirement of the current TS to have an OPERABLE RMOV board D and E is captured by proposed ITS LCO 3.8.7.c. The details relating to system design, purpose, and what constitutes OPERABILITY for the RMOV boards D and E have been relocated to the Bases. The design features required for operability (auto transfer on undervoltage) are also located in the Bases. Relocation of these details to the Bases is acceptable since the details of what constitutes OPERABILITY are not necessary to establish the requirement for OPERABILITY. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program in Section 5 of the Technical Specifications.

LA5 CTS 3.9.A.3.h (for Unit 1 and 2) and 3.9.A.3.g (for Unit 3) require 480 V reactor motor operated valve (RMOV) boards to be energized with motor-generator (MG) sets in service. CTS 3.9.B.13 and 14 (for Unit 1 and 2) and 11 and 12 (for Unit 3) provide Required Actions for when one or any two 480 V MG board sets become inoperable.

480 V AC RMOV boards contain MG sets in their feeder lines. The 480 V AC RMOV boards D and E provide motive power to valves associated with the LPCI mode of the RHR system. The MG sets act as electrical isolators and provide an automatic transfer on loss of power. The ability to provide power to these valves from two independent 4-kv shutdown boards ensures that single failure of a DG will not result in the failure of both LPCI pumps in one subsystem. Therefore, the failure of the automatic transfer capability will result in the inoperability of the of the affected LPCI subsystem. Having an MG set out of service

removes the auto transfer feature, and reduces the assurance that full RHR (LPCI) capacity will be available when required.

The intent of the current TS 3.9.B.13 (Units 1 and 2) and 3.9.B.11 (Unit 3) to only allow operation for 7 days with one MG set inoperable is maintained by Required Action C which requires declaring the affected RHR subsystem inoperable. This causes entry into the LCO 3.5.1 for an inoperable RHR LPCI loop which results in the same 7 day LCO. Having both RMOV board D and E auto transfers out of service can considerably reduce equipment availability. The inability to provide power to the inboard injection valve and the recirculation pump discharge valve from either 4-kv board associated with an inoperable MG set would result in declaring the both LPCI subsystems inoperable and entering the Actions required for LPCI. Thus the intent of CTS 3.9.B.14 (Units 1 and 2) and 3.9.B.12 (Unit 3) is maintained. This is acceptable since the LCO and Actions for the affected equipment are the more appropriate place for control of the required actions to be taken in the event of an inoperable component.

The details relating to system design, purpose, and what constitutes OPERABILITY for the RMOV boards D and E have been relocated to the Bases. The design features required for operability (auto transfer on undervoltage) are also located in the Bases. Relocation of these details to the Bases is acceptable since the details of what constitutes OPERABILITY are not necessary to establish the requirement for OPERABILITY. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program in Section 5 of the Technical Specifications.

"Specific"

L1 The time to reach MODE 4, Cold Shutdown has been extended from 24 hours to 36 hours. This provides the necessary time to shut down and cool down the plant in a controlled and orderly manner that is within the capabilities of the unit, assuming the minimum required equipment is OPERABLE. This extra time reduces the potential for a unit upset that could challenge safety systems. This time is consistent with the BWR Standard Technical Specifications, NUREG 1433. The increased time allowed to reach MODE 4 is acceptable based on the small probability of an event during this time and the desire to minimize plant transients. The requested 12 hour extension will provide sufficient time for the unit to reach MODE 4 in an orderly manner. As a result, the potential for human error will be reduced. In addition, the unit is now required to be in MODE 3 within 12 hours (a shutdown condition). As such, any reduction in a margin of safety will be insignificant and offset by the benefit gained from providing sufficient time to reach MODE 4, thus avoiding potential plant transients from attempting to reach MODE 4 in

the current time and the benefit of being subcritical (MODE 3) in a shorter required time.

L2 Proposed LCO 3.8.7, Conditions A and C will not include the requirement of CTS 4.9.B.4 (Units 1,2,3), 4.9.B.6 (Units 1,2) and 4.9.B.5 (Unit 3) to demonstrate the OPERABILITY of the all DGs associated with the remaining distribution systems within 24 hours. This change acknowledges that inoperability of a distribution subsystem is not indicative of a similar condition in the DG. Additionally, the periodic frequencies specified to demonstrate DG OPERABILITY have been shown to be adequate to provide a high degree of assurance that the DGs are OPERABLE. Therefore, this change allows credit to be taken for the normal periodic DG Surveillance as a demonstration of DG OPERABILITY and reduces the challenges and wear to the DGs. Minimizing DG starts is recommended to avoid unnecessary DG wear, thereby enhancing overall DG reliability (refer to Generic Letter 84-15). This action is consistent with BWR STS, NUREG-1433, and the design of BFN.

L3 Proposed LCO 3.8.7, Required Action B.1 provides an 8 hour time period to restore an inoperable 480 V shutdown board prior to initiating a shutdown while CTS 3.9.B.12 for Units 1 and 2 (3.9.B.10 for Unit 3) does not allow any time. Proposed Condition B allows a short time period to restore the inoperable 480 V shutdown board. The remaining 480 V shutdown board is capable of supporting the minimum safety functions necessary to shut down the reactor and maintain it in a safe shutdown condition assuming no single failure. The overall reliability is reduced because a single failure in the remaining 480 V shutdown board could result in the minimum required ESF functions not being supported. Therefore, the inoperable 480 V shutdown board must be restored to OPERABLE status within 8 hours. The 8 hour time period before requiring a unit shutdown is acceptable because 1) there is a potential for decreased safety if the unit operator's attention is diverted from the evaluations and actions necessary to restore power to the affected division to the actions associated with taking the unit to shutdown within this time limits, and 2) the potential for an event in conjunction with a single failure of a redundant component in the division with AC power. (The redundant component is verified OPERABLE in accordance with Specification 5.5.11, "Safety Function Determination Program (SFDP).") The second Completion Time (12 days) for Required Action B.1 establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable in any single contiguous occurrence of failing to meet the LCO.

L4 The allowed outage time for the Unit 1 and 2 Shutdown Board DC batteries has been increased from 5 to 7 days consistent with the Unit 3 Technical Specifications for Shutdown Battery 3EB and Units 1, 2, and 3 CTS for a unit battery. At BFN, there is a safety related 250 VDC unit battery located in each unit. The unit battery systems provide power for unit

control functions, unit DC motor loads and alternate control power to the 4.16 kV and 480 V AC shutdown boards. The primary control power supplies to the 3A, 3C, and 3D 4.16kV ac shutdown boards and the Unit 3 480 V shutdown boards are also provided by the unit batteries. There are five safety related 250 V DC battery systems assigned as primary control power supplies to 4.16 kV AC shutdown boards A, B, C, D, 3EB, and 480 V shutdown boards 1A, 1B, 2A, and 2B. Alternate control power for these shutdown boards are provided from the Unit Batteries. Therefore, the impact on Unit 1 and 2 for a 4-kv shutdown board battery being inoperable is no more severe than a unit battery being out of service on Unit 1, 2, or 3 or shutdown board 3EB battery being inoperable on Unit 3. For these reasons, a seven day out of service time is appropriate for an inoperable 4-kv shutdown board battery on Units 1 and 2. This change is acceptable since the allowed outage time continues to ensure corrective action is taken to restore the inoperable battery with no significant reduction in margin of safety while allowing time for corrective action to be accomplished.

L5 CTS 3.9.B.7 and B.8 for Units 1 and 2 (3.9.B.6 for Unit 3) requires NRC notification when a battery board is inoperable for any reason other than routine surveillance testing. This condition is not reportable to the NRC per 10 CFR 50.72, 50.73, or other 10 CFR requirements and as such is being removed from TS.

JUSTIFICATION FOR CHANGES
BFN ISTS 3.8.8: DISTRIBUTION SYSTEMS-SHUTDOWN

ADMINISTRATIVE

A1 All reformatting and renumbering is in accordance with the BWR/4 Standard Technical Specifications (STS), NUREG-1433. As a result, the Technical Specifications (TS) should be more readily readable, and therefore understandable, by plant operators as well as other users. The reformatting, renumbering, and rewording process involves no technical changes to existing Technical Specifications.

Editorial rewording (either adding or deleting) is made consistent with NUREG-1433. During ISTS development certain wording preferences or English language conventions were adopted which resulted in no technical changes (either actual or interpretational) to the Technical Specifications. Additional information has also been added to more fully describe each subsection. This wording is consistent with the BWR Standard Technical Specifications, NUREG-1433. Since the design is already approved by the NRC, adding more detail does not result in a technical change.

TECHNICAL CHANGE - MORE RESTRICTIVE

The items identified as More Restrictive (MR) are those which contain requirements that are more restrictive than Current Technical Specifications. These MR requirements are based on the Standard Technical Specifications for BWR/4, NUREG-1433, modified to reflect BFN specific design, and have been determined to be appropriate and safe for BFN based on a review of current design bases.

M1 Current applicability is during the COLD SHUTDOWN CONDITION with irradiated fuel in the reactor. The proposed applicability is more restrictive since it also applies during movement of irradiated fuel in the secondary containment, even when no irradiated fuel is in the reactor vessel. The Distribution Subsystems are required to be OPERABLE during these conditions to provide assurance that systems providing adequate coolant inventory makeup, needed to mitigate a fuel handling accident, and necessary to mitigate the effect of events that can lead to core damage during shutdown are available. They are also required to be operable to provide assurance that instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

M2 ACTIONs have been added to provide proper Required Actions to take when a required Distribution Subsystem is inoperable. Currently, no actions are provided. The new ACTIONS (ACTION A) will either require declaring the affected components inoperable and taking the ACTIONS of the applicable system LCO (Required Action A.1) or will require suspending CORE ALTERATIONS, OPDRVs, and irradiated fuel movement in the secondary containment, and initiating action to restore the inoperable source (Required Actions A.1, A.2.1, A.2.2, A.2.3, A.2.4, and A.2.5). In addition, a Surveillance has been added to ensure the OPERABILITY of the required Distribution Subsystem. This new ACTION and Surveillance are additional restrictions on plant operation.

TECHNICAL CHANGE - LESS RESTRICTIVE

LA1 The details relating to system design, purpose, and what constitutes OPERABILITY for the RMOV boards D and E have been relocated to the Bases. The design features required for operability (auto transfer on undervoltage) are also located in the Bases. Relocation of these details to the Bases is acceptable since the details of what constitutes OPERABILITY are not necessary to establish the requirement for OPERABILITY. Changes to the Bases will be controlled by the provisions of the proposed Bases Control Program in Section 5 of the Technical Specifications.

BROWNS FERRY NUCLEAR PLANT - IMPROVED TECHNICAL SPECIFICATIONS
SECTION 3.8
LIST OF REVISED PAGES

NUREG-1433 BWR/4 STS MARKUP

Replaced page 339 of 478 with page 339 of 478 Rev 3
Replaced page 3.8-6 (page 347 of 478) with page 3.8-6 (page 347 of 478) Rev 3
Replaced page 3.8-7 (page 349 of 478) with page 3.8-7 (page 349 of 478) Rev 3
Replaced page 3.8-8 (page 350 of 478) with page 3.8-8 (page 350 of 478) Rev 3
Replaced page 3.8-9 (page 351 of 478) with page 3.8-9 (page 351 of 478) Rev 3
Replaced page 3.8-11 (page 353 of 478) Rev 1 with page 3.8-11 (page 353 of 478) Rev 3
Replaced page 3.8-13 (page 355 of 478) with page 3.8-13 (page 355 of 478) Rev 3
Replaced page 3.8-15 (page 357 of 478) with page 3.8-15 (page 357 of 478) Rev 3
Replaced page 3.8-16 (page 358 of 478) with page 3.8-16 (page 358 of 478) Rev 3
Replaced page 361 of 478 Rev 1 with page 361 of 478 Rev 3
Replaced page 362 of 478 Rev 1 with page 362 of 478 Rev 3
Replaced page 3.8-19 (page 363 of 478) Rev 2 with page 3.8-19 (page 363 of 478) Rev 3
Replaced page 3.8-20 (page 364 of 478) Rev 2 with page 3.8-20 (page 364 of 478) Rev 3
Replaced page 365 of 478 Rev 1 with page 365 of 478 Rev 3
Replaced page 3.8-22 (page 367 of 478) with page 3.8-22 (page 367 of 478) Rev 3
Replaced page 3.8-24 (page 369 of 478) with page 3.8-24 (page 369 of 478) Rev 3
Replaced page 370A of 478 Rev 1 with page 370A of 478 Rev 3
Replaced page 3.8-26 (page 372 of 478) with page 3.8-26 (page 372 of 478) Rev 3
Replaced page 3.8-33 (page 379 of 478) Rev 1 with page 3.8-33 (page 379 of 478) Rev 3
Replaced page 3.8-38 (page 384 of 478) Rev 2 with page 3.8-38 (page 384 of 478) Rev 3

P1

Insert 3.8-1A (Unit 1 and 2)

~~When Unit 3 is not in MODE 1, 2, or 3,~~ Unit 3 DG(s) capable of supplying the Unit 3 4.16 kV shutdown board(s) required by LCO 3.8.7, "Distribution Systems – Operating."

P1

Insert 3.8-1A (Unit 3)

~~When Unit 1 or 2 are not in MODE 1, 2, or 3,~~ Unit 1 and 2 DG(s) capable of supplying the Unit 1 and 2 4.16 kV shutdown board(s) required by LCO 3.8.7, "Distribution Systems – Operating."

P42

Insert 3.8-1B

with two divisions of 480 V load shed logic and common accident signal logic OPERABLE

INSERT 3.8-6A (P1)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
(P51) ~~SR 3.8.1.1 Verify correct breaker alignment and indicated power availability for each [required] offsite circuit.~~	~~7 days~~
SR 3.8.1.2 (P20) ----------NOTES---------- (Stet) ~~1. Performance of SR 3.8.1.7 satisfies this SR.~~ (P29) ~~2.~~ 2. All DG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. (P30) (P31) ~~3.~~ 3. A modified DG start involving idling and gradual acceleration to synchronous speed may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.~~7~~ 4 must be met. (P20) (B1) ---------- (Stet) Verify each DG starts ~~from standby~~ (P30) ~~conditions~~ and achieves steady state voltage ≥ ~~[3740]~~ 3940 V and ≤ ~~[4580]~~ 4400 V and frequency ≥ ~~[58.8]~~ Hz and ≤ ~~[61.2]~~ Hz. (B2)	(P32) 31 days ~~As specified in Table 3.8.1-1~~

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.1.~~3~~ 2 (P20)	----------NOTES---------- 1. DG loadings may include gradual loading as recommended by the manufacturer. 2. Momentary transients outside the load range do not invalidate this test. 3. This Surveillance shall be conducted on only one DG at a time. 4. This SR shall be preceded by and immediately follow, without shutdown, a successful performance of SR 3.8.1.~~2~~ 1 (P20) or SR 3.8.1.~~4~~ 4 (P20). An intermediate warmup period is allowed prior to loading. (P21) ---------- Verify each DG is synchronized and loaded and operates for ≥ 60 minutes at a load ≥ ~~[1710] kW and ≤ [2000] kW.~~ ~~2600 kW~~ 2295 kW and ≤ 2550 kW. (B2)	31 days (P32) ~~As specified in Table 3.8.1-1~~
SR ~~3.8.1.4~~ (P33)	Verify each ~~day~~ tank [and engine mounted tank] contain[s] ≥ [900] gal of fuel oil.	~~31~~ days
SR 3.8.1.~~5~~ (P22)	Check for ~~and~~ remove accumulated water from each day tank [and engine mounted tank].	[~~31~~] days
SR 3.8.1.~~6~~ 3 (P20)	Verify the 7-day (P1) fuel oil transfer system operates to ~~[automatically]~~ transfer fuel oil from storage tank~~[s]~~ to the day tank ~~[and engine mounted tank].~~ (B1)	31 ~~[92]~~ days (B2)

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
SR 3.8.1.~~7~~ 4 P20 ----------NOTE---------- All DG starts may be preceded by an engine prelube period. ----------	Stet ~~P30~~
Verify each DG starts from standby condition and achieves, in ≤ ~~[12]~~ 10 seconds, voltage ≥ ~~[3740] V and ≤ [4580] V~~ 3940V and frequency ≥ ~~[58.8] Hz and ≤ [61.2] Hz.~~ B2 B2	184 days
P43 SR 3.8.1.8 [----------NOTE---------- This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. ----------] Verify [automatic [and] manual] transfer of [unit power supply] from the [normal] offsite circuit to the alternate] offsite circuit.	[18 months]

(continued)

Insert

Verify after DG fast start from standby conditions that the DG achieves steady state voltage ≥ 3940V and ≤ 4400V, and frequency ≥ 58.8 Hz. and ≤ 61.2 Hz.

P55

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
SR 3.8.1.5 (P20) ~~SR 3.8.1.8~~ ----------NOTES---------- 1. This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. (P34) 2. If performed with the DG synchronized with offsite power, it shall be performed at a power factor ≤ ~~[0.9]~~. (B1) (B1) ----------	
Verify each DG rejects a load greater than or equal to its associated single largest post-accident load, and:	~~[18 months]~~ (B2)
a. Following load rejection, the frequency is ≤ ~~[65.5]~~ 66.75 Hz; and (B2)	steady state (PS6)
b. ~~Within [3] seconds~~ following load rejection, the voltage ~~is ≥ [3740] V and ≤ [4580] V and~~ 4800	(B2) (PS6) recovers to ≥ 3940 V and ≤ 4400 V.
stet c. ~~Within [6] seconds~~ following load rejection, the frequency ~~is~~ recovers to ≥ ~~[58.8]~~ Hz and ≤ ~~[61.2]~~ Hz.	(B3) (B2) steady state (PS6)
SR 3.8.1.10 ----------NOTE---------- This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. ---------- (PS) Verify each DG operating at a power factor ≤ [0.9] does not trip and voltage is maintained ≤ [4800] V during and following a load rejection of ≥ [1710] kW and ≤ [2000] kW.	[18 months]

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
SR 3.8.1.~~12~~ 6 P20	
----------NOTES----------	
1. All DG starts may be preceded by an engine prelube period.	Stet followed by a warm-up period P54
2. This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. P34	

Verify on an actual or simulated ~~Emergency Core Cooling System (ECCS) initiation~~ signal each DG auto-starts ~~from standby condition and:~~ accident. P1 B1 Stet	[18 months] B1
a. In ≤ [12] seconds after auto-start and during tests, achieves voltage ≥ [3740] V and ≤ [4580] V;	P44
b. In ≤ [12] seconds after auto-start and during tests, achieves frequency ≥ [58.8] Hz and ≤ [61.2] Hz;	
c. Operates for ≥ [5] minutes;	
d. Permanently connected loads remain energized from the offsite power system; and	
e. Emergency loads are energized [or auto-connected through the automatic load sequencer] from the offsite power system. P38	

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
SR 3.8.1.~~14~~ 7 P20 ----------NOTES---------- ~~1.~~ Momentary transients outside the load and power factor ranges do not invalidate this test. 2. This Surveillance shall not be performed in MODE 1 or 2. However, credit may be taken for unplanned events that satisfy this SR. P34 ---------- B2 Verify each DG operating at a power factor ≤ {0.9} operates for ≥ 24 hours: a. For ≥ {2} hours loaded ≥ ~~[3100]~~ 2680 ~~2800~~ kW ~~and ≤ [3400] kW;~~ and ≤ 2805 kW; and B2 b. For the remaining hours of the test loaded ≥ ~~[2850] kW and ≤ [3150] kW.~~ ~~2600~~ 2295 kW and ≤ 2550 kW	{18 months} B2
SR 3.8.1.15 ----------NOTES---------- 1. This Surveillance shall be performed within 5 minutes of shutting down the DG after the DG has operated ≥ [2] hours loaded ≥ [1710] kW and ≤ [2000] kW. Momentary transients outside of load range do not invalidate this test. P39 2. All DG starts may be preceded by an engine prelube period. ---------- Verify each DG starts and achieves, in ≤ [12] seconds, voltage ≥ [3740] V and ≤ [4584] V and frequency ≥ [58.8] Hz and ≤ [61.2] Hz.	[18 months]

(continued)

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SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
SR 3.8.1.~~10~~ 8 (P20) ----------NOTE---------- This Surveillance shall not be performed in MODE 1, 2 or 3. However, credit may be taken for unplanned events that satisfy this SR. ---------- (P34) (B1) Verify interval between each ~~sequenced timed~~ load block is within ~~± [10% of design interval]~~ (B1) for each ~~load sequencer~~ individual timer. (the allowable values) ~~(the calibration tolerance)~~	[18 months] (B2)
SR 3.8.1.~~18~~ 9 (P20) ----------NOTES---------- 1. All ~~DG~~ starts may be preceded by ~~an~~ engine prelube period. (P20) stet	
2. This Surveillance shall not be performed in MODE 1, 2, or 3. However, credit may be taken for unplanned events that satisfy this SR. (P34) ----------	
Verify, on an actual or simulated loss of offsite power signal in conjunction with an actual or simulated ECCS initiation signal:	[18 months] (B2)
a. De-energization of emergency buses;	
b. Load shedding from emergency buses; and	
c. DG auto-starts from standby condition and:	
1. energizes permanently connected loads in ≤ ~~[12]~~ 10 seconds,	(B2)
2. energizes auto-connected emergency loads through ~~[load sequencer]~~ individual timers,	(B1)
	(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.8.1.~~19~~ 9 (continued) P20	
B2 3. achieves steady state voltage ≥ ~~[3740]~~ 3940 V and ≤ ~~[4580]~~ 4400 V,	
B2 4. achieves steady state frequency ≥ ~~[58.8]~~ Hz and ≤ ~~[61.2]~~ Hz, and	
B2 5. supplies permanently connected and auto-connected emergency loads for ≥ ~~[5]~~ minutes.	
SR 3.8.1.20 ----------NOTE---------- All DG starts may be preceded by an engine prelube period. ---------- P5 Verify, when started simultaneously from standby condition, [each] [2A and 2C] DG achieves, in ≤ [12] seconds, voltage ≥ [3740] V and ≤ [4580] V and frequency ≥ [58.8] Hz and ≤ [61.2] Hz.	10 years

INSERT 3.8-16A P1

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3.8 ELECTRICAL POWER SYSTEMS

3.8.2 AC Sources – Shutdown

LCO 3.8.2 The following AC electrical power sources shall be OPERABLE:

a. One qualified circuit connected between the offsite transmission network and the onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.~~10~~ 8, "Distribution Systems – Shutdown"; ~~and~~

b. ~~One~~ diesel generators (DG) each capable of supplying one ~~division~~ of the onsite Class 1E AC electrical power distribution subsystem(s) required by LCO 3.8.~~10~~ 8, "Distribution Systems – Shutdown"; and

Unit 3
Two Unit 3
Two Unit 1 and 2
of the four
Unit 1 and 2
4.16 KV shutdown board
INSERT 3.8-18A

APPLICABILITY: MODES 4 and 5,
During movement of irradiated fuel assemblies in the secondary containment.

Insert 3.8-18A (Units 1 and 2)

c. ~~When Unit 3 is not in MODE 1, 2, or 3~~, Unit 3 DGs capable of supplying the Unit 3 4.16 kV shutdown boards required by LCO 3.8.8.

Insert 3.8-18A (Unit 3)

c. ~~When Unit 1 or 2 are not in MODE 1, 2, or 3~~, Unit ~~3~~ 1 and 2 DGs capable of supplying the Unit ~~3~~ 1 and 2 4.16 kV shutdown boards required by LCO 3.8.8.

with any required 4.16kV shutdown board not energized from a qualified source as a result of condition A. (P27)

(move note to position immediately preceeding Required Action 3.8.2.0.1 on next page)

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required offsite circuit inoperable. (M1)	----------NOTE---------- Enter applicable Condition and Required Actions of LCO 3.8.~~10~~ (8) with one required division de-energized as a result of Condition A. ----------	when Condition B is entered with no AC power source to any required 4.16 kV shutdown board (P27)
	A.1 Declare affected required feature(s), with no offsite power available, inoperable. (qualified) (F1)	~~30 days~~ ~~Immediately~~ (stet) (P6) ~~AND~~ Immediately from discovery of Condition A concurrent with inoperability of redundant required feature(s)
	OR	
	A.2.1 Suspend CORE ALTERATIONS.	Immediately
	AND	
	A.2.2 Suspend movement of irradiated fuel assemblies in the ~~[secondary]~~ containment. (P6)	Immediately
	AND	
	A.2.3 Initiate action to suspend operations with a potential for draining the reactor vessel (OPDRVs).	Immediately
	AND	
	A.2.4 Initiate action to restore required offsite power circuit to OPERABLE status.	Immediately

OR

One required DG inoperable (P6)

supported by the inoperable AC source(s)

stet

(continued)

Insert note from previous page

B.1 Declare affected required feature(s) inoperable — Immediately

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~Two or more~~ B. ~~One~~ required ~~DG~~ inoperable. ~~AC sources~~	~~OR~~ B.1.1 ~~2.~~ Suspend CORE ALTERATIONS.	Immediately
	AND	
B. One or more required Unit 1 and 2 <Unit 1 ; 2> / Unit 3 <Unit 3> DGs inoperable. (P6)	~~B.2.2~~ B.1.2 Suspend movement of irradiated fuel assemblies in ~~secondary~~ containment. (B1)	Immediately
	AND B.1.3 ~~B.3~~ ~~2.~~ Initiate action to suspend OPDRVs.	Immediately
	AND B.1.4 ~~B.4~~ ~~2.~~ Initiate action to restore required DG to OPERABLE status. (Unit 1 and 2 <Unit 1 ; 2> / Unit 3 <Unit 3>)	Immediately

Insert 3.8-20B (P58)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.2.1	----------NOTE---------- The following SRs are not required to be performed: SR 3.8.1.~~3~~ 2, SR 3.8.1.~~5~~ 5, ~~through SR 3.8.1.11, SR 3.8.1.13 through SR 3.8.16, [SR 3.8.1.18], and~~ SR 3.8.1.~~19~~ 10 9 (7) SR 3.8.1.7, SR 3.8.1.8, and ---------- (P5) <Unit 1+2> Unit 1 and 2 / Unit 3 <Unit 3> For AC sources required to be OPERABLE, the SRs of Specification 3.8.1, ~~except SR 3.8.1.8, SR 3.8.1.17, and SR 3.8.1.20,~~ are applicable.	In accordance with applicable SRs

INSERT 3.8-20A (P6)

REV. 3

P6

Insert 3.8-20A (Units 1 and 2)

SR 3.8.2.2 For the required Unit 3 DG~~s~~, the SRs of Unit 3 Technical Specifications are applicable.	In accordance with applicable SRs

Insert 3.8-20A (Unit 3)

SR 3.8.2.2 For the required Unit 1 and 2 DG~~s~~, the SRs of Unit 1 and 2 Technical Specifications are applicable.	In accordance with applicable SRs

Insert 3.8-20B <Units 1 & 2> P58

C. One or more required Unit 3 DGs inoperable.	C.1 Declare affected SGT and CREV subsystem(s) inoperable.	30 days AND Immediately from discovery of Condition C concurrent with inoperability of redundant required feature(s).

Insert 3.8-20B <Unit 3> P58

C. One or more required Unit 1 and 2 DGs inoperable.	C.1 Declare affected SGT and CREV subsystem(s) inoperable.	30 days AND Immediately from discovery of Condition C concurrent with inoperability of redundant required feature(s).

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One or more DGs with new fuel oil properties not within limits.	D.1 Restore stored fuel oil properties to within limits.	30 days P48
D ~~E~~ P20 B2 165 One or more DGs with starting air receiver pressure < ~~[225] psig and ≥ [125] psig~~ the required unit.	D ~~E~~ P20 1 ~~Restore starting air receiver pressure to ≥ [225] psig.~~ Declare associated DG inoperable.	Immediately ~~48 hours~~ P35
E ~~F~~ P20 Required Action and associated Completion Time not met. OR One or more DGs with diesel fuel oil, lube oil, or starting air subsystem ~~not within limits~~ inoperable P16 for reasons other than Condition A, B, C, or D. ~~or E.~~ that result in a loss of function P16	E ~~F~~ P20 1 Declare associated DG inoperable. P20	Immediately

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources – Operating

LCO 3.8.4 (B1) The following ~~[Division 1 and Division 2 station service, and DG 1B, 2A, and 2C]~~ DC electrical power subsystems shall be OPERABLE:

(P6) INSERT 3.8-24A

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One Unit DC electrical power subsystem inoperable. (P6) INSERT 3.8-24B	A.1 Restore required DC electrical power subsystem to OPERABLE status.	7 days ~~2 hours~~ (P8) (P9)
B. Required Action and Associated Completion Time of Condition A not met ~~for station service DC subsystem~~. (P6)	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	12 hours 36 hours
C. ~~Required Action and associated Completion Time of Condition A not met for~~ DG DC ~~subsystem~~ electrical power subsystem(s) inoperable. (B1) (P6)	C.1 Declare associated DG inoperable.	Immediately

INSERT 3.8-24C (P6)

Insert 3.8-24A (Unit 1 and 2)

a. Unit DC subsystems 1, 2, and 3;

b. Shutdown Board DC subsystems A, B, C, and D;

c. Unit 1 and 2 Diesel Generator (DG) DC subsystems; ~~and~~

d. Unit 3 DG DC subsystem(s) supporting DG(s) required to be OPERABLE by LCO 3.8.1, "AC Sources - Operating,"; and

e. Unit 3 Shutdown Board DC subsystems 3EB ~~needed~~ to support equipment required to be OPERABLE by ~~LCO 3.6.4.3, "Standby Gas Treatment (SGT) System," and~~ LCO 3.7.3, "Control Room Emergency Ventilation (CREV) System."

Insert 3.8-24A (Unit 3)

a. Unit DC subsystems 1, 2, and 3;

b. Shutdown Board DC subsystem 3EB;

c. Unit 3 Diesel Generator (DG) DC subsystems; and

d. Unit 1 and 2 DG DC subsystem(s) supporting DG(s) required to be OPERABLE by LCO 3.8.1, "AC Sources - Operating."

e. Unit 1 and 2 Shutdown Board DC subsystems needed to support equipment required to be OPERABLE by LCO 3.6.4.3, "Standby Gas Treatment (SGT) System," and LCO 3.7.3, "Control Room Emergency Ventilation (CREV) System."

Insert 3.8-24B (Unit 1 and 2)

OR

One Unit 1 and 2 Shutdown Board DC electrical power subsystem inoperable.

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
SR 3.8.4.~~6~~ 5 P20 ----------NOTE---------- ~~This Surveillance shall not be performed in MODE 1, 2, or 3. However, credit may be taken for unplanned events that satisfy this SR.~~ P34 ---------- Stet Verify each required battery charger supplies ≥ ~~{400~~ amps for ~~station service subsystems~~, and ≥ ~~100~~ 15 amps for DG subsystems~~}~~ at ≥ ~~{129}~~ 105 V ~~for ≥ {4} hours~~ B2 P45	the Unit and 50 amps for the Shutdown Board subsystems at ≥ 210 V B2 B1 60 P49 ~~{18~~ months~~}~~ B2
SR 3.8.4.~~7~~ 3 P20 ----------NOTES---------- 1. The modified performance discharge test in SR 3.8.4.~~8~~ 4 may be performed in lieu of the service test in SR 3.8.4.~~7~~ 3 once per 60 months. P20 P20 2. ~~This Surveillance shall not be performed in MODE 1, 2, or 3. However, credit may be taken for unplanned events that satisfy this SR.~~ P34 ---------- Verify battery capacity is adequate to supply, and maintain in OPERABLE status, the required emergency loads for the design duty cycle when subjected to a battery service test.	~~{18~~ months~~}~~ B2

(continued)

SR 3.8.4.2 Verify each required battery charger charges its respective battery after the battery's 18 month service test. | 18 months

P49

---------- Note ----------
Performance of SR 3.8.4.5 satisfies this SR.

Table 3.8.6-1 (page 1 of 1)
Battery Cell Parameter Requirements

PARAMETER	CATEGORY A: LIMITS FOR EACH DESIGNATED PILOT CELL	CATEGORY B: LIMITS FOR EACH CONNECTED CELL	CATEGORY C: ALLOWABLE LIMITS FOR EACH CONNECTED CELL
Electrolyte Level	> Minimum level indication mark, and ≤ ¼ inch above maximum level indication mark(a)	> Minimum level indication mark, and ≤ ¼ inch above maximum level indication mark(a)	Above top of plates, and not overflowing
Float Voltage	≥ 2.13 V	≥ 2.13 V	> 2.07 V
Specific Gravity(b)(c)(d) P46	≥ ~~1.195~~ 1.20 B2	≥ 1.195 AND Average of all connected cells > 1.205 B2	Not more than 0.020 below average of all connected cells AND Average of all connected cells ≥ 1.195 B2

for a limited number of cells provided demonstrated battery capacity at the last discharge test meets the minimum qualifying value.

(a) It is acceptable for the electrolyte level to temporarily increase above the specified maximum level during equalizing charges provided it is not overflowing.

P47 (b) Corrected for electrolyte temperature and level. Level correction is not required, however, when on float charge battery charging current is < 1 amp ~~for station service batteries~~ and < 0.5 amp for DG batteries.

(c) A battery charging current of < 1 amp for ~~station service batteries~~ and B1 B2 < 0.5 amp for DG batteries when on float charge is acceptable for meeting specific gravity limits following a battery recharge, for a maximum of 7 days. When charging current is used to satisfy specific B2 gravity requirements, specific gravity of each connected cell shall be measured prior to expiration of the 7 day allowance.

(d) Alternate values ~~recommended by the manufacturer~~ may be used ~~as appropriate~~. P46

3.8 ELECTRICAL POWER SYSTEMS

3.8 ~~8~~ 7 Distribution Systems – Operating

LCO 3.8 ~~8~~ 7 ~~[Division 1] and [Division 2]~~ The following AC, and DC, ~~[and AC vital bus]~~ electrical power distribution subsystems shall be OPERABLE:

INSERT 3.8-38A

APPLICABILITY: MODES 1, 2, and 3.

INSERT 3.8-38AA

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more AC electrical power distribution subsystems inoperable. <Unit 3> Unit 3 <1 and 2> Unit 1 and 2 Shutdown Board 4.16kV	A.1 Restore the AC electrical power distribution subsystems to OPERABLE status. AND A.2 Declare Associated Diesel Generator inoperable. INSERT 3.8-38AB	5 days ~~8 hours~~ AND 12 days ~~16 hours~~ from discovery of failure to meet LCO. Immediately
B. One ~~or more AC vital buses~~ inoperable. <Unit 3> Unit 3 Unit 1 Unit 2 480 V Shutdown Board <Unit 1> <Unit 2> INSERT 3.8-38B	B.1 Restore AC ~~vital bus~~ distribution subsystems to OPERABLE status. <Unit 3> 3EB required Unit DC Board or Shutdown Board DC Distribution Panel to	8 ~~2~~ hours AND 12 days ~~16 hours~~ from discovery of failure to meet LCO
E. One ~~or more [station service]~~ Unit DC ~~electrical power distribution subsystems~~ Board inoperable. INSERT 3.8-38C	E.1 Restore ~~DC electrical power distribution subsystems to~~ OPERABLE status.	7 days ~~2 hours~~ AND 12 days ~~16 hours~~ from discovery of failure to meet LCO

INSERT 3.8-38D

~~INSERT 3.8-38E~~

INSERT 3.8-38F

(continued)

BROWNS FERRY NUCLEAR PLANT - IMPROVED TECHNICAL SPECIFICATIONS
SECTION 3.8
LIST OF REVISED PAGES

NUREG-1433 BWR/4 STS BASES MARKUP

Replaced page 721 of 939 with page 721 of 939 Rev 3
Replaced page B3.8-16 (Page 738 of 939) Rev 1 with page B3.8-16 (Page 738 of 939) Rev 3
Replaced page B3.8-17 (Page 739 of 939) with page B3.8-17 (Page 739 of 939) Rev 3
Replaced page B3.8-18 (Page 740 of 939) Rev 1 with page B3.8-18 (Page 740 of 939) Rev 3
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Replaced page B3.8-83 (Page 831 of 939) Rev 2 with page B3.8-83 (Page 831 of 939) Rev 3
Replaced page 832a of 939 Rev 2 with page 832a of 939 Rev 3

Rev. 3

(P1)

Insert B3.8-3A (Unit 1 and 2)

, and the Unit 3 DG(s) needed to support required Standby Gas Treatment (SGT) trains and Control Room Emergency Ventilation System (CREVS) trains are required to be OPERABLE. Two divisions of 480 V load shed logic and two divisions of CAS logic are required to be OPERABLE to support Unit 1 and 2 DG OPERABILITY and post-accident loads. ~~In the case of the Unit 3 DG(s), during MODES 1, 2, and 3,~~ Unit 3 Technical Specifications will require the OPERABILITY of all Unit 3 DGs and provide appropriate compensatory actions for inoperable Unit 3 DG(s). Insert from below ~~However, when Unit 3 is not in MODE 1, 2, or 3, the DG(s) necessary to support the operation of Unit 2 may not be required. Therefore, the Unit 2 LCO for AC Sources requires the necessary DG(s) to support SGT and CREVS only when Unit 3 is not in MODES 1, 2, or 3. These requirements~~

Insert B3.8-3A (Unit 3)

, and the Unit 1 and 2 DG(s) needed to support required Standby Gas Treatment (SGT) trains and Control Room Emergency Ventilation System (CREVS) trains are required to be OPERABLE. Two divisions of 480 V load shed logic and two divisions of CAS logic are required to be OPERABLE to support Unit 3 DG OPERABILITY and post-accident loads. ~~In the case of the Unit 1 and 2 DG(s), during MODES 1, 2, and 3,~~ Unit 1 and 2 Technical Specifications will require the OPERABILITY of all Unit 1 and 2 DGs and provide appropriate compensatory actions for inoperable Unit 1 and 2 DG(s). ~~However, when Unit 1 or 2 is not in MODE 1, 2, or 3, DG(s) necessary to support the operation of Unit 3 may not be required. Therefore, the Unit 3 LCO for AC Sources requires the necessary DG(s) to support SGT and CREVS only when Unit 1 or 2 is not in MODES 1, 2, or 3. These requirements~~

Insert from below

Insert two places above

in support of Unit 3 / Unit 1 and 2 <Unit 1 & 2> / <Unit 3> operations. To support the operation of Unit 1, Unit 2, Unit 3 <Unit 1> <Unit 2> <Unit 3> the Unit 1, Unit 2, Unit 3 <Unit 1> <Unit 2> <Unit 3> LCO for AC Sources - Operating also requires the necessary Unit 3 / Unit 1 and 2 <Unit 1 & 2> / <Unit 3> DG(s) to support SGT and CREVS required by LCO 3.8.7, Distribution Systems - Operating, for supplying the Unit 3 / Unit 1 and 2 <Unit 1 & 2> / <Unit 3> 4.16 kV Shutdown boards.

BASES

SURVEILLANCE REQUIREMENTS (continued)

minimum and maximum frequencies of the DG are 58.8 Hz and 61.2 Hz, respectively. These values are equal to ± 2% of the 60 Hz nominal frequency and are derived from the recommendations found in ~~Regulatory~~ Safety Guide ~~1~~ 9 (Ref. 3). P24

P51

SR 3.8.~~1~~.1

This SR ensures proper circuit continuity for the offsite AC electrical power supply to the onsite distribution network and availability of offsite AC electrical power. The breaker alignment verifies that each breaker is in its correct position to ensure that distribution buses and loads are connected to their preferred power source and that appropriate independence of offsite circuits is maintained. The 7 day Frequency is adequate since breaker position is not likely to change without the operator being aware of it and because its status is displayed in the control room.

P20

SR 3.8.1.~~2~~ 1 and SR 3.8.1.~~7~~ 4

These SRs help to ensure the availability of the standby electrical power supply to mitigate DBAs and transients and maintain the unit in a safe shutdown condition.

start

P30

P31

To minimize the wear on moving parts that do not get lubricated when the engine is not running, these SRs have been modified by a Note (Note 2 for SR 3.8.~~1~~.2 and Note 1 for SR 3.8.1.~~7~~) to indicate that all DG starts for these Surveillances may be preceded by an engine prelube period and followed by a warmup prior to loading.

For the purposes of this testing, the DGs are started from standby conditions. Standby conditions for a DG mean that the diesel engine coolant and oil are being continuously circulated and temperature is being maintained consistent with manufacturer recommendations. may be utilized for SR 3.8.1.2

B1

In order to reduce stress and wear on diesel engine engines, ~~some manufacturers recommend~~ a modified start in which the allowed at starting speed of DGs is limited, warmup is ~~limited to~~ this lower speed, and the DGs are gradually accelerated to synchronous speed prior to loading. These start procedures are the intent of the Note ~~5, which is only applicable when such modified start procedures are recommended by the manufacturer.~~

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.2 and SR 3.8.1.7 (continued)

SR 3.8.1.7 requires that, at a 184 day Frequency, the DG starts from standby conditions and achieves required voltage and frequency within 12 seconds. The 12 second start requirement supports the assumptions in the design basis LOCA analysis of FSAR, Section [6.3] (Ref. 12). The 12 second start requirement is not applicable to SR 3.8.1.21 (see Note of SR 3.8.1.2), when a modified start procedure as described above is used. If a modified start is not used, the 12 second start requirement of SR 3.8.1.7 applies.

Since SR 3.8.1.7 does require a 12 second start, it is more restrictive than SR 3.8.1.21 and it may be performed in lieu of SR 3.8.1.2. This procedure is the intent of Note 1 of SR 3.8.1.2.1.

The normal 31 day Frequency for SR 3.8.1.2 (see Table 3.8.1-1, "Diesel Generator Test Schedule") is consistent with Safety Regulatory Guide 9 (Ref. 3). The 184 day Frequency for SR 3.8.1.14 is a reduction in cold testing consistent with Generic Letter 84-15 (Ref. 7). These Frequencies provide adequate assurance of DG OPERABILITY, while minimizing degradation resulting from testing.

SR 3.8.1.3

This Surveillance verifies that the DGs are capable of synchronizing and accepting greater than or equal to the equivalent of the maximum expected accident loads. A minimum run time of 60 minutes is required to stabilize engine temperatures, while minimizing the time that the DG is connected to the offsite source.

Although no power factor requirements are established by this SR, the DG is normally operated at a power factor between [0.8 lagging] and [1.0]. The [0.8] value is the design rating of the machine, while [1.0] is an operational limitation [to ensure circulating currents are minimized]. The load band is provided to avoid routine overloading of the DG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.~~3~~ 2 (continued)

P20

P32 The ~~normal~~ 31 day Frequency for this Surveillance ~~(see Table 3.8.1-1)~~ is consistent with ~~Regulatory Guide 1.9~~ Safety Guide 9 (Ref. 3). P24

Note 1 modifies this Surveillance to indicate that diesel engine runs for this Surveillance may include gradual loading, as recommended by the manufacturer, so that mechanical stress and wear on the diesel engine are minimized.

Note 2 modifies this Surveillance by stating that momentary transients because of changing bus loads do not invalidate this test. Similarly, momentary power factor transients above the limit do not invalidate the test.

Note 3 indicates that this Surveillance should be conducted on only one DG at a time in order to avoid common cause failures that might result from offsite circuit or grid perturbations.

Note 4 stipulates a prerequisite requirement for performance of this SR. A successful DG start must precede this test to credit satisfactory performance. Additionally, prior to loading, an engine idle/warmup period is allowed. P31

SR 3.8.1.4

P33 This SR provides verification that the level of fuel oil in the day tank [and engine mounted tank] is at or above the level at which fuel oil is automatically added. The level is expressed as an equivalent volume in gallons, and is selected to ensure adequate fuel oil for a minimum of 1 hour of DG operation at full load plus 10%.

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

P22

SR 3.8.1.5

P35 Microbiological fouling is a major cause of fuel oil degradation. There are numerous bacteria that can grow in

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.~~9~~ 5 (continued)

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

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

The voltage tolerances specified in this SR are based on the degraded voltage and overvoltage relay settings

As required by IEEE-308 (Ref. 14), the load rejection test is acceptable if the increase in diesel speed does not exceed 75% of the difference between synchronous speed and the overspeed trip setpoint, or 15% above synchronous speed, whichever is lower. ~~For DGs 2A, 2C, and 1B,~~ this represents ~~65.5~~ 66.75 Hz, equivalent to 75% of the difference between nominal speed and the overspeed trip setpoint.

The ~~time,~~ ~~voltage, and~~ frequency tolerances specified in this SR are derived from ~~Regulatory Guide 1.9~~ Safety Guide 9 (Ref. 3) recommendations for response during load sequence intervals. ~~The [6] seconds specified is equal to 60% of the 10 second load sequence interval associated with sequencing the residual heat removal (RHR) pumps during an undervoltage on the bus concurrent with a LOCA.~~ The voltage and frequency specified are consistent with the design range of the equipment powered by the DG. SR 3.8.1.~~9~~5.a corresponds to the maximum frequency excursion, while SR 3.8.1.~~9~~5.b ~~and SR 3.8.1.9.c are~~ and 3.8.1.5.c are steady state voltage ~~and frequency~~ values to which the system must recover following load rejection. The ~~[18 month]~~ Frequency is consistent with the recommendations of Regulatory Guide 1.~~108~~ 9 (Ref. ~~9~~ 8).

This SR is modified by ~~two~~ a Notes. ~~The reason for Note 1 is that, during operation with the reactor critical, performance of this SR could cause perturbations to the electrical distribution systems that could challenge continued steady state operation and, as a result, plant safety systems. Credit may be taken for unplanned events that satisfy this SR.~~ In order to ensure that the DG is tested under load conditions that are as close to design basis conditions as possible, Note 2 requires that, if synchronized to offsite power, testing the must be performed using a power factor ≤ ~~[~~0.9~~]~~. This power factor is chosen to be representative of the actual design basis inductive loading that the DG would experience.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.8.1.~~12~~ 6 P20

This Surveillance demonstrates that the DG automatically starts and achieves the required voltage and frequency within the specified time ~~([12]~~ seconds) from the design basis actuation signal (LOCA signal) and operates for ≥ [5] minutes. The [5] minute period provides sufficient time to demonstrate stability. SR 3.8.1.~~12~~.d and SR 3.8.1.12.e ensure that permanently connected loads and emergency loads are energized from the offsite electrical power system on a LOCA signal without loss of offsite power. P44

The requirement to verify the connection and power supply of permanent and autoconnected loads is intended to satisfactorily show the relationship of these loads to the loading logic for loading onto offsite power. In certain circumstances, many of these loads cannot actually be connected or loaded without undue hardship or potential for undesired operation. For instance, ECCS injection valves are not desired to be stroked open, high pressure injection systems are not capable of being operated at full flow, or RHR systems performing a decay heat removal function are not desired to be realigned to the ECCS mode of operation. In lieu of actual demonstration of the connection and loading of these loads, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified. P38

P54

Insert B 3.8-25B from page 750

P1

This test will also verify the start of the
Unit 3 — <Unit 1 and 2>
Unit 1 and 2 — <Unit 3>
DGs aligned to the SGT and CREV systems on an accident signal from P30
Unit 1 — <Unit 1> P34
Unit 2 — <Unit 2>
Unit 3 — <Unit 3>

B1

~~The Frequency of [18 months] takes into consideration plant conditions required to perform the Surveillance and is intended to be consistent with the expected fuel cycle lengths.~~ Operating experience has shown that these components usually pass the SR when performed at the ~~[18 month]~~ B1 Frequency. Therefore, the Frequency is acceptable from a reliability standpoint. P34 P34

This SR is modified by two Notes. The reason for Note 1 is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil being continuously circulated and temperature maintained consistent with manufacturer recommendations. The reason for Note 2 is that during operation with the reactor critical,

Insert B 3.8-25A from page 750 P57

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.13 (continued)

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

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

P5

SR 3.8.1.~~14~~ 7 P20

105 percent to 110 percent of the continuous duty rating of the DG.

P1 ~~Regulatory Guide 1.108 (Ref. 9), paragraph 2.a.(3), requires~~ demonstration once per ~~[~~18 months~~]~~ that the DGs can start and B1 run continuously at full load capability for an interval of not less than 24 hours – 22 hours of which is at a load equivalent to the continuous rating of the DG, and 2 hours of which is at a load equivalent to ~~110% of the continuous duty~~ rating of the DG. ~~Plant Hatch has taken an exception to this requirement and performs the 2 hour run at the 2000 hour rating (3100 kW).~~ The DG starts for this Surveillance can be performed either from standby or hot conditions. The provisions for ~~prelube and warmup, discussed in SR 3.8.1.2, and for~~ gradual loading, discussed in SR 3.8.1.~~3~~ 2, are applicable to this SR.

P1 ~~Insert B3.8-27A~~

stet

P30 P20

In order to ensure that the DG is tested under load conditions that are as close to design conditions as possible, testing must be performed using a power factor ≤ ~~[~~0.9~~]~~. This power B2 factor is chosen to be representative of the actual design basis inductive loading that the DG could experience. A load band is provided to avoid routine overloading of the DG. Routine overloading may result in more frequent teardown inspections in accordance with vendor recommendations in order to maintain DG OPERABILITY.

B1 The ~~[~~18 month~~]~~ Frequency is consistent with the 1.9 recommendations of Regulatory Guide ~~1.108~~ (Ref. ~~9~~), ~~paragraph 2.a.(3), takes into consideration plant conditions required to perform the Surveillance; and is intended to be consistent with expected fuel cycle lengths~~. P34

(continued)

Rev. 3

~~Insert B3.8-27A~~ P1

~~the two-hour rating, which is greater than the maximum expected post-accident loading on the DG, confirms the DG capability for long term operation.~~

Insert B 3.8-25A P57

In order to minimize the number of DGs involved in testing, demonstration of automatic starts of the

Unit 3 - <Unit 1 and 2>

Unit 1 and 2 - <Unit 3>

DGs on an accident signal from

Unit 1 - <Unit 1>

Unit 2 - <Unit 2>

Unit 3 - <Unit 3>

may be performed in conjunction with testing to demonstrate automatic starts of the

Unit 3 - <Unit 1 and 2>

Unit 1 and 2 - <Unit 3>

DGs on an accident signal from

Unit 3 - <Unit 1 and 2>

Unit 1 or 2 - <Unit 3>.

Insert B 3.8-25B

To minimize wear and tear on the DGs, this SR has been modified by a note which permits DG starts to be preceded by an engine prelube period followed by a warm-up period.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.17 (continued)

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

P41

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR.

SR 3.8.1.~~18~~ 8 P20

P1 individual pump timers

Under accident conditions (~~[~~and loss of offsite power~~]~~) loads shutdown boards P1 B1 are sequentially connected to the ~~bus~~ by ~~the~~ automatic ~~load sequencer~~. The ~~sequencing logic~~ control~~s~~ the permissive and starting signals to motor breakers to prevent overloading of the DGs due to high motor starting currents. The [10]% ~~load sequence~~ time interval tolerance ensures that sufficient time exists for the DG to restore frequency and voltage prior to applying the next load and that safety analysis assumptions regarding ESF equipment time delays are not violated. Reference 2 provides a summary of the automatic loading of ESF ~~buses.~~ shutdown boards. P1

INSERT B3.8-30A P26

The Frequency of ~~[~~18 months~~]~~ is consistent with ~~the~~ 1.9 P51 B1 recommendations of Regulatory Guide ~~1.108~~ (Ref. ~~9~~ 8), P20 ~~paragraph 2.a.(2); takes into consideration plant conditions required to perform the Surveillance; and is intended to be consistent with expected fuel cycle lengths.~~ P34

This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy this SR. P34

B3

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

(continued)

Rev. 3

P26

Insert B3.8-30A

This SR is demonstrated by performance of SR 3.3.5.1.5 for the Core Spray and LPCI pump timers, SR 3.7.2.3 for the EECW pump timers, and SR 3.8.1.9.b for the 480 V load shed logic timers. ~~These calibration tolerances~~ The allowable values for these timers ensure that sufficient time exists for the DG to restore frequency and voltage prior to applying the next load and that safety analysis assumptions regarding ESF equipment time delays are not violated.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.1.18 (continued)

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

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

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

B3

SR 3.8.1.~~19~~ 9 P20

In the event of a DBA coincident with a loss of offsite power, the DGs are required to supply the necessary power to ESF systems so that the fuel, RCS, and containment design limits are not exceeded.

P28

INSERT B3.8-31A

This Surveillance demonstrates ~~DG operation, as discussed in the Bases for SR 3.8.1.11,~~ during a loss of offsite power actuation test signal in conjunction with an ECCS initiation signal. In lieu of actual demonstration of connection and loading of loads, testing that adequately shows the capability of the DG system to perform these functions is acceptable. This testing may include any series of sequential, overlapping, or total steps so that the entire connection and loading sequence is verified.

B2 The Frequency of ~~[~~18 months~~]~~ takes into consideration plant conditions required to perform the Surveillance and is intended to be consistent with an expected fuel cycle length

B2 of ~~[~~18 months~~]~~.

Stet

P30

P34

This SR is modified by ~~two Notes.~~ a Note P34 The reason for Note ~~1~~ P34 the is to minimize wear and tear on the DGs during testing. For the purpose of this testing, the DGs must be started from standby conditions, that is, with the engine coolant and oil being continuously circulated and temperature maintained consistent with manufacturer recommendations. The reason for Note 2 is that performing the Surveillance would remove a required offsite circuit from service, perturb the electrical

(continued)

BASES

SURVEILLANCE REQUIREMENTS

Diesel Generator Test Schedule (continued)

increased test Frequency must be maintained until seven consecutive failure free tests have been performed.

The Frequency for accelerated testing is 7 days, but no less than 24 hours. Tests conducted at intervals of less than 24 hours may be credited for compliance with Required Actions. However, for the purpose of re-establishing the normal 31-day Frequency, a successful test at an interval of less than 24 hours should be considered an invalid test and not count towards the seven consecutive failure free starts, and the consecutive test count is not reset. P32

A test interval in excess of 7 days (or 31 days, as appropriate) constitutes a failure to meet SRs and results in the associated DG being declared inoperable. It does not, however, constitute a valid test or failure of the DG, and any consecutive test count is not reset.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.
2. B1 FSAR, Chapter ~~Section [8.2]~~.
3. Safety ~~Regulatory~~ Guide ~~1.~~9. P24
4. FSAR, Chapter ~~[6]~~. B1
5. FSAR, Chapter 14 ~~[15]~~.
6. Regulatory Guide 1.93.
7. Generic Letter 84-15.
8. ~~10 CFR 50, Appendix A, GDC 18.~~
9. P20 8 ~~9.~~ Regulatory Guide 1.~~108~~. 9 P59
10. ~~Regulatory Guide 1.137.~~
11. P20 9 ~~11.~~ ANSI C84.1, 1982.

(continued)

Insert B3.8-36A (Unit 1 and 2) (P6)

Two Unit 1 and 2 DGs, and ~~when~~ Unit 3 DGs required to support operable ~~is not in MODE 1, 2, or 3 with~~ SGT and CREV Systems ~~required OPERABLE, Unit 3 DGs~~

Insert B3.8-36A (Unit 3)

Two Unit 3 DGs, and ~~when~~ Unit 1 or 2 DGs required to support operable ~~are not in MODE 1, 2, or 3 with~~ SGT and CREV Systems ~~required OPERABLE, Unit 1 and 2 DGs~~

(P6) <except as marked>

BASES (continued)

APPLICABILITY

The AC sources are required to be OPERABLE in MODES 4 and 5 and during movement of irradiated fuel assemblies in the secondary containment to provide assurance that:

a. Systems providing adequate coolant inventory makeup are available for the irradiated fuel assemblies in the core in case of an inadvertent draindown of the reactor vessel;

b. Systems needed to mitigate a fuel handling accident are available;

c. Systems necessary to mitigate the effects of events that can lead to core damage during shutdown are available; and

d. Instrumentation and control capability is available for monitoring and maintaining the unit in a cold shutdown condition or refueling condition.

AC power requirements for MODES 1, 2, and 3 are covered in LCO 3.8.1.

ACTIONS

A.1

INSERT B3.8-38A

An offsite circuit is considered inoperable if it is not available to one required ESF division. If two or more ESF 4.16 kV buses are required per LCO 3.8.10, one division with offsite power available may be capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for draining the reactor vessel. By ~~the allowance of the declaring option to declare~~ required features inoperable ~~with no offsite power available~~, appropriate restrictions can be implemented in accordance with the affected required feature(s) LCOs' ACTIONS.

STET

that are supported by the inoperable AC source

STET

INSERT B3.8-38B

~~8.1~~ B

STET

~~A.2.1, A.2.2, A.2.3, A.2.4, B.1, B.2, B.3, and B.4~~ B.1, B.1.1, B.1.2, B.1.3, and B.1.4 (P20)

~~and~~

INSERT from B 3.8-39

~~With the offsite circuit not available to all required divisions~~, the option still exists to declare all required features inoperable. However, Since this option may involve undesired administrative efforts, the allowance for

INSERT B 3.8-38C

(continued)

Rev. 3

Insert B3.8-38A (P6)

With the required offsite circuit inoperable, ~~or one required DG is inoperable,~~ the remaining AC sources

Insert B3.8-38B

~~The 30 day Completion Time takes into account the OPERABILITY of the redundant required features, and their offsite and DG power availability. Additionally, the 30 day Completion Time takes into account the capacity and capability of the remaining AC sources, reasonable time for repairs, and low probability of an event occurring during this period. If the redundant required feature(s) is (are) not OPERABLE, the second Completion Time requires immediately declaring the required feature(s), supported by the inoperable AC source, inoperable. This results in taking the appropriate ACTIONS in the supported system Specification for the inoperable function.~~

Insert B3.8-38C (P6)

~~With two or more required AC sources inoperable,~~ With no offsite circuit available or one or more DGs inoperable,

Insert B 3.8-39A (P58)

Required Action C.1 is intended to provide assurance that a loss of offsite power, during the period that a required Unit 3 DG is inoperable, does not result in a complete loss of safety function of critical systems (i.e., SGT or CREVS). These features consist of SGT or CREVS trains redundant to trains supported by the inoperable Unit 3 DG.

The 30 day Completion Time takes into account the OPERABILITY of the redundant required features, and their offsite and DG power availability, Additionally, the 30 day Completion Time takes into account the capacity and capability of the remaining AC sources, reasonable time for repairs, and low probability of an event occurring during this period. If the redundant required feature(s) is (are) not OPERABLE, the second Completion Time requires immediately declaring the required feature(s), supported by the inoperable AC source, inoperable. This results in taking the appropriate ACTIONS in the supported system Specification for the inoperable function.

(P6) except as marked

BASES

ACTIONS

~~B.1.1~~ ~~B.2.1~~, ~~A.2.2~~, ~~A.2.3~~, ~~A.2.4~~ ~~and~~ B1, B.1.1, B.1.2, B.1.3, and B.1.4 ~~B.1, B.2, B.3, and B.4~~

(continued)

sufficiently conservative actions is made. ~~With the required DG inoperable, the minimum required diversity of AC power sources is not available.~~ ~~AC sources~~ It is, therefore, required to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies in the ~~secondary~~ containment, and activities (B1) that could result in inadvertent draining of the reactor vessel.

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required AC sources and to continue this action until restoration is accomplished in order to provide the necessary AC power to the plant safety systems.

(P58)

Insert B 3.8-39A from page 768

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required AC electrical power sources should be completed as quickly as possible in order to minimize the time during which the plant safety systems may be without sufficient power.

~~Returns to original location~~

Start

~~Move to B 3.8-38~~

Pursuant to LCO 3.0.6, the Distribution System ACTIONS would not be entered even if all AC sources to it are inoperable, resulting in de-energization. Therefore, the Required Actions of Condition ~~A~~ have been modified by a Note to qualified indicate that when Condition ~~A~~ is entered with no AC power to any required ~~ESF bus~~, ACTIONS for LCO 3.8.~~10~~8 must be immediately entered. This Note allows Condition ~~A~~ to provide requirements for the loss of the offsite circuit whether or not a ~~division is de-energized.~~ LCO 3.8.~~10~~8 provides the appropriate restrictions for the situation involving ~~a de-energized~~ an inoperable division.

4.16 KV shutdown board

4.16kV shutdown board is made inoperable

(P11)

SURVEILLANCE REQUIREMENTS

SR 3.8.2.1

(P1)

SR 3.8.2.1 requires the SRs from LCO 3.8.1 that are necessary for ensuring the OPERABILITY of the AC sources in other than MODES 1, 2, and 3. ~~SR 3.8.1.8 is not required to~~ (P43)

Unit 1 and 2

Unit 3 (Unit 3)

(continued)

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air

BASES

BACKGROUND

Each diesel generator (DG) is provided with ~~a~~ storage tanks (P1) having a fuel oil ~~capacity~~ volume (P1) sufficient to operate that DG for a period of 7 days while the DG is supplying maximum post loss of coolant accident (LOCA) load demand discussed in FSAR, Section ~~[9.5.2]~~ 8.5.2.4 (B1) (Ref. 1). The maximum load demand is calculated using the assumption that at least two DGs are available. This onsite fuel oil capacity is sufficient to operate the DGs for longer than the time to replenish the onsite supply from outside sources.

INSERT B3.8-41A (P1)

Fuel oil is transferred from storage tank to day tank by either of two transfer pumps associated with each ~~storage tank.~~ Diesel Generator (P1) Redundancy of pumps and piping precludes the failure of one pump, or the rupture of any pipe, valve, or tank to result in the loss of more than one DG. All ~~outside~~ tanks, ~~pumps, and piping are located underground.~~ are embedded in the substructure of the Standby Diesel Generator Building (P1) (P1) 7-day

INSERT B3.8-41B

For proper operation of the stored (P1) standby DGs, it is necessary to ensure the proper quality of the fuel oil. Regulatory Guide 1.137 (Ref. 2) addresses the recommended fuel oil practices as supplemented by ANSI N195 (Ref. 3). The fuel oil properties governed by these SRs are the water and sediment content, the kinematic viscosity, specific gravity (or API gravity), and impurity level.

INSERT B3.8-41C (P1)

The DG lubrication system is designed to provide sufficient lubrication to permit proper operation of its associated DG under all loading conditions. The system is required to circulate the lube oil to the diesel engine working surfaces and to remove excess heat generated by friction during operation. Each engine oil sump contains an inventory capable of supporting a minimum of ~~17~~ days of operation. (B2) ~~The onsite storage in addition to the engine oil sump is sufficient to ensure 7 days' continuous operation.~~ (B3) This supply is sufficient to allow the operator to replenish lube oil from outside sources.

Insert B3.8-41E

Each DG has ~~an~~ two fully redundant air start systems with adequate capacity for at least ~~five successive~~ one start attempts on the DG without recharging the air start receiver(s). (either of which is capable of starting the engine) (P35)

INSERT B3.8-41D

(continued)

Insert B3.8-41A

A transfer pump is located at the fuel oil storage tanks which can supply fuel oil from two 71,000-gallon fuel oil storage tanks to the 7-day storage tanks. In addition, it is possible to transfer fuel from one 7-day storage tank to any other by using transfer pumps.

Insert B3.8-41B

This is accomplished automatically by level switches on the day tank.

Insert B3.8-41C

The fuel oil property monitored is the total particulate concentration. Periodic testing of the stored fuel oil total particulate concentration is a method to monitor the potential degradation related to long term storage and the potential impact to fuel filter plugging as a result of high particulate levels.

Insert B3.8-41D

The 175-gallon and 150-gallon capacities listed in Condition B are based upon the DG seven-day consumption and six-day consumption of lube oil, respectively. The total lube oil system capacity is 465 gallons, of which, 235 gallons are useable (i.e., 230 gallons are not useable). If the seven-day and six-day capacities are added to the non-useable capacity, a minimum value of lube oil capacity can be established for purposes of this LCO. Therefore, 405 gallons are required to ensure the seven-day requirement (i.e., 230 + 175); while, 380 gallons (i.e., 230 + 150) are required to ensure the six-day requirement. Note: actual lube oil consumption is 0.98 gal/hr or 23.52 gal/day - 25 gal/day was conservatively chosen to establish the seven-day and six-day requirements.

Insert B 3.8-41E

Each DG has two fully redundant air start systems either of which is fully capable of starting the engine. Each air start system has adequate capacity for at least one start attempt on the DG without recharging of its air receivers. The air compressors may be cross-tied without affecting operability of either air start system. For DG operability, only one of the air start systems is required. The associated DG must be declared inoperable if both air start systems are inoperable.

BASES (continued)

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in FSAR, Chapter ~~[6]~~ (Ref. ~~3~~), and Chapter ~~[15]~~ (Ref. ~~4~~), assume Engineered Safety Feature (ESF) systems are OPERABLE. The DGs are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section ~~3.4, Reactor Coolant System (RCS)~~; and Section 3.6, Containment Systems.

Since diesel fuel oil, lube oil, and starting air subsystem support the operation of the standby AC power sources, they satisfy Criterion 3 of the NRC Policy Statement.

LCO

Stored diesel fuel oil is required to have sufficient supply for 7 days of full load operation. It is also required to meet specific standards for quality. Additionally, sufficient lube oil supply must be available to ensure the capability to operate at full load for 7 days. This requirement, in conjunction with an ability to obtain replacement supplies within 7 days, supports the availability of DGs required to shut down the reactor and to maintain it in a safe condition for an ~~anticipated~~ abnormal operational ~~occurrence (AOO)~~ or a postulated DBA with loss of offsite power. DG day tank fuel oil requirements, as well as transfer capability from the storage tank to the day tank, are addressed in LCO 3.8.1, "AC Sources – Operating," and LCO 3.8.2, "AC Sources – Shutdown."

~~The~~ starting air system is required to have a minimum capacity for ~~five successive~~ DG start attempts without recharging the air start receivers. The associated DG must be declared inoperable if both air start systems are inoperable.

APPLICABILITY

The AC sources (LCO 3.8.1 and LCO 3.8.2) are required to ensure the availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an ~~AOO~~ or a postulated DBA. Because stored diesel fuel oil, lube oil, and starting air subsystem support LCO 3.8.1 and LCO 3.8.2, stored diesel fuel oil, lube oil,

(continued)

BASES

ACTIONS

D.1 (continued)

P48 the fuel oil properties were outside limits, there is high likelihood that the DG would still be capable of performing its intended function.

P35

P35 to start the associated DG may

P20 D.1

P35 Insert B 3.8-45B

With starting air receiver pressure < ~~[225]~~ 165 B2 psig, sufficient capacity in the required starting air system ~~for five successive DG start attempts does~~ not exist. However, as long as the receiver pressure is > [125] psig, there is adequate capacity for at least one start attempt, and the DG can be considered OPERABLE while the air receiver pressure is restored to the required limit. A period of 48 hours is considered sufficient to complete restoration to the required pressure prior to declaring the DG inoperable. This period is acceptable based on the remaining air start capacity, the fact that most DG starts are accomplished on the first attempt, and the low probability of an event during this brief period.

P35 INSERT B3.8-45A

P20 E.1

inoperable P35

With a Required Action and associated Completion Time not met, or the stored diesel fuel oil, lube oil, or starting air subsystem ~~not within limits~~ for reasons other than addressed by Conditions A through E, the associated DG may be incapable of performing its intended function and must be immediately declared inoperable.

SURVEILLANCE REQUIREMENTS

SR 3.8.3.1

This SR provides verification that there is an adequate inventory of fuel oil in the storage tanks to support each DG's operation for 7 days at full load. The 7 day period is sufficient time to place the unit in a safe shutdown condition and to bring in replenishment fuel from an offsite location.

The 31 day Frequency is adequate to ensure that a sufficient supply of fuel oil is available, since low level alarms are

(continued)

Insert B3.8-45A (P35)

The associated DG may be incapable of performing its intended function and must be immediately declared inoperable. This declaration also requires entry into applicable Conditions and Required Actions for an inoperable DG, LCO 3.8.1, "AC Sources—Operating."

Insert B.3.8-45B (P35)

Only one of the two redundant air starting systems is required to support associated DG operability.

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.4 DC Sources – Operating

(P1) <except as marked>

BASES

BACKGROUND

The DC electrical power system provides the AC emergency power system with control power. It also provides both motive and control power to selected safety related equipment. (P11) Also, these DC subsystems provide DC electrical power to inverters, which in turn power the AC vital buses. As required by 10 CFR 50, Appendix A, GDC 17 (Ref. 1), the DC electrical power system is designed to have sufficient independence, redundancy, and testability to perform its safety functions, assuming a single failure. The DC electrical power system also conforms to the recommendations of Regulatory Guide 1.6 (Ref. 2) and IEEE-~~308~~ 308 ~~(Ref. 3)~~ (P24). meets the intent of

INSERT B38-50A

The ~~station service~~ DC power sources provide both motive and control power to selected safety related equipment, as well as circuit breaker control power for the nonsafety related ~~4160 V~~ and ~~all~~ ~~600-V~~ and lower, AC distribution systems. Each DC subsystem is energized by one 125/250 V station service battery and three 125 V battery chargers (two normally inservice chargers and one spare charger). Each battery is exclusively associated with a single 125/250 VDC bus. Each set of battery chargers exclusively associated with a 125/250 VDC subsystem cannot be interconnected with any other 125/250 VDC subsystem. The normal and backup chargers are supplied from the same AC load groups for which the associated DC subsystem supplies the control power. The loads between the redundant 125/250 VDC subsystem are not transferable except for the Automatic Depressurization System, the logic circuits and valves of which are normally fed from the Division 1 DC system.

<INDENT>

(3.) The diesel generator (DG) DC ~~power sources~~ subsystems provide control and instrumentation power for their respective DG. In addition, DG 2A and 2C DC power sources provide circuit breaker control power for the loads on the 4160 V 2E, 2F, and 2G emergency buses. Each DG DC subsystem is energized by one 125 V battery and one 125 V battery charger (5) per 125V subsystem. ~~Provisions exist for connecting a portable alternate battery charger~~.

(DF two)

During normal operation, the DC loads are powered from the battery chargers with the batteries floating on the system.

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(continued)

Rev. 3

P1

Insert B3.8-51A

Each diesel battery has adequate storage capacity to carry required loads. These include control and logic power, governor booster pumps, generator relay protection, generator field flashing, and the motor-driven fuel pumps. The governor booster pumps and generator field flashing require power for only a relatively short time during a diesel start. ~~Approximately 5.5 seconds after start, the diesel battery load is about 4.2 amps.~~

Insert B3.8-51B

Each diesel battery is located in the room with the diesel generator it serves. One of its chargers is also in the room; the other is immediately outside the door in the Diesel Generator Building hallway.

Insert B3.8-51C

for the Unit DC and Shutdown Board DC subsystems is 210 V. The minimum design voltage limit for the DG DC subsystems is 105 V.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.4 and SR 3.8.4.5 (continued)

The connection resistance limits for this SR must be no more than 20% above the resistance as measured during installation, or not above the ceiling value established by the manufacturer.

P5

The 12 month Frequency of these SRs is consistent with IEEE-450 (Ref. 7), which recommends detailed visual inspection of cell condition and inspection of cell to cell and terminal connection resistance on a yearly basis.

SR 3.8.4.~~6~~ 2 P20 and SR 3.8.4.5

Battery charger capability requirements 4 are based on the design capacity of the chargers (Ref. ~~3~~). According to Regulatory Guide 1.32 (Ref. 8), the battery charger supply is required to be based on the largest combined demands of the various steady state loads and the charging capacity to restore the battery from the design minimum charge state to the fully charged state, irrespective of the status of the unit during these demand occurrences. The minimum required amperes and ~~duration~~ verification of the charger's ability to recharge the battery ensures that these requirements can be satisfied. P45

INSERT B3.8-56A

P49

The Frequency is acceptable, given the unit conditions required to perform the test and the other administrative controls existing to ensure adequate charger performance during these [18 month] intervals. In addition, this Frequency is intended to be consistent with expected fuel cycle lengths.

P34

This SR is modified by two Notes. The reason for Note 1 is that performing the Surveillance would remove a required DC electrical power subsystem from service, perturb the electrical distribution system, and challenge safety systems. Note 2 is added to this SR to acknowledge that credit may be taken for unplanned events that satisfy the Surveillance.

Stet

SR 3.8.4.5 is modified by a Note. The Note

P1

PAGE 796a OF 930

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.7 (continued)

challenge safety systems. Credit may be taken for unplanned events that satisfy the Surveillance. P34

SR 3.8.4.~~8~~ 4 P20

A battery performance discharge test is a test of constant current capacity of a battery, normally done in the as found condition, after having been in service, to detect any change in the capacity determined by the acceptance test. The test is intended to determine overall battery degradation due to age and usage.

A battery modified performance discharge test is described in the Bases for SR 3.8.4.~~7~~ 3. P20 Either the battery performance discharge test or the modified performance discharge test is acceptable for satisfying SR 3.8.4.~~8~~ 4; however, only the modified performance discharge test may be used to satisfy SR 3.8.4.~~8~~ 4 while satisfying the requirements of SR 3.8.4.~~7~~ 3 P20 at the same time. P20

The acceptance criteria for this Surveillance is consistent with IEEE-~~450~~ 450 (Ref. ~~7~~ 7) and IEEE-485 (Ref. 10). These references recommend that the battery be replaced if its capacity is below 80% of the manufacturer's rating. A capacity of 80% shows that the battery rate of deterioration is increasing, even if there is ample capacity to meet the load requirements.

The Frequency for this test is normally 60 months. If the battery shows degradation, or if the battery has reached 85% of its expected life and capacity is < 100% of the manufacturer's rating, the Surveillance Frequency is reduced to 12 months. However, if the battery shows no degradation but has reached 85% of its expected life, the Surveillance Frequency is only reduced to 24 months for batteries that retain capacity ≥ 100% of the manufacturer's rating. Degradation is indicated, according to IEEE-~~450~~ 450 (Ref. ~~7~~ 7), when the battery capacity drops by more than 10% relative to its capacity on the previous performance test or when it is 10% below the manufacturer's rating. All these Frequencies are consistent with the recommendations in IEEE-~~450~~ 450 (Ref. ~~7~~ 7).

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.4.8 (continued)

P34 This SR is modified by a Note. The reason for the Note is that performing the Surveillance would remove a required DC electrical power subsystem from service, perturb the electrical distribution system, and challenge safety systems. Credit may be taken for unplanned events that satisfy the Surveillance.

REFERENCES

1. 10 CFR 50, Appendix A, GDC 17.
2. Regulatory Guide 1.6.
3. IEEE Standard ~~308, 1978.~~ 279 308 B1
4. FSAR, ~~Chapter [6]~~ Sections 8.5 and 8.6.
5. FSAR, Chapter ~~[15]~~ 6 and 14 B1
6. Regulatory Guide 1.93.
7. IEEE Standard 450, 1995.
8. Regulatory Guide 1.32, February 1977.
9. Regulatory Guide 1.129, December 1974.
10. IEEE Standard 485, 1983.
11. NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 22, 1993. P17

BASES

ACTIONS

A.1, A.2.1, A.2.2, A.2.3, and A.2.4 (continued)

capable of supporting sufficient required features to allow continuation of CORE ALTERATIONS, fuel movement, and operations with a potential for draining the reactor vessel. By allowance of the option to declare required features inoperable with associated DC power sources inoperable, appropriate restrictions are implemented in accordance with the affected system LCOs' ACTIONS. In many instances, this option may involve undesired administrative efforts. Therefore, the allowance for sufficiently conservative actions is made (i.e., to suspend CORE ALTERATIONS, movement of irradiated fuel assemblies, and any activities that could result in inadvertent draining of the reactor vessel).

Suspension of these activities shall not preclude completion of actions to establish a safe conservative condition. These actions minimize the probability of the occurrence of postulated events. It is further required to immediately initiate action to restore the required DC electrical power subsystems and to continue this action until restoration is accomplished in order to provide the necessary DC electrical power to the plant safety systems.

The Completion Time of immediately is consistent with the required times for actions requiring prompt attention. The restoration of the required DC electrical power subsystems should be completed as quickly as possible in order to minimize the time during which the plant safety systems may be without sufficient power.

SURVEILLANCE REQUIREMENTS

SR 3.8.5.1

SR 3.8.5.1 requires performance of all Surveillances required by SR 3.8.4.1 through SR 3.8.4.~~8.4~~ 5 Therefore, see the corresponding Bases for LCO 3.8.4 for a discussion of each SR.

P20

This SR is modified by a Note. The reason for the Note is to preclude requiring the OPERABLE DC sources from being discharged below their capability to provide the required power supply or otherwise ~~rendered~~ rendering them inoperable during the performance of SRs. It is the intent that these SRs must

P18

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.8.5.1 (continued)

still be capable of being met, but actual performance is not required, unless required to support an operating unit per Section 3.8.4. (P16)

REFERENCES

1. FSAR, Chapter ~~[6]~~. (B1)
2. FSAR, Chapter ~~[15]~~ 14.
3. (P17) NRC No. 93-102, "Final Policy Statement on Technical Specification Improvements," July 23, 1993.

BASES

ACTIONS

A.1 (continued)

INSERT B38-83B AS LAST PARAGRAPH OF SECTION A.1

could be restored OPERABLE. This could continue indefinitely.

This Completion Time allows for an exception to the normal "time zero" for beginning the allowed outage time "clock." This results in establishing the "time zero" at the time this LCO was initially not met, instead of at the time Condition A was entered. The ~~16 hour~~ 12 day Completion Time is an acceptable limitation on this potential to fail to meet the LCO indefinitely. P13

P1 P15

INSERT B 3.8-83A

Insert B38-83D as section A.2

P53

B3

B.1

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

Condition B represents one AC vital bus without power; potentially both the DC source and the associated AC source are nonfunctioning. In this situation the plant is significantly more vulnerable to a complete loss of all noninterruptible power. It is, therefore, imperative that the operator's attention focus on stabilizing the plant, minimizing the potential for loss of power to the remaining vital buses, and restoring power to the affected AC vital buses.

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

(continued)

Insert B 3.8-83B (P1) (P15)

Pursuant to LCO 3.0.6, the Distribution System Actions B, C, D, or G would not be entered even if the 4.16 kV shutdown board was inoperable, resulting in de-energization of 480 V board. Therefore, the Required Actions of Condition A are modified by a Note to indicate that when Condition A is entered with no power source to a required 480 V board, Actions B, C, D, or G must be immediately entered. This allows Condition A to provide requirements for the loss of the 4.16 kV shutdown board without regard to whether a 480 V shutdown board is de-energized. Actions B, C, D, or G provide the appropriate restrictions for a de-energized 480V board.

Insert B 3.8-83C (P1) (P15)

Pursuant to LCO 3.0.6, the Distribution System Action C would not be entered even if the 480 V shutdown board was inoperable, resulting in de-energization of 480 V RMOV board. Therefore, the Required Actions of Condition B are modified by a Note to indicate that when Condition B is entered with no power source to a required 480 V RMOV board, Actions C must be immediately entered. This allows Condition B to provide requirements for the loss of the 480 V shutdown board without regard to whether a 480 V RMOV board is de-energized. Actions C provides the appropriate restrictions for a de-energized 480V RMOV board.

Insert B 3.8-83D

A.2 With a Shutdown Board inoperable, the associated DG would have no power distribution mechanism and would hence also be inoperable. Required actions for an inoperable DG are included in LCO 3.8.1.

BROWNS FERRY NUCLEAR PLANT - IMPROVED TECHNICAL SPECIFICATIONS
SECTION 3.8
LIST OF REVISED PAGES

JUSTIFICATION FOR CHANGES TO NUREG-1433

Replace page 1 of 10 through 10 of 10 Revision 2 with page 1 of 11 through 11 of 11 Revision 3

JUSTIFICATION FOR CHANGES TO NUREG-1433
SECTION 3.8 - ELECTRICAL POWER SYSTEMS

BRACKETED PLANT SPECIFIC INFORMATION

B1 Brackets removed and optional wording preferences revised as necessary to reflect appropriate plant specific requirements.

B2 Brackets removed and values revised as necessary to reflect plant specific design.

B3 Bracketed requirements removed and optional wording deleted since it is not applicable to BFN plant design.

NON-BRACKETED PLANT SPECIFIC CHANGES

P1 Appropriate plant-specific nomenclature, descriptions and values have been used to reflect BFN plant specific design. Editorial change that has no technical effect. Change incorporated to clarify the Specification or due to some other change that was made (such as a change to a bracketed item that results in the need for a non-bracketed wording change).

P2 This change increases the allowed outage time from 72 hours and 6 days from discovery of failure to meet the LCO, to 7 days and 14 days from discovery of failure to meet the LCO to restore the offsite circuit/diesel to operable status.

BFN current TS 3.9.B.1 allows reactor operation for 7 days with one required offsite power source available. BFN requires 2 of 4 offsite power sources be available during reactor operation for Units 1 and 2 and 2 of 3 offsite power sources be available during reactor operation for Unit 3. When one offsite circuit is inoperable, the remaining operable offsite circuit and the four DGs (A, B, C, and D for Units 1 and 2; 3EA, 3EB, 3EC and 3ED for Unit 3) are adequate to supply electrical power to the onsite Class 1E Distribution System. The 7 day completion time takes into consideration the additional redundancy, capacity, and capability of the remaining AC sources in the BFN design, reasonable time for repairs, and the low probability of a DBA occurring during this period and is consistent with the existing licensing basis. The 14 day Completion Time establishes a limit on the maximum time allowed for any combination of required AC power sources to be inoperable during any single contiguous occurrence of failure to meet the LCO. This is consistent with the NUREG-1433 "standard" allowance of the sum of two Completion Times which can be currently entered.

BFN current TS 3.9.B.3 (Units 1 and 2) and TS 3.9.B.2 (Unit 3) allow reactor operation for 7 days with one of the required unit's diesel generators inoperable provided 2 offsite power sources are available and all of the CS and RHR (LPCI and containment cooling) systems, and the remaining three unit's diesel generators are OPERABLE. BFN has eight DGs (i.e., four for Units 1 and 2 and four for Unit 3) that can be connected to any shutdown board. The remaining DGs and offsite circuits are adequate to supply electrical power to the onsite Class 1E Distribution System. The 7 day completion time takes into consideration the additional redundancy, capacity, and capability of the remaining AC sources in the BFN design, reasonable time for repairs, and the low probability of a DBA occurring during this period and is consistent with the existing licensing basis. The 14 day Completion Time establishes a limit on the maximum time allowed for any combination of required AC power sources to be inoperable during any single contiguous occurrence of failure to meet the LCO. This is consistent with the NUREG-1433 "standard" allowance of the sum of two Completion Times which can be currently entered.

P3 Added ACTION K to address plant specific requirements related to DG operability.

P4 BFN design does not include a separate "sequencer." Individual components each have timing devices, which are associated with the OPERABILITY of the component and/or the AC source as appropriate.

P5 BFN TSs currently do not require these tests. Operability is adequately demonstrated by BFN's current licensing bases test requirement. Therefore, BFN will not include these tests in the proposed BFN ISTS.

P6 Specification 3.8.2, 3.8.4, and associated Bases have been revised to reflect plant specific design/equipment and associated current technical specification requirements.

P7 The words "in the secondary containment," were added for consistency with the LCO applicability statement and its Bases discussion.

P8 BFN current TS 3.9.B.7 allows reactor operation for 7 days with one of the three 250-V unit batteries/or its associated battery board inoperable. The ESS 250-V DC system is arranged, and the batteries sized, such that the loss of any one unit battery will not prevent the safe shutdown and cooldown of all three units in the event of the loss of offsite power and a design basis accident in any one unit. Loss of control power to any engineered safeguards control circuit is annunciated in the Main Control Room of the unit affected.

P9 BFN CTS 3.9.B.8 allows reactor operation for 5 days with one of the 250-V shutdown board (SD) batteries and/or its associated battery board inoperable. The loss of one battery affects normal control power for the 480-V and 4160-V SD which it supplies. Complete loss of the control power to these SD results in loss of only those engineered safeguards supplied by these boards, which is acceptable. BFN has extended the allowed outage time to 7 days based on Justification L1 of CTS markup for proposed Specification 3.8.4 and L4 of CTS markup for proposed Specification 3.8.7.

P10 SR wording changes to reflect the 250-V plant and control power supply batteries and the 125-V DG batteries.

P11 NUREG LCO 3.8.7 and LCO 3.8.8, their associated Bases, and all references to them have been deleted. Inverters, as utilized in the NUREG STS (i.e., inverters that power many required systems and that are required to be powered by the DC sources to meet accident analysis assumptions), do not exist at BFN. Renumbering and relettering as appropriate due to deletions.

P12 NUREG LCO 3.8.9 and associated ACTIONS have been written to address each BFN distribution subsystem separately to allow different completion times to be provided for each type of AC and DC electrical power distribution system based on current BFN TS requirements. Actions relettered as appropriate. The 12 day completion time establishes a limit on the maximum time allowed for any combination of required distribution subsystems to be inoperable during any single contiguous occurrence of failure to meet the LCO. This is consistent with the NUREG-1433 "standard" allowance of the sum of two completion times which can be currently entered.

P13 Allowed outage time for one units 1 and 2 4.16 kV shutdown board inoperable of 5 days will be maintained. BFN current TS 3.9.B.4 allows reactor operation for 5 days with one unit 1 and 2 4.16 kV shutdown board inoperable.

P14 The Bases for NUREG LCO 3.8.9, Condition E have been deleted consistent with deletion of Condition E of Specification 3.8.9.

P15 Allowed outage time for one 480-V diesel auxiliary board inoperable of 5 days will be maintained. CTS 3.9.B.6 allows reactor operation for 5 days with one of the 480-V diesel auxiliary boards inoperable. The diesel auxiliary boards principally serve loads associated with the operation of the diesel generators and SGT trains A and B (Units 1 and 2 boards only). Other essential small loads are also served from these boards. Loss of only one of these boards will not negate the effectiveness of standby core cooling.

P16 Changes were made to provide additional information or clarity, or were made to use plant specific terminology.

P17 The proper final policy statement reference has been used. The current wording was developed prior to issuance of the final policy statement.

P18 Typographical/grammatical error or Writer's Guide convention corrected.

P19 BFN design is not truly divisionalized at the 4.16 kV shutdown board level. Other descriptions of the offsite circuit suffice to describe allowed connections.

P20 Renumbering and relettering as appropriate due to deletions or additions.

P21 This change has been made since Section 3.5, "ECCS and RCIC" provides the appropriate limits that are affected by the systems in this LCO.

P22 Not part of the current BFN licensing basis. NUREG SRs 3.8.1.5, 3.8.3.5, and 3.8.3.6 are not required in the CTS. BFN chooses not to adopt these SRs as they are preventive maintenance type requirements that will be plant controlled.

P23 BFN chooses to maintain the current licensing basis frequency (CTS 4.9.A.2.b) of three months (92 days).

P24 Applicable plant specific references have been added and non applicable NUREG-1433, Revision 1, references have been deleted based on BFN current licensing bases.

P25 Not Used.

P26 Bases wording revised for consistency with the Specification wording.

P27 The Note to proposed LCO 3.8.2, Required Action A.1 was revised to be consistent with the note to proposed LCO 3.8.1, Required Action F.1. The use of the word "de-energized" is incorrect and inconsistent with the Bases discussion. The intent of the note is to designate that the applicable Conditions and Required Actions of proposed LCO 3.8.8 are to be entered when any required board is inoperable. The board can be inoperable without being de-energized.

P28 Since NUREG SR 3.8.1.11 was deleted, the pertinent information from the Bases for that SR has been moved to the Bases for NUREG SR 3.8.1.19 (BFN proposed SR 3.8.1.9).

P29 Deleted in response to NRC comment NUREG M/U 3.8.1 Issue 10.

P30 Deleted in response to NRC comment NUREG M/U 3.8.1 Issue 11.

P31 Deleted in response to NRC comment NUREG M/U 3.8.1 Issue 13.

P32 The 31 day testing requirement is based on Regulatory Guide 1.9 recommended test frequency. Since 10 CFR 50.65, "Maintenance Rule," has been implemented for the DGs, the accelerated test schedule (NUREG Table 3.8.1-1) has been deleted.

P33 BFN TSs currently do not require verification of the engine tank level (NUREG SR 3.8.1.4). The fuel oil transfer system at BFN provides an automatic transfer to the engine tank prior to reaching the specified minimum level. This feature is tested by proposed SR 3.8.1.3. Provided the transfer system continued to function as designed, the specific level in the engine tank need not be surveilled.

P34 The BFN design is such that the DGs, offsite circuits, and DC systems are shared completely. Therefore, 18-month testing would typically be performed with one unit operating. Incorporation of this note would require a dual-unit outage to perform Surveillances. Furthermore, the current Technical Specifications do not impose this limitation. Therefore, this note is deleted and affected portions of the Bases have been revised accordingly. TSTF-8, R.2 incorporated.

P35 BFN design criteria does not require the starting air system to provide the capacity for five DG starts. At BFN, the starting air system consists of two redundant starting air systems, each with the capacity to start the diesel engine at least once. BFN only requires one of these systems to be OPERABLE to support the DG. The LCO and associated action (NUREG Action E) has been modified to require only one subsystem be operable. When the required starting air system is inoperable, the supported DG must be declared inoperable immediately. This is consistent with current BFN operational restrictions for the starting air system. The Bases description of the air starting system design has been modified to reflect the BFN design.

P36 The DG capability curve allows for operational limits of the DG relative to KW and kVARS.

P37 This test is encompassed by NUREG SR 3.8.1.19. At BFN the only difference in results would be that the actual loads would be less during performance of NUREG SR 3.8.1.11.

P38 There are no logic ties between the permanently connected loads and the accident signal or DG start signal. Therefore, NUREG SR 3.8.1.12.d is not required. ECCS equipment is energized through individual load sequence timers. The requirements for functionally testing these timers are included in BFN ITS 3.3.5.1. Auto initiation of the ECCS equipment is verified during performance of SRs included in BFN ITS 3.5.1 and 3.7.2. Because there is no correlation between the DG accident start logic and the accident start logic for these pumps, testing under ITS SR 3.8.6 would be redundant. Therefore, NUREG SR 3.8.1.12.e is not required.

P39 This NUREG SR is not required by CTS and BFN chooses not to implement. Since proposed ITS SR 3.8.1.4 verifies a DG start from the standby condition to similar requirements of NUREG SR 3.8.1.15, the proposed surveillance adequately satisfies the intent of the NUREG surveillance. In addition, the proposed surveillance is performed with greater frequency (i.e., 184 days versus 18 months). Therefore, NUREG SR 3.8.1.15 has been deleted.

P40 This SR is not required by CTS and BFN chooses not to implement. Ability to synchronize the DGs to the offsite source is verified during monthly synchronization and loading (NUREG SR 3.8.1.3). Because DG operation becomes more stable with loading, synchronization with no load is adequate to verify capability.

P41 Deleted NUREG SR 3.8.1.17 since there is no defined test mode at BFN. It is understood that test mode is defined as parallel operation of the DG (drop mode with protective devices enabled). A test mode override feature is not part of the BFN design bases; therefore, there should be no SR for test mode override.

P42 A specific requirement for the 480 V load shedding and common accident signal logic systems to be operable and corresponding actions when one division is inoperable have been added. This is necessary since these logic systems are common to all four Unit 1 and 2 DGs. As a result, an inoperable division of logic affects all four DGs. The remaining division is fully redundant and continues to provide the required 480 V load shedding and common accident signal functions. However, a single failure in the remaining division could result in all four DGs not responding as assumed in the accident analysis. Similarly, the Unit 3 common accident signal logic system is common to all four Unit 3 DGs. However, the 480 V load shedding logic system is DG specific. This means it is possible to lose load shedding for one D/G with no impact on the remaining three DGs. Therefore, the current technical specification requirement and associated actions (allowed outage time of 7 days) have been included.

P43 At BFN, the breaker alignment for qualified offsite circuits does not change at the 4.16 kV shutdown board level, only at the 4.16 kV unit board level (balance of plant (BOP) equipment). Transfers between offsite circuits supplying the 4.16 kV unit boards may be manual or automatic. The transfer capability of this BOP equipment is demonstrated by preventive maintenance and during the 4.16 kV unit board functional tests. BFN does not currently have a TS requirement for demonstrating this transfer capability and chooses not to implement because BFN considers it inappropriate for BOP equipment. Therefore, NUREG SR 3.8.1.8 has not been included in the proposed BFN ISTS. As a result, the reference to this NUREG SR has been deleted from NUREG SR 3.8.2.1.

P44 The NUREG SR 3.8.1.12.a,b,and c acceptance criteria is redundant to ITS SRs 3.8.1.4 and 3.8.1.2 acceptance criteria. The performance frequencies for ITS SRs 3.8.1.4 and 3.8.1.2 are less than the 18 month frequency for NUREG SR 3.8.1.12. The ability to start the DG in 10 seconds and achieve required frequency and voltage is not dependent upon the initiation signal.

P45 The BFN DBA analysis assumes the batteries have sufficient capacity to handle the accident for 30 minutes. The SR has been modified to require that the ability to recharge after a DBA be demonstrated without regard to the duration of the recharge.

P46 Note (d) to Table 3.8.6-1 has been added to allow use of alternate values of specific gravity based on manufacturer recommendations. BFN's battery manufacturer provided an evaluation that justifies operability of the batteries based on a specified number of cells having a specific gravity of ≥ 1.180 provided the demonstrated battery capacity was ≥ 81.2% at the last discharge test.

P47 BFN's battery manufacturer (C&D Power Systems) does not recommend that the specific gravity of batteries at BFN be level corrected (as long as the level is between the high and low indicator marks) during normal surveillance inspections. Section 4.3 of IEEE Standard 450-1980 recommends that specific gravity readings should be taken in accordance with the manufacturer's instructions. The table has been adjusted accordingly.

P48 Corrected for current BFN licensing basis. Current Technical Specifications do not impose new fuel oil testing requirements. Current practice requires fuel oil testing when it is transferred into the DG 7-day tanks. As such, NUREG LCO 3.8.3, Condition D, has been deleted and NUREG SR 3.8.3.3 has been revised to apply only to stored fuel oil testing. Additional detail concerning the BFN diesel fuel oil testing program can be found in the "Programs and Manuals" section 5.5 of the proposed Technical Specifications.

P49 BFN CTS do not require performance testing of battery chargers. The only time the batteries would be discharged to the point that the chargers would be required to perform at maximum output is during the battery discharge test required by proposed SR 3.8.4.4. TVA proposes to verify the chargers are capable of charging the batteries after their designed duty cycle, hence verifying performance of their design function, at the same frequency as the 18 month service test required by proposed SR 3.8.4.3 and after each battery discharge test required by proposed SR 3.8.4.4 at a 60 month frequency, which will verify charger capability to perform at maximum output.

P50 The Surveillance has been modified to not require a breaker alignment check since misalignments of any transfers involving the AC safety related boards listed in Table B 3.8.7-1 will be self revealing to the unit operators. The corresponding bases were also revised.

4 kV Boards

4 KV Shutdown Boards A and B are normally aligned to Shutdown Bus 1 with Shutdown Bus 2 as their alternate feeder. 4 kV Shutdown Boards C and D are normally aligned to Shutdown Bus 2 with Shutdown Bus 1 as their alternate feeder. All of the Unit 1 and 2 4 kV shutdown boards are normal power seeking, meaning they will automatically transfer back to the normal feeder, if the board is in auto and power is available to the breaker.

In the event of a 4 kV shutdown board auto transfer to its alternate source, an alarm is received at Panels 0-9-23 and 2-9-8 in the control room.

In the event a 4 kV shutdown board is manually transferred, annunciations will be received at Panel 0-9-23 in the main control room prior to the transfer. These annunciations are generated from positioning the local or control room auto/manual transfer switches to manual.

The annunciations noted above in conjunction with actual breaker position indication in the control room are adequate to ensure the control room operator is aware that a 4 kV Shutdown Board is being aligned to an alternate source.

480 V Shutdown Boards can only be manually transferred. Transfers can occur at either the unit control board or at the respective shutdown board. Transfers at the shutdown board can only occur after the local manual/auto switches have been placed in manual. Placing these switches in manual results in an annunciation at Panel 9-8-3, thereby notifying the unit operator of this action.

480 V Standby Gas Treatment Board

The 480 V Standby Gas Treatment Board has only one power source, the Unit 3D 4 kV Shutdown Board. Therefore it is not possible to misalign this board.

480 V Diesel Auxiliary Board A and B

The 480 V Diesel Auxiliary Boards can only be manually transferred. Transfers can occur at either the electrical control board in the main control room or at the respective board. Transfers at the board can only occur after the local manual/auto switches have been placed in manual. Placing these switches in manual results in an annunciation at Panel 9-23-8, thereby notifying the unit operator of this action.

P51 NUREG SR 3.8.1.1 has been deleted and the appropriate actions incorporated into revised Required Actions A.1 and B.1 of LCO 3.8.1. Upon discovery of an inoperable offsite circuit, the availability of the remaining required offsite circuit is periodically verified. This action ensures proper circuit continuity for the offsite AC electrical power supply to the onsite distribution network and availability of offsite AC electrical power. Additionally, appropriate independence of offsite circuits is verified to be maintained. Additional specific actions to verify breaker alignment are unnecessary since breaker position cannot change without the operator being aware of it unless multiple failures occur and because breaker status is displayed and annunciated in the control room. Appropriate Bases changes have also been made. See Justification P50 (above) for additional information.

P52 This condition addresses the situation where both one required offsite circuit and one DG are inoperable and affect only one 4.16 kV shutdown board. The Note clarifies the applicability.

P53 Added Required Action A.2 to LCO 3.8.7 to declare associated DG inoperable. This will ensure actions for LCO 3.8.1 are entered as described in JFD A2. All of the equipment listed in CTS 3.9.B.4 are redundant features that would be verified under LCO 3.8.1 Required Actions B1 and B2.

P54 The Note for NUREG SR 3.8.1.12 has been modified to allow a warmup period prior to the DG start. Use of a warmup period will reduce the wear on the DGs without affecting SR testing.

P55 NUREG SR 3.8.1.7 has been modified to specify the voltage and frequency requirements for the DG to be able to perform its safety function. Only the minimum voltage and speed values are required to be met within 10 seconds. At the point these requirements are met, the DG is capable of performing its safety function. The voltage and frequency ranges specified for steady state operation verify that the voltage regulator and governor are operating at the expected setpoints.

P56 A sentence has been added to the bases for ITS SR 3.8.1.5 to explain that the voltage tolerances are based on the degraded voltage and overvoltage relay settings. CTS do not require this SR and BFN has chosen not to adopt specific time requirements for the DGs return to steady state voltage and frequency values. Specifying that the voltage and frequency values are "steady state" values in ITS SR 3.8.1.5.c ensures consistency with the description in the bases and with other SRs which specify that the values specified are steady state values.

P57 The Bases for ITS SR 3.8.1.6 has been modified to denote that testing to ensure that another unit's DGs will start from the specified unit's accident signal may be performed concurrent with the other unit's DG testing. This will permit grouping of tests such that no more than one group of four DGs will be required to be involved for each test. This will reduce the number of support personnel required for each test and the overall time required for testing.

P58 Condition C has been added to ITS LCO 3.8.2, along with its associated Required Action and Completion Time, to address a potential condition specific to BFN design. Systems required to support multiple units are supported by both the Unit 1 & 2 DGs and the Unit 3 DGs. Loss of one or more of the required opposite units DGs increases the probability that the part of the shared systems supported by the DG(s) will be unavailable. The Required Action Completion Times are based on CTS requirements.

P59 Regulatory Guide 1.9 incorporates and supercedes Regulatory Guide 1.108.

BROWNS FERRY NUCLEAR PLANT - IMPROVED TECHNICAL SPECIFICATIONS
SECTION 3.8
LIST OF REVISED PAGES

NO SIGNIFICANT HAZARDS CONSIDERATIONS

Replace page 1 of 27 through 27 of 27 Revision 1 with page 1 of 32 through 32 of 32 Revision 3

TECHNICAL CHANGES - LESS RESTRICTIVE
(L1)

TVA has concluded that operation of Browns Ferry Nuclear Plant in accordance with the proposed change to technical specifications does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91 (a)(1), of the three standards set forth in 10 CFR 50.92.

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The proposed change eliminates the requirement to demonstrate the Operability of the DGs within 24 hours whenever an offsite circuit (or shutdown bus) is determined inoperable. The probability of an accident is not increased by these changes because the DGs are not assumed to be initiators of any design basis event. The proposed change will not increase the consequences of an accident because there is no change to the assumed reliability of the DGs as a result of the elimination of a DG Operability demonstration when an offsite circuit (or shutdown bus) is not operable. This change acknowledges that the inoperability of an offsite circuit (or shutdown bus) is not indicative of a condition affecting the Operability of an DG. Additionally, the periodic frequencies specified to demonstrate DG operability have been shown to be adequate to provide a high degree of assurance that the DG is operable. By allowing credit to be taken for normal periodic surveillance as a demonstration of DG operability, this change reduces unnecessary challenges and wear to the DGs. Therefore, this change does not involve a significant increase to the consequences of any accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The proposed change will not involve any physical changes to plant systems, structures, or components, or the manner in which they are operated, maintained, modified, tested, or inspected. Therefore, it does not create the possibility of a new or different kind of accident from any accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L1) (continued)

3. The proposed amendment does not involve a significant reduction in a margin of safety.

The proposed change eliminates the requirement to demonstrate the operability of the DGs within 24 hours whenever an offsite circuit (or shutdown bus) is determined to be inoperable. The proposed change does not involve a significant reduction in a margin of safety because the existing routine Surveillance Frequency has been shown, based on operating experience, to be adequate for assuring the DGs remain operable. This change acknowledges that the inoperability of an offsite circuit (or shutdown bus) is not indicative of a condition affecting the operability of any DG. By allowing credit to be taken for normal periodic Surveillance as a demonstration of DG operability, this change reduces unnecessary challenges and wear to the DGs which should increase DG availability and reliability. As a result, the change does not affect the current analysis assumptions. Therefore, this change does not involve a significant reduction in the margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L2)

Not used.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L3)

TVA has concluded that operation of Browns Ferry Nuclear Plant in accordance with the proposed change to technical specifications does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91 (a)(1), of the three standards set forth in 10 CFR 50.92.

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The diesel generators (DGs) are used to support mitigation of the consequences of an accident, but they are not considered as the initiator of any previously analyzed accident. Further, equipment powered by the DGs which may be considered as an initiator continues to be evaluated for loss of function and previously determined appropriate ACTIONS for such inoperabilities continue to be required. As such the proposed ACTION will not increase the probability of any accident previously evaluated. The proposed ACTION continues to provide adequate assurance of OPERABLE required equipment and therefore, does not involve any increase to the consequences of any accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The proposed change introduces no new mode of plant operation and it does not involve physical modification to the plant. Therefore, it does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed amendment does not involve a significant reduction in a margin of safety.

   This change does not involve a significant reduction in a margin of safety since the determination of loss of function continues to be determined in the same manner.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L4)

TVA has concluded that operation of Browns Ferry Nuclear Plant in accordance with the proposed change to technical specifications does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91 (a)(1), of the three standards set forth in 10 CFR 50.92.

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   This change does not result in any hardware or operating procedure changes. DGs and offsite circuits are not assumed to be initiators of any analyzed event. The change will not allow continuous operation such that a single failure will preclude the affected component's function from being performed. This change allows an additional 12 hours to reach MODE 4, which provides a reasonable amount of time to perform an orderly shutdown, thus further minimizing a potential upset from a too rapid decrease in plant power. Additionally, the consequences of an event occurring while the unit is being shut down during the extra 12 hours is the same as the consequences of an event occurring for the current 24 hours. Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The possibility of a new or different kind of accident from any accident previously evaluated is not created because the proposed change introduces no new mode of plant operation and it does not involve physical modification to the plant.

3. The proposed amendment does not involve a significant reduction in a margin of safety.

   The increased time allowed to reach MODE 4 with inoperable AC Sources is acceptable based on the small probability of an event requiring the inoperable AC Sources and the desire to minimize plant transients. The requested 12 hour extension will provide sufficient time for the unit to reach MODE 4 in an orderly manner. As a result, the potential for human error will be reduced. In addition, the unit is now required to be in MODE 3 within 12 hours (a shutdown condition). Any reduction in a

TECHNICAL CHANGES - LESS RESTRICTIVE
(L4) (continued)

margin of safety will be insignificant and offset by the benefit gained from providing sufficient time to reach MODE 4, thus avoiding potential plant transients from attempting to reach MODE 4 in the current time and the benefit of being subcritical (MODE 3) in a shorter required time.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L5)

TVA has concluded that operation of Browns Ferry Nuclear Plant in accordance with the proposed change to technical specifications does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91 (a)(1), of the three standards set forth in 10 CFR 50.92.

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   This change does not result in any hardware or operating procedure changes. The DGs and offsite circuits are used to support mitigation of the consequences of an accident, but they are not considered as the initiator of any previously analyzed accident. As such the proposed increase in the Completion Time will not increase the probability of any accident previously evaluated. The change will not allow continuous operation with multiple AC Sources inoperable. The change allows up to 24 hours to restore multiple, inoperable AC Sources. Restrictions are imposed to limit the maximum time the requirements of proposed LCO 3.8.1.a and b are not met (the second Completion Time of the restoration actions of Actions A and B). The consequences of an event occurring during the proposed Completion Times are the same as the consequences of an event occurring under the current ACTIONS. Therefore, the proposed change does not involve a significant increase to the consequences of any accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The proposed change introduces no new mode of plant operation and it does not involve physical modification to the plant. The proposed change will provide Completion Times to restore multiple, inoperable AC Sources to OPERABLE status prior to requiring a unit shutdown. Therefore, it does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed amendment does not involve a significant reduction in a margin of safety.

   The proposed Completion Times to restore multiple, inoperable AC Sources to OPERABLE status prior to requiring a shutdown is acceptable based on the overall probability of an event requiring the inoperable AC Sources during this time period. Providing Completion Times will minimize the potential for plant transients that can occur during shutdown by providing some time to restore the affected AC Sources prior to

TECHNICAL CHANGES - LESS RESTRICTIVE
(L5) (continued)

requiring a shutdown. In addition, the NRC has previously evaluated these new times and approved them in Regulatory Guide 1.93. As such, any reduction in a margin of safety by the addition of these Completion Times will be offset by the benefit gained in avoiding an unnecessary plant transient by providing time to restore the inoperable AC Source.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L6)

TVA has concluded that operation of Browns Ferry Nuclear Plant in accordance with the proposed change to technical specifications does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91 (a)(1), of the three standards set forth in 10 CFR 50.92.

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The diesel generators (DGs) and offsite circuits are used to support mitigation of the consequences of an accident, but they are not considered as the initiator of any previously analyzed accident. Further, equipment powered by the DGs and offsite circuits which may be considered as an initiator continues to be evaluated for loss of function and previously determined appropriate ACTIONS for such inoperabilities continue to be required. As such the proposed increase in the Completion Time will not increase the probability of any accident previously evaluated. The proposed ACTION continues to provide adequate assurance of OPERABLE required equipment and therefore, does not involve any increase to the consequences of any accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The proposed change introduces no new mode of plant operation and it does not involve physical modification to the plant. Therefore, it does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed amendment does not involve a significant reduction in a margin of safety.

   This change does not involve a significant reduction in a margin of safety since the OPERABILITY of the equipment and loss of function continues to be evaluated in the same manner. The increase in time allowed for such a evaluation is minimal and provides additional potential for preferred restoration of the equipment to OPERABLE status rather than requiring a shutdown transient.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L7)

TVA has concluded that operation of Browns Ferry Nuclear Plant in accordance with the proposed change to technical specifications does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91 (a)(1), of the three standards set forth in 10 CFR 50.92.

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The diesel generators (DGs) are used to support mitigation of the consequences of an accident, but they are not considered as the initiator of any previously analyzed accident. As such the revised criteria for demonstrating long term load carrying capability will not increase the probability of any accident previously evaluated. The proposed criteria provides adequate assurance of reliable DGs based on guidelines established by the NRC Staff. Therefore, the proposed change does not involve any increase to the consequences of any accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The proposed change introduces no new mode of plant operation and it does not involve physical modification to the plant. Therefore, it does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed amendment does not involve a significant reduction in a margin of safety.

   This change does not involve a significant reduction in a margin of safety since the OPERABILITY of the DGs continues to be determined in the same manner. Further, reliability status will be determined based on guidelines established by the NRC Staff. Therefore the proposed change provides an acceptable assessment of the reliability of the DGs.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L8)

TVA has concluded that operation of Browns Ferry Nuclear Plant in accordance with the proposed change to technical specifications does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91 (a)(1), of the three standards set forth in 10 CFR 50.92.

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The logic systems are used to support mitigation of the consequences of an accident, but they are not considered as the initiator of any previously analyzed accident. The logic systems consist of two fully redundant divisions either of which is capable of ensuring DG operability. Therefore, at BFN an inoperable division of logic cannot affect the operability of CS, RHR (LPCI and containment cooling) systems. The proposed BFN ISTS includes a Safety Function Determination Program (SFDP) which will ensure appropriate actions are taken when the inoperability of a support system affects a supported systems' operability. As such, excluding the specific requirement that all CS, RHR (LPCI and containment cooling) systems be operable will not increase the probability of any accident previously evaluated. The consequences of an event occurring during the proposed 7 day Completion Time is the same as the consequences of an event occurring under the current ACTIONS. Therefore, the proposed change does not involve any increase to the consequences of any accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The proposed change introduces no new mode of plant operation and it does not involve physical modification to the plant. Therefore, it does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed amendment does not involve a significant reduction in a margin of safety.

   An inoperable division of logic (480 V load shed or common accident signal) does not affect DG operability. However, it does represent a degraded mode since loss of the other division would affect the assumed response of the DGs. The proposed Specification includes a SFDP which will ensure appropriate actions are taken when the inoperability of a support system affects a supported systems operability. Therefore, the specific requirements to ensure operability of the CS, RHR (LPCI and

TECHNICAL CHANGES - LESS RESTRICTIVE
(L8) (continued)

containment cooling) systems are captured by the SFDP. This change does not involve a significant reduction in a margin of safety since the OPERABILITY of the DGs continues to be determined in the same manner.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L9)

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The diesel generators (DGs) are used to support mitigation of the consequences of an accident, but they are not considered as the initiator of any previously analyzed accident. As such the revised criteria for demonstrating load carrying capability will not increase the probability of any accident previously evaluated. The proposed criteria provides adequate assurance of reliable DG performance based on guidelines established by Regulatory Guide 1.9. Therefore, the proposed change does not involve any increase to the consequences of any accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The proposed change introduces no new mode of plant operation and it does not involve physical modification to the plant. Therefore, it does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed amendment does not involve a significant reduction in a margin of safety.

   This change does not involve a significant reduction in a margin of safety since the operability of the DGs continues to be determined in the same manner as is required under current technical specifications. Further, DG performance testing will continue to be performed in accordance with recognized regulatory guidance. Therefore, the proposed change provides an acceptable assessment of the reliability of the DGs.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L10)

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The DGs are used to support mitigation of the consequences of an accident, but they are not considered as the initiator of any previously analyzed accident. As such, the removal of reliability testing from the technical Specifications will not increase the probability of any accident previously evaluated. The proposal to monitor DG reliability using 10 CFR 50.65 Maintenance Rule requirements provides adequate assurance of reliable DGs based on guidelines established by the NRC Staff. Therefore, the proposed change does not involve any increase to the consequences of any accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The proposed change introduces no new mode of plant operation and it does not involve physical modification to the plant. Therefore, it does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed amendment does not involve a significant reduction in a margin of safety.

   This change does not involve a significant reduction in a margin of safety since the reliability of the DGs continues to be monitored in the same manner as is required under current technical specifications. The criteria used to satisfy the Maintenance Rule reliability requirements are similar to the current Technical Specification requirements and is bounded by the Probabilistic Safety Assessment performed specific to BFN. Therefore, the proposed change provides an acceptable alternate method of monitoring the reliability of the DGs.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L11)

TVA has concluded that operation of Browns Ferry Nuclear Plant in accordance with the proposed change to technical specifications does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91 (a)(1), of the three standards set forth in 10 CFR 50.92.

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   This change proposed to delete the requirement to notify NRC within 24 hours when one division of the logic system is inoperable. The report does not affect the probability of an accident. Therefore, the proposed change will not increase the probability or consequences of any accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The proposed change does not involve a physical alteration of the plant (no new or different type of equipment will be installed) or changes in methods governing plant operation. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. The proposed amendment does not involve a significant reduction in a margin of safety.

   This change does not involve a significant reduction in a margin of safety since the proposed change does not affect system or personnel response to an accident.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L1)

TVA has concluded that operation of Browns Ferry Nuclear Plant in accordance with the proposed change to technical specifications does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91 (a)(1), of the three standards set forth in 10 CFR 50.92.

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   A power supply is necessary to support the equipment used to mitigate the consequences of an accident; however, the power supply is not considered the initiator of any previously analyzed accident. As such, the proposed revision to the Surveillance Requirements will not increase the probability of any accident previously evaluated. The proposed SRs continue to provide adequate assurance of OPERABLE DGs and available offsite circuits and therefore, does not involve an increase in the consequences of any accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The possibility of a new or different kind of accident from any accident previously evaluated is not created because the proposed change introduces no new mode of plant operation and it does not involve physical modification to the plant.

3. The proposed amendment does not involve a significant reduction in a margin of safety.

   This change does not involve a significant reduction in a margin of safety since the proposed change removes requirements for paralleling the required DG to the required offsite circuit. Omitting this condition represents a significant improvement in the margin of safety by removing the potential for a single fault to affect both required power sources:

TECHNICAL CHANGES - LESS RESTRICTIVE
(L1)

TVA has concluded that operation of Browns Ferry Nuclear Plant in accordance with the proposed change to technical specifications does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91 (a)(1), of the three standards set forth in 10 CFR 50.92.

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   This requested amendment does not result in any hardware or operating procedure changes. The diesel generators are not assumed to be an initiator of any analyzed event. The diesel generators function to mitigate consequences of an analyzed event by supplying sufficient power to equipment assumed to function during an accident. The diesel generator air start pressure requirements support operation of the diesel generators and therefore help mitigate the consequences of design basis accidents. The proposed change still provides assurance diesel generator air start pressure requirements will be maintained since more frequent diesel generator testing will not adversely impact air start pressure. Additionally, pressure alarms provide assurance that air start pressure is maintained within required limits. Therefore, this proposed change will not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The proposed change introduces no new mode of plant operation and it does not involve physical modification to the plant. Therefore it does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed amendment does not involve a significant reduction in a margin of safety.

   No significant reduction in a margin of safety is involved with this change since the 31 day Frequency has been shown, based on operating experience to be adequate for maintaining air start pressure. Additionally, pressure alarms provide additional assurance that air start pressure is maintained within required limits.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L2)

Not used.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L3)

TVA has concluded that operation of Browns Ferry Nuclear Plant in accordance with the proposed change to technical specifications does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91 (a)(1), of the three standards set forth in 10 CFR 50.92.

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The diesel generators (DGs) are used to support mitigation of the consequences of an accident, but they are not considered as the initiator of any previously analyzed accident. As such the evaluation of operational parameters and allowance of time for restoration of these parameters will not increase the probability of any accident previously evaluated. The proposed ACTIONS continue to provide adequate assurance of OPERABLE DGs since substantial margin exists for these parameters and therefore, does not involve any increase to the consequences of any accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The proposed change introduces no new mode of plant operation and it does not involve physical modification to the plant. Therefore it does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed amendment does not involve a significant reduction in a margin of safety.

   This change does not involve a significant reduction in a margin of safety since the OPERABILITY of the DGs continues to be determined in the same manner. The substantial margin provided for these parameters allows for some degradation without significantly affecting the capability of the DG to perform its safety function. Since the degradation is limited in both capacity and time, the allowance is not considered significant.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L1)

TVA has concluded that operation of Browns Ferry Nuclear Plant in accordance with the proposed change to technical specifications does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91 (a)(1), of the three standards set forth in 10 CFR 50.92.

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The proposed change increases the allowed outage time for the Unit 1 and 2 Shutdown Board DC batteries from 5 to 7 days consistent with the Unit 3 Technical Specifications for Shutdown Battery 3EB. The DC power sources are not assumed to be initiators of any analyzed event. Their role is providing power to components required for accident mitigation thereby limiting the consequences. As such the additional 48 hours to restore an inoperable Shutdown Board DC battery will not increase the probability of any accident previously evaluated. The proposed ACTION continues to provide adequate assurance of OPERABLE DC power sources and therefore, does not involve any increase to the consequences of any accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The possibility of a new or different kind of accident from any accident previously evaluated is not created because the proposed change introduces no new mode of plant operation and it does not involve physical modification to the plant.

3. The proposed amendment does not involve a significant reduction in a margin of safety.

   The shutdown board sizing calculation demonstrates that the shutdown board and battery have adequate capacity to support the operation when one shutdown board bus is out of service. The 7 day completion time is based on BFN plant design of the shutdown board DC System. This change does not involve a significant reduction in a margin of safety since the OPERABILITY of the Shutdown Board batteries continues to be required. The safety analysis assumptions will still be maintained, thus no question of safety exists.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L2)

TVA has concluded that operation of Browns Ferry Nuclear Plant in accordance with the proposed change to technical specifications does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91 (a)(1), of the three standards set forth in 10 CFR 50.92.

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   This change does not result in any hardware or operating procedure changes. DC Sources are not assumed to be initiators of any analyzed event. The change will not allow continuous operation such that a single failure will preclude the affected component's function from being performed. This change allows an additional 12 hours to reach MODE 4, which provides a reasonable amount of time to perform an orderly shutdown, thus further minimizing a potential upset from a too rapid decrease in plant power. Additionally, the consequences of an event occurring while the unit is being shut down during the extra 12 hours is the same as the consequences of an event occurring for the current 24 hours. Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The possibility of a new or different kind of accident from any accident previously evaluated is not created because the proposed change introduces no new mode of plant operation and it does not involve physical modification to the plant.

3. The proposed amendment does not involve a significant reduction in a margin of safety.

   The increased time allowed to reach MODE 4 with inoperable DC Sources is acceptable based on the small probability of an event requiring them and the desire to minimize plant transients. The requested 12 hour extension will provide sufficient time for the unit to reach MODE 4 in an orderly manner. As a result, the potential for human error will be reduced. In addition, the unit is now required to be in MODE 3 within 12 hours (a shutdown condition). As such, any reduction in a margin of safety will be insignificant and offset by the benefit gained from providing sufficient time to reach MODE 4, thus avoiding potential plant transients from attempting to reach MODE 4 in the current time and the benefit of being subcritical (MODE 3) in a shorter required time.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L3)

TVA has concluded that operation of Browns Ferry Nuclear Plant in accordance with the proposed change to technical specifications does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91 (a)(1), of the three standards set forth in 10 CFR 50.92.

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   This change decreases the battery performance test Surveillance Frequency a maximum of 30 months. CTS 4.9.A.2.c requires a battery capacity test every 24 months (plus a 25% extension). However, a new Surveillance, proposed SR 3.8.4.3, introduces a battery service test every 18 months. The new service test will provide assurance that the battery remains capable of supporting the expected post-accident loads. The less frequent capacity test will continue to monitor overall battery capacity and allow trending of remaining capacity (with more frequent testing on signs of degradation of approaching end-of-life). The DC power sources are not assumed to be initiators of any analyzed event. Their role is providing power to components required for accident mitigation thereby limiting the consequences. The proposed change still provides assurance battery cell parameters are maintained within limits such that the batteries are capable of performing their intended function. The consequences of an accident are not affected by this change since the most common outcome of performing a Surveillance is an acceptable outcome. The proposed change does not alter the design of the batteries. In addition, no change has been made in the way the batteries are expected to operate during an accident or transient. Therefore, this change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The possibility of a new or different kind of accident from any accident previously evaluated is not created because the proposed change introduces no new mode of plant operation and it does not involve physical modification to the plant.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L3) (continued)

3. The proposed amendment does not involve a significant reduction in a margin of safety.

The proposed Frequency for the battery performance test is adequate for ensuring the batteries are maintained capable of performing their intended functions and also ensures that potential battery degradation is detect to preclude loss of function. The safety analysis assumptions will still be maintained, thus no question of safety exists. Therefore, this change does not involve a significant reduction in a margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L4)

TVA has concluded that operation of Browns Ferry Nuclear Plant in accordance with the proposed change to technical specifications does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91 (a)(1), of the three standards set forth in 10 CFR 50.92.

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   This change proposed to delete the requirement to notify NRC when a DC power source is inoperable for any reason other than routine surveillance testing. The report does not affect the probability of an accident. Therefore, the proposed change will not increase the probability or consequences of any accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The proposed change does not involve a physical alteration of the plant (no new or different type of equipment will be installed) or changes in methods governing plant operation. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. The proposed amendment does not involve a significant reduction in a margin of safety.

   This change does not involve a significant reduction in a margin of safety since the proposed change does not affect system or personnel response to an accident.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L1)

TVA has concluded that operation of Browns Ferry Nuclear Plant in accordance with the proposed change to technical specifications does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91 (a)(1), of the three standards set forth in 10 CFR 50.92.

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   This change does not result in any hardware or operating procedure changes. Distribution Systems are not assumed to be initiators of any analyzed event. The change will not allow continuous operation such that a single failure will preclude the affected component's function from being performed. This change allows an additional 12 hours to reach MODE 4, which provides a reasonable amount of time to perform an orderly shutdown, thus further minimizing a potential upset from a too rapid decrease in plant power. Additionally, the consequences of an event occurring while the unit is being shut down during the extra 12 hours is the same as the consequences of an event occurring for the current 24 hours. Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The possibility of a new or different kind of accident from any accident previously evaluated is not created because the proposed change introduces no new mode of plant operation and it does not involve physical modification to the plant.

3. The proposed amendment does not involve a significant reduction in a margin of safety.

   The increased time allowed to reach MODE 4 with inoperable Distribution subsystems is acceptable based on the small probability of an event requiring the inoperable Distribution subsystems and the desire to minimize plant transients. The requested 12 hour extension will provide sufficient time for the unit to reach MODE 4 in an orderly manner. As a result, the potential for human error will be reduced. In addition, the unit is now required to be in MODE 3 within 12 hours (a shutdown condition). As such, any reduction in a margin of safety will be

TECHNICAL CHANGES - LESS RESTRICTIVE
(L1) (continued)

insignificant and offset by the benefit gained from providing sufficient time to reach MODE 4, thus avoiding potential plant transients from attempting to reach MODE 4 in the current time and the benefit of being subcritical (MODE 3) in a shorter required time.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L2)

TVA has concluded that operation of Browns Ferry Nuclear Plant in accordance with the proposed change to technical specifications does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91 (a)(1), of the three standards set forth in 10 CFR 50.92.

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The proposed change eliminates the requirement to demonstrate the Operability of the DGs within 24 hours whenever a board is determined inoperable and to verify the operability of the remaining boards. The probability of an accident is not increased by these changes because the DGs and distribution systems are not assumed to be initiators of any design basis event. Additionally, the proposed change does not involve any physical changes to plant systems, structures, or components, or the manner in which they are operated, maintained, modified, or tested. The proposed change will not increase the consequences of an accident because there is no change to the assumed reliability of the DGs or distribution systems as a result of the elimination of a DG Operability demonstration or breaker alignment verification when a board is not operable. This change acknowledges that the inoperability of a distribution subsystem is not indicative of a condition affecting the Operability of a DG or other distribution subsystems. Additionally, the periodic frequencies specified to demonstrate operability have been shown to be adequate to provide a high degree of assurance that the DG and distribution subsystems are operable. By allowing credit to be taken for normal periodic surveillance as a demonstration of DG operability, this change reduces unnecessary challenges an wear to the DGs. Therefore, this change does not involve a significant increase to the consequences of any accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The proposed change will not involve any physical changes to plant systems, structures, or components, or the manner in which they are operated, maintained, modified, tested, or inspected. Therefore it does not create the possibility of a new or different kind of accident from any accident previously evaluated.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L2) (continued)

3. The proposed amendment does not involve a significant reduction in a margin of safety.

The proposed change does not involve a significant reduction in a margin of safety because the existing routine Surveillance Frequency has been shown, based on operating experience, to be adequate for assuring the DGs and distribution subsystems remain operable. This change acknowledges that the inoperability of a distribution subsystem is not indicative of a condition affecting the operability of any DG or any other subsystem. By allowing credit to be taken for normal periodic Surveillance as a demonstration of operability, this change reduces unnecessary challenges and wear to the DGs which should increase DG availability and reliability. As a result, the change does not affect the current analysis assumptions. Therefore, this change does not involve a significant reduction in the margin of safety.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L3)

TVA has concluded that operation of Browns Ferry Nuclear Plant in accordance with the proposed change to technical specifications does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91 (a)(1), of the three standards set forth in 10 CFR 50.92.

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The proposed change provides an 8 hour time period to restore an inoperable 480 V shutdown board prior to initiating a shutdown while CTS 3.9.B.12 does not allow any time. The probability of an accident is not increased by these changes because the 480 V shutdown boards are not assumed to be initiators of any design basis event. The 8 hour time period before requiring a unit shutdown is acceptable because 1) there is a potential for decreased safety if the unit operator's attention is diverted from the evaluations and actions necessary to restore power to the affected division to the actions associated with taking the unit to shutdown within this time limits, and 2) the potential for an event in conjunctions with a single failure of a redundant component in the division with AC power. (The redundant component is verified OPERABLE in accordance with Specification 5.5.11, "Safety Function Determination Program (SFDP).") Additionally, the consequences of an event occurring during the extra 8 hours is no greater than the consequences while the unit is being shut down that same time period. Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The proposed change introduces no new mode of plant operation and it does not involve physical modification to the plant. Therefore it does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed amendment does not involve a significant reduction in a margin of safety.

   The additional time allowed to restore the inoperable 480 V shutdown board is acceptable based on the small probability of an event requiring it and the desire to minimize plant transients. The 8 hour time period before requiring a unit shutdown is acceptable because there is a potential for decreased safety if the unit operator's attention is diverted from the evaluations and actions necessary to restore power to

TECHNICAL CHANGES - LESS RESTRICTIVE
(L3) continued

the affected division to the actions associated with taking the unit to shutdown within this time limit. As a result, the potential for human error will be reduced. As such, any reduction in a margin of safety will be insignificant and offset by the benefit gained from providing sufficient time to restore the 480 V shutdown prior to initiating a shutdown, thus avoiding potential plant transients.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L4)

TVA has concluded that operation of Browns Ferry Nuclear Plant in accordance with the proposed change to technical specifications does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91 (a)(1), of the three standards set forth in 10 CFR 50.92.

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   The proposed change increases the allowed outage time for the Unit 2 Shutdown Battery Boards from 5 to 7 days consistent with the Unit 3 Technical Specifications for Shutdown Battery Board 3EB. The DC power distribution subsystems are not assumed to be initiators of any analyzed event. Their role is distributing power to components required for accident mitigation thereby limiting the consequences. As such the additional 48 hours to restore an inoperable Shutdown Battery Board DC will not increase the probability of any accident previously evaluated. The proposed ACTION continues to provide adequate assurance of OPERABLE DC power sources and therefore, does not involve any increase to the consequences of any accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The proposed change introduces no new mode of plant operation and it does not involve physical modification to the plant. Therefore it does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. The proposed amendment does not involve a significant reduction in a margin of safety.

   The shutdown board sizing calculation demonstrates that the shutdown board and battery have adequate capacity to support the operation when one shutdown board bus is out of service. The 7 day completion time is based on BFN plant design of the shutdown board DC System. This change does not involve a significant reduction in a margin of safety since the OPERABILITY of the Shutdown Battery Boards continues to be required. The safety analysis assumptions will still be maintained, thus no question of safety exists.

TECHNICAL CHANGES - LESS RESTRICTIVE
(L5)

TVA has concluded that operation of Browns Ferry Nuclear Plant in accordance with the proposed change to technical specifications does not involve a significant hazards consideration. TVA's conclusion is based on its evaluation, in accordance with 10 CFR 50.91 (a)(1), of the three standards set forth in 10 CFR 50.92.

1. The proposed amendment does not involve a significant increase in the probability or consequences of an accident previously evaluated.

   This change proposed to delete the requirement to notify NRC when a battery board is inoperable for any reason other than routine surveillance testing. The report does not affect the probability of an accident. Therefore, the proposed change will not increase the probability or consequences of any accident previously evaluated.

2. The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

   The proposed change does not involve a physical alteration of the plant (no new or different type of equipment will be installed) or changes in methods governing plant operation. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any previously evaluated.

3. The proposed amendment does not involve a significant reduction in a margin of safety.

   This change does not involve a significant reduction in a margin of safety since the proposed change does not affect system or personnel response to an accident.

BROWNS FERRY NUCLEAR PLANT - IMPROVED TECHNICAL SPECIFICATIONS
SECTION 3.8
LIST OF REVISED PAGES

BFN UNIT 1, 2, and 3 CROSS-REFERENCE MATRIX

Replaced pages 1 of 5 through 5 of 5 Revision 2 with pages 1 of 5 through 5 of 5 Revision 3

BFN UNIT 1, 2, AND 3 CROSS-REFERENCE MATRIX
ITS Section 3.8

CTS NUMBER [*]	BFN ITS NUMBER	NUREG NUMBER	DELETED	RELOCATED TO BASES	RELOCATED TO TRM	RELOCATED TO PROC	RELOCATED CONTROL	REVISED (Rev. 3)
3.9.A.1	3.8.1 Applicability	3.8.1 Applicability						
3.9.A.1.a	3.8.1 LCO b	3.8.1 LCO b						
3.9.A.1.b	NONE	NONE						
3.9.A.1.c	3.8.1 LCO a	3.8.1 LCO a		YES			ITS 5.5.10	
3.9.A.2	NONE	NONE	YES					
3.9.A.3.a	NONE	NONE		YES			ITS 5.5.10	
3.9.A.3.b	NONE	NONE		YES			ITS 5.5.10	
3.9.A.3.c	3.8.7 LCO a	3.8.9 LCO		YES			ITS 5.5.10	
3.9.A.3.d	3.8.7 LCO b	3.8.9 LCO		YES			ITS 5.5.10	
3.9.A.3.e [3.9.A.3.f]	3.8.7 LCO d	3.8.9 LCO		YES			ITS 5.5.10	
3.9.A.3.f [3.9.A.3.e]	3.3.8.1 LCO	3.3.8.1 LCO						
3.9.A.3.g [U1 and U2 only]	NONE	NONE		YES			ITS 5.5.10	
3.9.A.3.h [3.9.A.3.g]	3.8.7 LCO c	3.8.9 LCO		YES			ITS 5.5.10	
3.9.A.4	3.8.4 LCO	3.8.4 LCO		YES			ITS 5.5.10	
3.9.A.4	3.8.7 LCO e	3.8.9 LCO		YES			ITS 5.5.10	
3.9.A.4	3.8.7 LCO f	3.8.9 LCO		YES			ITS 5.5.10	
3.9.A.5.a	3.8.1 LCO b	NONE						
3.9.A.5.b	3.8.1 LCO b	NONE						
3.9.A.6	3.8:3 ACTION A	3.8.3 ACTION A						
3.9.B	3.8.1 Applicability	3.8.1 Applicability						
3.9.B.1	3.8.1 ACTION A	3.8.1 ACTION A						
3.9.B.10 [U1 and U2 only]	NONE	NONE	YES					
3.9.B.11 [3.9.B.9]	SR 3.3.8.1	SR 3.3.8.1						
3.9.B.11.a [3.9.B.9.a]	3.3.8.1 ACTION B	NONE						
3.9.B.11.b [3.9.B.9.b]	3.3.8.1 ACTION C	NONE						
3.9.B.11.c [3.9.B.9.c]	3.3.8.1 ACTION A	NONE						
3.9.B.11.d [3.9.B.9.d]	3.3.8.1 ACTION D	NONE						
3.9.B.12 [3.9.B.10]	3.8.7 ACTION B	3.8.9 ACTION B						
3.9.B.12 [3.9.B.10]	3.8.7 ACTION H	3.8.9 ACTION D						
3.9.B.13 [3.9.B.11]	3.8.7 ACTION C	NONE		YES			ITS 5.5.10	
3.9.B.14 [3.9.B.12]	3.8.7 ACTION I	NONE		YES			ITS 5.5.10	
3.9.B.15 [3.9.B.13]	3.8.1 ACTION I	3.8.1 ACTION G						
3.9.B.15 [3.9.B.13]	3.8.4 ACTION B	3.8.4 ACTION B						
3.9.B.15 [3.9.B.13]	3.8.7 ACTION H	3.8.9 ACTION D						
3.9.B.2 [3.9.B.3]	NONE	NONE		YES			ITS 5.5.10	
3.9.B.3 [3.9.B.2]	3.8.1 ACTION B	3.8.1 ACTION B						
3.9.B.4	3.8.7 ACTION A	3.8.9 ACTION A						
3.9.B.4	3.8.7 ACTION H	3.8.9 ACTION D						
3.9.B.4	3.8.7 ACTION I	3.8.9 ACTION F						
3.9.B.5 [U1 and U2 only]	3.8.1 ACTION A	3.8.1 ACTION A						

*Units 1, 2, and 3 except as indicated; Information in brackets is for Unit 3 unless noted otherwise.

CTS NUMBER [*]	BFN ITS NUMBER	NUREG NUMBER	DELETED	RELOCATED TO BASES	RELOCATED TO TRM	RELOCATED TO PROC	RELOCATED CONTROL	REVISED (Rev. 3)
3.9.B.6 [3.9.B.5]	3.8.7 ACTION D	3.8.9 LCO						
3.9.B.7 [3.9.B.6 part]	3.8.4 ACTION A	3.8.4 ACTION A						
3.9.B.7 [3.9.B.6 part]	3.8.7 ACTION E	3.8.9 ACTION C						
3.9.B.8 [3.9.B.6 part]	3.8.4 ACTION A	3.8.4 ACTION A						
3.9.B.8 [3.9.B.6 part]	3.8.7 ACTION E	3.8.9 ACTION C						
3.9.B.9 [3.9.B.7]	3.8.1 ACTION C	NONE	YES					
3.9.B.9 [3.9.B.7]	3.8.1 ACTION D	NONE	YES					
3.9.C	3.8.2 Applicability	3.8.2 Applicability						
3.9.C	3.8.8 Applicability	3.8.10 Applicability						
3.9.C.1	3.8.2 LCO b	3.8.2 LCO b						
3.9.C.1	3.8.8 LCO	3.8.10 LCO						
3.9.C.2	3.8.2 LCO a	3.8.2 LCO a						
3.9.C.3	3.8.8 LCO	3.8.10 LCO						
3.9.C.4	3.8.8 LCO	3.8.10 LCO						
3.9.D.1	3.8.2 ACTION C	NONE						X
3.9.D.1	3.6.4.3 LCO	NONE		YES			ITS 5.5.10	
3.9.D.1	3.7.3 LCO	NONE		YES			ITS 5.5.10	
3.9.D.1	3.8.1 Applicability	NONE		YES			ITS 5.5.10	
3.9.D.1	3.8.1 LCO c	NONE		YES			ITS 5.5.10	
3.9.D.1	3.8.2 LCO c	NONE		YES			ITS 5.5.10	
3.9.D.2	3.8.1 ACTION K.1	NONE						
3.9.D.2	3.8.1 ACTION K.2	NONE						
3.9.D.2	3.8.1 LCO c	NONE						
3.9.D.2	3.8.2 ACTION A	3.8.2 ACTION A						
3.9.D.2	3.8.2 ACTION B	3.8.2 ACTION B						
3.9.D.3	3.8.1 ACTION K.2	NONE						
3.9.D.3	3.8.2 ACTION A	3.8.2 ACTION A						
3.9.D.3	3.8.2 ACTION B	3.8.2 ACTION B						
4.9.A - Table 4.9.A	NONE	NONE			YES		10 CFR 50.59	
4.9.A - Table 4.9.A.4.C	3.3.8.1	NONE						
4.9.A.1.a	SR 3.8.1.1	SR 3.8.1.2	YES		YES	YES	10 CFR 50.59 and LCP	
4.9.A.1.a	SR 3.8.1.2	SR 3.8.1.3	YES		YES	YES	10 CFR 50.59 and LCP	
4.9.A.1.a	SR 3.8.1.3	SR 3.8.1.6	YES		YES	YES	10 CFR 50.59 and LCP	
4.9.A.1.a	SR 3.8.1.4	SR 3.8.1.7	YES		YES	YES	10 CFR 50.59 and LCP	
4.9.A.1.a	SR 3.8.1.7	SR 3.8.1.14	YES		YES	YES	10 CFR 50.59 and LCP	
4.9.A.1.a	SR 3.8.3.4	SR 3.8.3.4	YES		YES	YES	10 CFR 50.59 and LCP	
4.9.A.1.b	SR 3.8.1.9	SR 3.8.1.19						
4.9.A.1.b(1)	SR 3.8.1.9.a	SR 3.8.1.19.a						
4.9.A.1.b(1)	SR 3.8.1.9.b	SR 3.8.1.19.b						
4.9.A.1.b(2)	SR 3.8.1.9.c	SR 3.8.1.19.c						
4.9.A.1.b(3)	SR 3.8.1.9.b	SR 3.8.1.19.b						

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CTS NUMBER [*]	BFN ITS NUMBER	NUREG NUMBER	DELETED	RELOCATED TO BASES	RELOCATED TO TRM	RELOCATED TO PROC	RELOCATED CONTROL	REVISED (Rev. 3)
4.9.A.1.b(3)	SR 3.8.1.9.c	SR 3.8.1.19.c						
4.9.A.1.c	SR 3.8.3.1	SR 3.8.3.1				YES	LCP	
4.9.A.1.d	NONE	NONE			YES		10 CFR 50.59	
4.9.A.1.e	SR 3.8.3.3	SR 3.8.3.3						
4.9.A.2.a	SR 3.8.4.1	SR 3.8.4.1				YES	LCP	
4.9.A.2.a	SR 3.8.6.1	SR 3.8.6.1				YES	LCP	
4.9.A.2.b	SR 3.8.6.2	SR 3.8.6.2		YES		YES	ITS 5.5.10 and LCP	
4.9.A.2.c	SR 3.8.4.4	SR 3.8.4.8				YES	LCP	
4.9.A.3.a	SR 3.3.5.1.6	SR 3.3.5.1.6						
4.9.A.3.a	SR 3.8.1.6	SR 3.8.1.12						
4.9.A.3.b	SR 3.8.1.9.b	SR 3.8.1.19.b		YES		YES	ITS 5.5.10 AND LCP	
4.9.A.4.a	NONE	NONE	YES					
4.9.A.4.b	SR 3.8.1.9	SR 3.8.1.19						
4.9.A.4.c	SR 3.3.8.1.1	SR 3.3.8.1.3						
4.9.A.4.c	SR 3.3.8.1.2	NONE						
4.9.A.4.d	SR 3.8.7.1	SR 3.8.9.1				YES	LCP	
4.9.A.5.a	SR 3.5.1.12	NONE						
4.9.B.1	3.8.1 ACTION A.1	3.8.1 ACTION A.1	YES					
4.9.B.2 [4.9.B.3]	3.8.1 ACTION A.1	3.8.1 ACTION A.1	YES	YES			IST 5.5.10	
4.9.B.3 [4.9.B.2]	3.8.1 ACTION B 3.2	3.8.1 ACTION B 3.2						
4.9.B.3 [4.9.B.2]	3.8.1 ACTION B.1	3.8.1 ACTION B.1						
4.9.B.4	NONE	NONE	YES					
4.9.B.5 [U1 and U2 only]	NONE	NONE	YES					
4.9.B.6 [4.9.B.5]	NONE	NONE	YES					
4.9.C.1	NONE	NONE	YES					
4.9.D.1	SR 3.8.2.1	SR 3.8.2.1						
4.9.D.2	NONE	NONE		YES			IST 5.5.10	
NONE	3.8.1 ACTION E	3.8.1 ACTION C						
NONE	3.8.1 ACTION F	3.8.1 ACTION D						
NONE	3.8.1 ACTION G	NONE						
NONE	3.8.1 ACTION H	3.8.1 ACTION E						
NONE	3.8.1 ACTION J	3.8.1 ACTION H	YES					
NONE	3.8.1 ACTION J	3.8.1 ACTION H						
NONE	3.8.2 ACTION A	3.8.2 ACTION A						
NONE	3.8.2 ACTION B	3.8.2 ACTION B						
NONE	3.8.3 ACTION B	3.8.3 ACTION B						
NONE	3.8.3 ACTION C	3.8.3 ACTION C						
NONE	3.8.3 ACTION D	3.8.3 ACTION E						
NONE	3.8.3 ACTION E	3.8.3 ACTION F						
NONE	3.8.3 Applicability	3.8.3 Applicability						
NONE	3.8.3 LCO	3.8.3 LCO						

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CTS NUMBER [*]	BFN ITS NUMBER	NUREG NUMBER	DELETED	RELOCATED TO BASES	RELOCATED TO TRM	RELOCATED TO PROC	RELOCATED CONTROL	REVISED (Rev. 3)
NONE	3.8.4 ACTION C	3.8.4 ACTION C						
NONE	3.8.4 ACTION D	NONE						
NONE	3.8.4 Applicability	3.8.4 Applicability						
NONE	3.8.5 ACTION A	3.8.5 ACTION A						
NONE	3.8.5 Applicability	3.8.5 Applicability						
NONE	3.8.5 LCO	3.8.5 LCO						
NONE	3.8.6 - TABLE 3.8.6-1	3.8.6 - TABLE 3.8.6-1						
NONE	3.8.6 ACTION A	3.8.6 ACTION A						
NONE	3.8.6 ACTION B	3.8.6 ACTION B						
NONE	3.8.6 Applicability	3.8.6 Applicability						
NONE	3.8.6 LCO	3.8.6 LCO						
NONE	3.8.7 ACTION F	NONE						
NONE	3.8.7 ACTION G	NONE						
NONE	3.8.7 Applicability	3.8.9 Applicability						
NONE	3.8.8 ACTION A	3.8.10 ACTION A						
NONE	3.8.8 ACTION A	3.8.10 LCO						
NONE	3.8.8 Applicability	3.8.10 Applicability						
NONE	NONE	3.8.1 ACTION F						
NONE	NONE	3.8.1 LCO c						
NONE	NONE	3.8.3 ACTION D						
NONE	NONE	3.8.7 ACTION A						
NONE	NONE	3.8.7 ACTION B						
NONE	NONE	3.8.7 Applicability						
NONE	NONE	3.8.7 LCO a						
NONE	NONE	3.8.7 LCO b						
NONE	NONE	3.8.8 ACTION A						
NONE	NONE	3.8.8 Applicability						
NONE	NONE	3.8.8 LCO						
NONE	NONE	3.8.9 ACTION E						
NONE	NONE	SR 3.8.1.1						
NONE	NONE	SR 3.8.1.10						
NONE	NONE	SR 3.8.1.11						
NONE	NONE	SR 3.8.1.13						
NONE	NONE	SR 3.8.1.15						
NONE	NONE	SR 3.8.1.16						
NONE	NONE	SR 3.8.1.17						
NONE	NONE	SR 3.8.1.20						
NONE	NONE	SR 3.8.1.4						
NONE	NONE	SR 3.8.1.5						
NONE	NONE	SR 3.8.1.8						
NONE	NONE	SR 3.8.3.5						

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BFN UNIT 1, 2, AND 3 CROSS-REFERENCE MATRIX
ITS Section 3.8

CTS NUMBER [*]	BFN ITS NUMBER	NUREG NUMBER	DELETED	RELOCATED TO BASES	RELOCATED TO TRM	RELOCATED TO PROC	RELOCATED CONTROL	REVISED (Rev. 3)
NONE	NONE	SR 3.8.3.6						
NONE	NONE	SR 3.8.4.2						
NONE	NONE	SR 3.8.4.3						
NONE	NONE	SR 3.8.4.4						
NONE	NONE	SR 3.8.4.5						
NONE	NONE	SR 3.8.7.1						
NONE	NONE	SR 3.8.8.1						
NONE	NONE	TABLE 3.8.1-1						
NONE	SR 3.8.1.10	NONE						
NONE	SR 3.8.1.5	SR 3.8.1.9						
NONE	SR 3.8.1.8	SR 3.8.1.18						
NONE	SR 3.8.2.2	NONE						
NONE	SR 3.8.3.2	SR 3.8.3.2						
NONE	SR 3.8.4.2	NONE						X
NONE	SR 3.8.4.3	SR 3.8.4.7						
NONE	SR 3.8.4.5	SR 3.8.4.6						
NONE	SR 3.8.5.1	SR 3.8.5.1						
NONE	SR 3.8.6.3	SR 3.8.6.3						
NONE	SR 3.8.8.1	SR 3.8.10.1						

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