August 11, 2000

Mr. James Davis, Director
Operations Department
Nuclear Energy Institute
1776 I Street, N. W.
Suite 400
Washington, DC 20006-3708

SUBJECT: PROPOSED MODIFICATIONS TO TSTF-360, REQUIREMENTS FOR DC SOURCES

Dear Mr. Davis:

This is to inform you that we have completed our review of TSTF-360 in which the NEI Technical Specification Task Force (TSTF) proposed changes to the Standard Technical Specification (STS) requirements for DC sources. We request that you modify TSTF-360 to include the changes outlined in the markups contained in Enclosure 1. Enclosure 2 contains an explanation of the reasons for each of the changes to Specifications 3.8.4, 3.8.5, and 3.8.6. Corresponding changes were made to the Bases, along with additional clarification of the basis for the STS requirements for DC sources. For your convenience, Enclosure 3 contains a clean version of the revised STS 3.8.4, 3.8.5, and 3.8.6.

We believe that the proposed modification to TSTF-360 provides a comprehensive and defensible set of requirements for DC sources. We also believe that the proposed Bases could provide the basis for a generic safety evaluation for TSTF-360 for use in the Consolidated Line Item Improvement Process which is intended to streamline the license amendment review process to increase NRC efficiency, reduce unnecessary regulatory burden, and increase public confidence by making NRC's work processes more visible to our stakeholders.

We would be happy to meet with you at your earliest convenience to discuss our proposed changes. Please contact Robert Dennig of my staff at (301) 415-1156 or e-mail "rld@nrc.gov" if you have any questions or need further information.

Sincerely,

/RA/

David B. Matthews, Director
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Enclosures: As stated

cc: See attached list

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J. Davis August 11, 2000

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Enclosure 1
Markup of TSTF-360 STS 3.8.4, 3.8.5, and 3.8.6 and Bases

NEW INSERT: 3.8.4 ACTION Bases

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

Condition A represents one {**PWR:** train}{**BWR:** division} with one [or two] battery chargers inoperable (e.g., the voltage limit of SR 3.8.4.1 is not maintained). The ACTIONS provide a tiered response that focuses on returning the battery to the fully charged state and restoring a fully qualified charger to OPERABLE status in a reasonable time period. Required Action A.1 requires that the battery terminal voltage be restored to greater than or equal to the minimum established float voltage within 2 hours. This time provides for returning the inoperable charger to OPERABLE status or providing an alternate means of restoring battery terminal voltage to greater than or equal to the minimum established float voltage. Restoring the battery terminal voltage to greater than or equal to the minimum established float voltage provides good assurance that, within 12 hours, the battery will be restored to its fully charged condition (Required Action A.2) from any discharge that might have occurred due to the charger inoperability. A discharged battery with float voltage (the charger setpoint) across its terminals indicates that the battery is on the exponential charging current portion (the second part) of its recharge cycle. The time to return a battery to its fully charged state under this condition is simply a function of the amount of the previous discharge and the recharge characteristic of the battery. Thus there is good assurance of fully recharging the battery within 12 hours, avoiding a premature shutdown with its own attendant risk.

If established battery terminal float voltage cannot be restored to the battery terminals within 2 hours, that is an indication that the battery charger (primary or alternate) across the battery is faulty or is operating in the current limit mode. A faulty charger that is incapable of maintaining established battery terminal float voltage does not provide assurance that it can revert to and operate properly in the current limit mode that is necessary during the recovery period following a battery discharge event that the DC system is designed for.

If the charger is operating in the current limit mode after 2 hours, that is an indication that the battery has been substantially discharged and likely cannot perform its required design functions. The time to return the battery to its fully charged condition in this case is a function of the battery charger capacity, the amount of loads on the associated DC system, the amount of the previous discharge, and the recharge characteristic of the battery. The charge time can be extensive, and there is not adequate assurance that it can be recharged within 12 hours (Required Action A.2).

Required Action A.2 requires that the battery float current be verified as less than or equal to [2] amps. This indicates that, if the battery had been discharged as the result of the inoperable battery charger, it has now been fully recharged. If at the expiration of the initial 12 hour period the battery float current is not less than or equal to [2] amps this indicates there may be additional battery problems and the battery must be declared inoperable.

Required Action A.3 limits the restoration time for the inoperable battery charger to 7 days. This action is applicable if an alternate means of restoring battery terminal voltage to greater than or equal to the minimum established float voltage has been used (e.g. balance of plant non-Class 1E battery charger). The 7 day completion time reflects a reasonable time to effect restoration of the qualified battery charger to operable status.

B.1

----------REVIEWERS NOTE----------
The 2 hour Completion Times of Required Actions B.1 and C.1 are in brackets. Any licensee wishing to request a longer Completion Time will need to demonstrate that the longer Completion Time is appropriate for the plant in accordance with the guidance in Regulatory Guide (RG) 1.177, "An Approach for Plant-Specific, Risk-Informed Decision Making: Technical Specifications."

Condition B represents one {**PWR:** train}{**BWR:** division} with one [or two] batter[y][ies] inoperable. With one [or two] batter[y][ies] inoperable, the DC bus is being supplied by the OPERABLE battery charger[s]. Any event that results in a loss of the AC bus supporting the battery charger[s] will also result in loss of DC to that {train}. Recovery of the AC bus, especially if it is due to a loss of offsite power, will be hampered by the fact that many of the components necessary for the recovery (e.g. diesel generator control and field flash, AC load shed and diesel generator output circuit breakers, etc.) likely rely upon the batter[y][ies]. In addition the energization transients of any DC loads that are beyond the capability of the battery charger[s] and normally require the assistance of the batter[y][ies] will not be able to be brought online. The [2] hour limit allows sufficient time to effect restoration of an inoperable battery given that the majority of the conditions that lead to battery inoperability (e.g. loss of battery charger, battery cell voltage less than [2.07] V, etc.) are identified in Specifications 3.8.4, 3.8.5, and 3.8.6 together with additional specific completion times.

NEW INSERT: 3.8.5 ACTION Bases

.....

Condition A represents one {**PWR:** train}{**BWR:** division} with one [or two] battery chargers inoperable (e.g., the voltage limit of SR 3.8.4.1 is not maintained). The ACTIONS provide a tiered response that focuses on returning the battery to the fully charged state and restoring a fully qualified charger to OPERABLE status in a reasonable time period. Required Action A.1 requires that the battery terminal voltage be restored to greater than or equal to the minimum established float voltage within 2 hours. This time provides for returning the inoperable charger to OPERABLE status or providing an alternate means of restoring battery terminal voltage to greater than or equal to the minimum established float voltage. Restoring the battery terminal voltage to greater than or equal to the minimum established float voltage provides good assurance that, within 12 hours, the battery will be restored to its fully charged condition (Required Action A.2) from any discharge that might have occurred due to the charger inoperability. A discharged battery with float voltage (the charger setpoint) across its terminals indicates that the battery is on the exponential charging current portion (the second part) of its recharge cycle. The time to return a battery to its fully charged state under this condition is simply a function of the amount of the previous discharge and the recharge characteristic of the battery. Thus there is good assurance of fully recharging the battery within 12 hours, avoiding a premature shutdown with its own attendant risk.

If established battery terminal float voltage cannot be restored to the battery terminals within 2 hours, that is an indication that the battery charger (primary or alternate) across the battery is faulty or is operating in the current limit mode. A faulty charger that is incapable of maintaining established battery terminal float voltage does not provide assurance that it can revert to and operate properly in the current limit mode that is necessary during the recovery period following a battery discharge event that the DC system is designed for.

If the charger is operating in the current limit mode after 2 hours, that is an indication that the battery has been substantially discharged and likely cannot perform its required design functions. The time to return the battery to its fully charged condition in this case is a function of the battery charger capacity, the amount of loads on the associated DC system, the amount of the previous discharge, and the recharge characteristic of the battery. The charge time can be extensive, and there is not adequate assurance that it can be recharged within 12 hours (Required Action A.2).

Required Action A.2 requires that the battery float current be verified as less than or equal to [2] amps. This indicates that, if the battery had been discharged as the result of the inoperable battery charger, it has now been fully recharged. If at the expiration of the initial 12 hour period the battery float current is not less than or equal to [2] amps this indicates there may be additional battery problems and the battery must be declared inoperable.

Required Action A.3 limits the restoration time for the inoperable battery charger to 7 days. This action is applicable if an alternate means of restoring battery terminal voltage to greater than or equal to the minimum established float voltage has been used (e.g. balance of plant non-Class 1E battery charger). The 7 day completion time reflects a reasonable time to effect restoration of the qualified battery charger to operable status.

NEW INSERT: 3.8.6 ACTION Bases

B.1 and B.2

... Within 2 hours verification of the required battery charger OPERABILITY is made by monitoring the battery terminal voltage. If the terminal voltage is found to be less than the minimum established float voltage there are two possibilities, the battery charger is inoperable or is operating in the current limit mode. Condition A addressed charger inoperability. If the charger is operating in the current limit mode after 2 hours, that is an indication that the battery has been substantially discharged and likely cannot perform its required design functions. The time to return the battery to its fully charged condition in this case is a function of the battery charger capacity, the amount of loads on the associated DC system, the amount of the previous discharge, and the recharge characteristic of the battery. The charge time can be extensive, and there is not adequate assurance that it can be recharged within 12 hours (Required Action B.2). The battery must therefore be declared inoperable.

If the float voltage is found to be satisfactory but there are one or more battery cells with float voltage less than [2.07] V, the associated "OR" statement in Condition F is applicable and the battery must be declared inoperable immediately. If float voltage is satisfactory and there are no cells less than [2.07] V there is good assurance that, within 12 hours, the battery will be restored to its fully charged condition (Required Action B.2) from any discharge that might have occurred due to a temporary loss of the battery charger. A discharged battery with float voltage (the charger setpoint) across its terminals indicates that the battery is on the exponential charging current portion (the second part) of its recharge cycle. The time to return a battery to its fully charged state under this condition is simply a function of the amount of the previous discharge and the recharge characteristic of the battery. Thus there is good assurance of fully recharging the battery within 12 hours, avoiding a premature shutdown with its own attendant risk.

If the condition is due to one or more cells in a low voltage condition but still greater than [2.07] V and float voltage is found to be satisfactory, this is not indication of a substantially discharged battery and 12 hours is a reasonable time prior to declaring the battery inoperable.

Since Required Action B.1 only specifies “perform,” a failure of SR 3.8.4.1 acceptance criteria does not result in the Required Action not met. However, if SR 3.8.4.1 is failed, the appropriate Condition(s), depending on the cause of the failure, is entered.

C.1, C.2, C.3, and C.4

.....

With electrolyte level below the top of the plates there is a potential for dryout and plate degradation. Required Actions C.1, C.2, and C.3 address this potential. They are modified by a note that indicates they are only applicable if electrolyte level is below the top of the plates. Within 8 hours level is required to be restored to above the top of the plates. The requirements to verify that there is no leakage by visual inspection and to initiate action to equalize and test in accordance with manufacturer’s recommendation are taken from Annex D of IEEE Standard 450-1995. They are performed following the restoration of the electrolyte level to above the top of the plates. Based on the results of the manufacturer’s recommended testing the batter[y][ies] may have to be declared inoperable and the affected cell[s] replaced.

E.1

With one of more batteries in redundant trains with cell parameters not within limits there is not sufficient assurance that battery capacity has not been affected to the degree that the batteries can still perform there required function, given that redundant batteries are involved. With redundant batteries involved this potential could result in a total loss of function on multiple systems that rely upon the batteries. The longer completion times specified for cell parameters on non-redundant batteries not within limits are therefore not appropriate, and the parameters must be restored to within limits on at least one train within 2 hours.

F.1

... discovering one or more batteries in one train with one or more battery cells float voltage less than [2.07] V and float current greater than [2] amps indicates that the battery capacity may not be sufficient to perform the intended functions. The battery must therefore be declared inoperable immediately.

Enclosure 2
Summary of Proposed Changes to
STS 3.8.4, 3.8.5, and 3.8.6

Summary of Changes to TSTF-360, STS 3.8.4, 3.8.5, & 3.8.6

1. STS 3.8.4 & 3.8.5, Required Action A.1

Proposed wording change from:
"Verify associated batter[y][ies] not discharging."
to
"Restore battery terminal voltage to greater than or equal to the minimum established float voltage."

The reason for the proposed change is to ensure that the licensee does not get into the situation of having a battery incapable of performing its design duty cycle for close to 12 hours before a shutdown is begun. This would be the case for a battery with little or no margin whose battery charger failed and was replaced in 2 hours with a charger that could only supply normal dc loads but no battery charging current.

2. STS 3.8.4 & 3.8.5, Required Action A.2 and STS 3.8.6 Condition E

Proposed wording change from:
"Determine the associated batter[y][ies] state of charge is sufficient to perform the design duty cycle."
to
"Verify battery float current ≤ 2 amps."

and

Proposed deletion of second alternative in STS 3.8.6 Condition E that states:
"One or more batteries float current > [10] amps."

The reason for the proposed changes is that the state of charge determination proposed by the TSTF does not have consensus industry acceptance and licensees may not have the appropriate instrumentation or knowledge of the techniques discussed in Mr. Floyd's white paper to develop the plant-specific state of charge verification numbers. At this time, the approach seems better suited to a plant-specific application than to a generic STS application. At some point in the future, if the techniques are adopted in an IEEE Standard, they could be considered for inclusion in the STS.

3. SR 3.8.4.2

Proposed wording change from:
"Verify each battery charger supplies ≥ [400] amps at the minimum established float voltage for ≥ [8] hours."
to
"Verify each battery charger supplies ≥ [400] amps at greater than or equal to the minimum established float voltage for ≥ [8] hours."

It appears that the phrase "greater than or equal to" was inadvertently left out of SR 3.8.4.2 in TSTF-360.

4. STS 3.8.6, Reviewer's Note

Proposed wording change from:
"Licensees must also implement a program to monitor battery parameters that is based on the recommendations of IEEE Standard 450-1995, 'IEEE Recommended Practice For Maintenance, Testing, and Replacement Of Vented Lead-Acid Batteries For Stationary Applications.'"

to
*"Licensees must also implement a program **as specified in Specification 5.5.X** to monitor battery parameters that is based on the recommendations of IEEE Standard 450-1995, 'IEEE Recommended Practice For Maintenance, Testing, and Replacement Of Vented Lead-Acid Batteries For Stationary Applications.'"*

and

Addition of the following program description to Section 5.5:
"5.5.X Battery Monitoring and Maintenance Program

This program provides for battery monitoring and maintenance that is based on the recommendations of IEEE Standard 450-1995, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications." The program shall include, but not be limited to, the following:

Provisions for taking the battery manufacturer's prescribed actions when one or more battery cells' float voltage is found < [2.13] V."

The reason for the proposed change is to ensure that corrective action is taken when cell voltage is between 2.07 V and 2.13 V as recommended by IEEE 450-1995 because prolonged operation of cells below 2.13 V can reduce the life expectancy of cells.

5. STS 3.8.6, Conditions A, B, C, D and E

Proposed wording change from:
"One or more batteries . . ."
to
"One [or two] batter[y][ies on one train]

The reason for the proposed change is that certain battery parameter limits (electrolyte level, float voltage, temperature, and charging current) in the current STS that would require declaring the batteries inoperable are changed in TSTF-360 to degraded conditions with extended completion times. In addition, these extended completion times were proposed to be allowed if the degraded conditions existed on redundant batteries. The concern with the degraded conditions is that, to allow them to exist on redundant batteries, there must be a high degree of confidence that the degradation is not indicative of a condition that might catastrophically fail the batteries or otherwise render them inoperable under load during an event. The justification for allowing degraded conditions in redundant trains appears to be based on a good deal of individual judgement and experience that may not have the high degree of assurance the staff expects when degradation is allowed on important redundant safety systems. In addition, the case has not been made that there would be a large impact on plant operations if the redundant degradation is not allowed.

In order to avoid entry into LCO 3.0.3 if batteries in redundant trains had degraded cell problems, a new Condition E has been added to STS 3.8.6 that states:

CONDITION	*REQUIRED ACTION*	*COMPLETION TIME*
E. One or more batteries in redundant trains with cell parameters not within limits.	*E.1 Restore cell parameters for batteries in one train to within limits.*	*2 hours*

6. STS 3.8.6, Required Actions B.1 and B.2

Proposed change to add new Required Action B.1 and Completion Time and relabel current Required Action B.1 as Required Action B.2. New Required Action B.1 would state:

Required Action	*Completion Time*
B.1 Perform SR 3.8.4.1	*2 hours*

The reason for the proposed change is to make it perfectly clear that the intent of this required action is to ensure that the battery does indeed have float voltage across it and is not in the current limit mode when the current is > [2] amps. If current is > [2] amps and there are no other indications of battery or charger problems and the charger is in current limit, than it is likely that the battery had been substantially discharged and is on the initial portion of the recharge cycle. Because the battery is on the initial portion of the recharge cycle and the time it will remain on that portion of the cycle is a function of charger capacity, DC loads the charger is powering, and the recharge characteristic of the battery; there are many unknowns that do not give the staff strong assurance that the battery will be fully recharged in 12 hours. On the other hand, if the charger is at float voltage and out of the current limit mode, then that is an indication that, although the battery may have been discharged, it is now on the final portion of the recharge cycle. The time on this final portion is not a function of charger capacity or DC loading but only the recharge characteristic of the battery. This gives the staff strong assurance that the battery will be fully recharged in 12 hours. This provides a consistent approach with Condition A in STS 3.8.4 where the battery discharge was due to an inoperable charger.

7. STS 3.8.6, Required Action B.2 (formerly B.1) Completion Time

Proposed change from *"24 hours"* to *"12 hours"*.

The reason for the proposed change is to be consistent with STS 3.8.4, Required Action A.2, which requires verifying battery float current $\leq$ 2 amps once per 12 hours when a battery charger is inoperable.

8. STS 3.8.6, Required Actions C.2 and C.3

Proposed change to replace previous Required Action C.2:

Required Action	*Completion Time*
C.2 Perform SR 3.8.6.5 for affected cell(s).	*Once per 12 hours for 7 days*

with new Required Actions C.2 and C.3:

Required Action	*Completion Time*
C.2 Verify no evidence of leakage by visual inspection. *AND* *C.3 Initiate action to equalize and test in accordance with manufacturer's recommendation.*	*12 hours* *12 hours*

The Notes in the Condition and Required Action columns have been revised to reflect the addition of Required Action C.2. In addition, the Note in the Required Action column has been moved above Required Action C.1 and revised to include Required Action C.1, since Required Action C.1 is also only required if electrolyte level was below the top of the plates.

The reason for the proposed change is that, with electrolyte level below the top of the plates there is a potential for dryout and plate degradation. Required Actions C.2 and C.3 address this potential. The requirements to verify that there is no leakage by visual inspection and to equalize and test in accordance with manufacturer's recommendation are taken directly from Annex D of IEEE Standard 450-1995.

9. STS 3.8.6, Condition F (formerly Condition E)

Proposed additional provision to Condition F that states:

"OR

One [or two] batter[y][ies on one train] with one battery cells float voltage < [2.07] V and float current > [2] amps."

The reason for the proposed change is that, when a battery cell has a float voltage < 2.07 V and a float current > 2 amps, this indicates that the battery capacity may not be sufficient to perform the intended functions. Therefore, the preferred action is to enter STS 3.8.6, Condition F, declare the battery inoperable, and then enter STS 3.8.4, Condition B, which allows 2 hours to restore battery operability.

Enclosure 3
Clean Copy of Proposed Changes to
STS 3.8.4, 3.8.5, and 3.8.6

3.8 ELECTRICAL POWER SYSTEMS

3.8.4 DC Sources — Operating

LCO 3.8.4 The {Train A and Train B} DC electrical power subsystems shall be OPERABLE.

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

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One [or two] battery charger[s on one {train}] inoperable.	A.1 Restore battery terminal voltage to greater than or equal to the minimum established float voltage. AND A.2 Verify battery float current $\leq$ [2] amps. AND A.3 Restore battery charger[s] to OPERABLE status.	2 hours Once per 12 hours 7 days

CONDITION	REQUIRED ACTION	COMPLETION TIME
[B. One [or two] batter[y][ies on one train] inoperable.	B.1 Restore batter[y][ies] to OPERABLE status.	[2] hours]

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. One DC electrical power subsystem inoperable for reasons other than Condition A [or B].	C.1 Restore DC electrical power subsystem to OPERABLE status.	[2] hours
D. Required Action and associated Completion Time not met.	D.1 Be in MODE 3. AND D.2 Be in MODE {5}.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.4.1	Verify battery terminal voltage is greater than or equal to the minimum established float voltage.	7 days
SR 3.8.4.2	Verify each battery charger supplies $\geq$ [400] amps at greater than or equal to the minimum established float voltage for $\geq$ [8] hours. OR Verify each battery charger can recharge the battery to the fully charged state within [24] hours while supplying the largest combined demands of the various continuous steady state loads, after a battery discharge to the bounding design basis event discharge state.	[18 months]

SURVEILLANCE		FREQUENCY
SR 3.8.4.3	----------NOTES---------- 1. The modified performance discharge test in SR 3.8.6.6 may be performed in lieu of SR 3.8.4.3. 2. This Surveillance shall not be performed in MODE 1, 2, 3, or 4. However, credit may be taken for unplanned events that satisfy this SR. ---------- 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]

3.8 ELECTRICAL POWER SYSTEMS

3.8.5 DC Sources — Shutdown

LCO 3.8.5 DC electrical power subsystem shall be OPERABLE to support the DC electrical power distribution subsystem(s) required by LCO 3.8.10, "Distribution Systems - Shutdown."

APPLICABILITY: MODES {5 and 6},
During movement of irradiated fuel assemblies.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
[A. One [or two] battery charger[s on one {train}] inoperable. AND The redundant {trains} battery and charger[s] OPERABLE.	A.1 Restore battery terminal voltage to greater than or equal to the minimum established float voltage. AND A.2 Verify battery float current $\leq$ [2] amps. AND A.3 Restore battery charger[s] to OPERABLE status.	2 hours Once per 12 hours 7 days]

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. One DC electrical power subsystem inoperable [for reasons other than Condition A. OR Required Action and associated Completion Time of Condition A not met].	B.1	Declare affected required feature(s) inoperable.	Immediately
	OR		
	B.2.1	Suspend CORE ALTERATIONS.	Immediately
	AND		
	B.2.2	Suspend movement of irradiated fuel assemblies.	Immediately
	AND		
	B.2.3	{PWR: Initiate action to suspend operations involving positive reactivity additions.} {BWR: Initiate action to suspend operations with a potential for draining the reactor vessel.}	Immediately
	AND		Immediately
	B.2.4	Initiate action to restore required DC electrical power subsystems to OPERABLE status.	

SURVEILLANCE REQUIREMENTS

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

3.8 ELECTRICAL POWER SYSTEMS

3.8.6 Battery Parameters

----------REVIEWER'S NOTE----------
Licensee's must implement a program, as specified in Specification 5.5.[X],to monitor battery parameters that is based on the recommendations of IEEE Standard 450-1995, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications."

LCO 3.8.6 Battery parameters for the {Train A and Train B} batteries shall be within limits.

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 two] batter[y][ies on one train] with one or more battery cells float voltage < [2.07] V.	A.1 Perform SR 3.8.4.1. AND A.2 Perform SR 3.8.6.1. AND A.3 Restore affected cell voltage ≥ [2.07] V.	2 hours 2 hours 24 hours

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. One [or two] batter[y][ies on one train] with float current > [2] amps.	B.1 Perform SR 3.8.4.1. AND B.2 Restore battery float current to ≤ [2] amps.	2 hours 12 hours
----------NOTE---------- Required Actions C.2 and C.3 shall be completed if electrolyte level was below the top of plates. ---------- C. One [or two] batter[y][ies on one train] with one or more cells electrolyte level less than minimum established design limits.	----------NOTE---------- Required Actions C.1, C.2, and C.3 are only applicable if electrolyte level was below the top of plates. ---------- C.1 Restore electrolyte level to above top of plates. AND C.2 Verify no evidence of leakage by visual inspection. AND C.3 Initiate action to equalize and test in accordance with manufacturer's recommendation. AND C.4 Restore electrolyte level to greater than or equal to minimum established design limits.	8 hours 12 hours 12 hours 31 days

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One [or two] batter[y][ies on one train] with pilot cell electrolyte temperature less than minimum established design limits.	D.1 Restore battery pilot cell temperature to greater than or equal to minimum established design limits.	12 hours
E. One or more batteries in redundant trains with cell parameters not within limits.	E.1 Restore cell parameters for batteries in one train to within limits.	2 hours
F. Required Actions and associated Completion Time of Condition A, B, C, D, or E not met. OR One [or two] battery[y][ies on one train] with one or more battery cells float voltage < [2.07] V and float current > [2] amps.	F.1 Declare associated battery inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.6.1	----------NOTE---------- Not required to be met when battery terminal voltage is less than the minimum established float voltage of SR 3.8.4.1. ---------- Verify each battery float current is ≤ [2] amps.	7 days
SR 3.8.6.2	Verify each battery pilot cell voltage is ≥ [2.07] V.	31 days
SR 3.8.6.3	Verify each battery connected cell electrolyte level is greater than or equal to minimum established design limits.	31 days
SR 3.8.6.4	Verify each battery pilot cell temperature is greater than or equal to minimum established design limits.	31 days
SR 3.8.6.5	Verify each battery connected cell voltage is ≥ [2.07] V.	92 days

SURVEILLANCE		FREQUENCY
SR 3.8.6.6	----------NOTE---------- This Surveillance shall not be performed in MODE 1, 2, {3, or 4}. However, credit may be taken for unplanned events that satisfy this SR. ---------- Verify battery capacity is $\geq$ [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 the expected life with capacity < 100% of manufacturer's rating AND 24 months when battery has reached [85]% of the expected life with capacity $\geq$ 100% of manufacturer's rating

Insert for Section 5.5

5.5.X Battery Monitoring and Maintenance Program

This program provides for battery monitoring and maintenance that is based on the recommendations of IEEE Standard 450-1995, "IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications." The program shall include, but not be limited to, the following:

Provisions for taking the battery manufacturer's prescribed actions when one or more battery cells' float voltage is found < [2.13] V.