

Industry/TSTF Standard Technical Specification Change Traveler

Revise visual surveillance of batteries to specify inspection is for performance degradation

Priority/Classification 3) Improve Specifications

NUREGs Affected: 1430 1431 1432 1433 1434

Description:

Clarify the requirements of SR 3.8.4.3, battery visual inspection, to be consistent with the intent and the present wording of the Bases. Inspection is for items which could potentially degrade battery performance.

Justification:

The Bases of SR 3.8.4.3 in NUREG-1433 states that this SR "provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance". As a result, it is interpreted that physical damage or abnormal deterioration has to be of a type that could degrade battery performance before the SR would fail to be met. The presence of physical damage or deterioration does not necessarily represent a failure of SR 3.8.4.3, provided an evaluation determines that the physical damage or deterioration does not affect the OPERABILITY of the battery (its ability perform its design function). Therefore, for consistency with the Bases for SR 3.8.4.3 in NUREG-1433, SR 3.8.4.3 is proposed to be revised to add "that could degrade battery performance." The Bases for SR 3.8.4.3 are also proposed to be revised to clarify measures to be taken in the event physical damage or deterioration are discovered.

Revision History

OG Revision 0

Revision Status: Active

Next Action:

Revision Proposed by: Peach Bottom

Revision Description:
Original Issue

Owners Group Review Information

Date Originated by OG: 14-Jul-95

Owners Group Comments

Hatch Comments - I understand the intent but either interpret the word abnormal as "that could potentially degrade the battery performance" or just say abnormal physical damage or deterioration. Don't clutter the SRs with extra stuff that belongs in the Bases.

Owners Group Resolution: Approved Date: 14-Jul-95

TSTF Review Information

TSTF Received Date: 02-Aug-95 Date Distributed for Review 02-Aug-95

OG Review Completed: BWOG WOG CEOG BWROG

TSTF Comments:

WOG Comments - Agree, but delete the phrase "could potentially" from the inserted words. Should this SR be deleted from the TS? Same rationale to delete as the DG fuel oil spec. Not a direct indication of the inability to perform its required function.

CEOG Comments - Agree, also make wording change recommended by WOG.

TSTF Resolution: Approved Date: 27-Nov-95

4/2/98

NRC Review Information

NRC Received Date: 03-Jan-96

NRC Reviewer: E. Tomlinson

NRC Comments:

1/22/96 - reviewer accepted change.

1/22/96 - pkg to C. Grimes to review.

6/11/96 - C. Grimes comment: The TSB reviewer recommends approval. C. Grimes wants Tech Br. approval.

9/18/96 - Approved

Final Resolution: NRC Approves

Final Resolution Date: 18-Sep-96

Incorporation Into the NUREGs

File to BBS/LAN Date:

TSTF Informed Date:

TSTF Approved Date:

NUREG Rev Incorporated:

Affected Technical Specifications

SR 3.8.4.3 DC Sources - Operating

SR 3.8.4.3 Bases DC Sources - Operating

4/2/98

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
SR 3.8.4.2 Verify no visible corrosion at battery terminals and connectors. <u>OR</u> Verify battery connection resistance [is \leq [1E-5 ohm] for inter-cell connections, \leq [1E-5 ohm] for inter-rack connections, \leq [1E-5 ohm] for inter-tier connections, and \leq [1E-5 ohm] for terminal connections].	92 days
SR 3.8.4.3 Verify battery cells, cell plates, and racks show no visual indication of physical damage or abnormal deterioration.	[12] months
SR 3.8.4.4 Remove visible terminal corrosion and verify battery cell to cell and terminal connections are [clean and tight, and are] coated with anti-corrosion material.	[12] months
SR 3.8.4.5 Verify battery connection resistance [is \leq [1E-5 ohm] for inter-cell connections, \leq [1E-5 ohm] for inter-rack connections, \leq [1E-5 ohm] for inter-tier connections, and \leq [1E-5 ohm] for terminal connections].	[12] months

(continued)

that could degrade battery performance

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.8.4.3

Visual inspection of the battery cells, cell plates, and battery racks provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance. ↑

Insert
B 3.8.4.3

The 12 month Frequency for this SR is consistent with IEEE-450 (Ref. 9), which recommends detailed visual inspection of cell condition and rack integrity on a yearly basis.

SR 3.8.4.4 and SR 3.8.4.5

Visual inspection and resistance measurements of intercell, interrack, intertier, and terminal connections provide an indication of physical damage or abnormal deterioration that could indicate degraded battery condition. The anticorrosion material is used to help ensure good electrical connections and to reduce terminal deterioration. The visual inspection for corrosion is not intended to require removal of and inspection under each terminal connection. The removal of visible corrosion is a preventive maintenance SR. The presence of visible corrosion does not necessarily represent a failure of this SR provided visible corrosion is removed during performance of SR 3.8.4.4.

Reviewer's Note: The requirement to verify that terminal connections are clean and tight applies only to nickel cadmium batteries as per IEEE Standard P1106, "IEEE Recommended Practice for Installation, Maintenance, Testing and Replacement of Vented Nickel - Cadmium Batteries for Stationary Applications." This requirement may be removed for lead acid batteries.

The connection resistance limits for SR 3.8.4.5 shall be no more than 20% above the resistance as measured during installation, or not above the ceiling value established by the manufacturer.

The Surveillance Frequencies of [12] months is consistent with IEEE-450 (Ref. 9), which recommends cell to cell and terminal connection resistance measurement on a yearly basis.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE	FREQUENCY
SR 3.8.4.2 Verify no visible corrosion at battery terminals and connectors. <u>OR</u> Verify battery connection resistance [is \leq [1E-5 ohm] for inter-cell connections, \leq [1E-5 ohm] for inter-rack connections, \leq [1E-5 ohm] for inter-tier connections, and \leq [1E-5 ohm] for terminal connections].	92 days
SR 3.8.4.3 Verify battery cells, cell plates, and racks show no visual indication of physical damage or abnormal deterioration.	[12] months
SR 3.8.4.4 Remove visible terminal corrosion, verify battery cell to cell and terminal connections are clean and tight, and are coated with anti-corrosion material.	[12] months
SR 3.8.4.5 Verify battery connection resistance [is \leq [1E-5 ohm] for inter-cell connections, \leq [1E-5 ohm] for inter-rack connections, \leq [1E-5 ohm] for inter-tier connections, and \leq [1E-5 ohm] for terminal connections].	[12] months

(continued)

that could degrade battery performance

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.8.4.3

Visual inspection of the battery cells, cell plates, and battery racks provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance. ↑

Insert
B 3.8.4.3

The 12 month Frequency for this SR is consistent with IEEE-450 (Ref. 9), which recommends detailed visual inspection of cell condition and rack integrity on a yearly basis.

SR 3.8.4.4 and SR 3.8.4.5

Visual inspection and resistance measurements of intercell, interrack, intertier, and terminal connections provide an indication of physical damage or abnormal deterioration that could indicate degraded battery condition. The anticorrosion material is used to help ensure good electrical connections and to reduce terminal deterioration. The visual inspection for corrosion is not intended to require removal of and inspection under each terminal connection. The removal of visible corrosion is a preventive maintenance SR. The presence of visible corrosion does not necessarily represent a failure of this SR provided visible corrosion is removed during performance of SR 3.8.4.4.

Reviewer's Note: The requirement to verify that terminal connections are clean and tight applies only to nickel cadmium batteries as per IEEE Standard P1106, "IEEE Recommended Practice for Installation, Maintenance, Testing and Replacement of Vented Nickel - Cadmium Batteries for Stationary Applications." This requirement may be removed for lead acid batteries.

The connection resistance limits for SR 3.8.4.5 shall be no more than 20% above the resistance as measured during installation, or not above the ceiling value established by the manufacturer.

The Surveillance Frequencies of 12 months is consistent with IEEE-450 (Ref. 9), which recommends cell to cell and terminal connection resistance measurement on a yearly basis.

(continued)

Insert B SR 3.8.4.3

The presence of physical damage or deterioration does not necessarily represent a failure of this SR, provided an evaluation determines that the physical damage or deterioration does not affect the OPERABILITY of the battery (its ability to perform its design function).

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.8.4.2	Verify no visible corrosion at battery terminals and connectors. <u>OR</u> Verify battery connection resistance [is \leq [1E-5 ohm] for inter-cell connections, \leq [1E-5 ohm] for inter-rack connections, \leq [1E-5 ohm] for inter-tier connections, and \leq [1E-5 ohm] for terminal connections].	92 days
SR 3.8.4.3	Verify battery cells, cell plates, and racks show no visual indication of physical damage or abnormal deterioration.	[12] months
SR 3.8.4.4	Remove visible terminal corrosion and verify battery cell to cell and terminal connections are [clean and tight, and are] coated with anti-corrosion material.	[12] months
SR 3.8.4.5	Verify battery connection resistance [is \leq [1E-5 ohm] for inter-cell connections, \leq [1E-5 ohm] for inter-rack connections, \leq [1E-5 ohm] for inter-tier connections, and \leq [1E-5 ohm] for terminal connections].	[12] months

(continued)

that could degrade battery performance

BASES

SURVEILLANCE
REQUIREMENTS
(continued)

SR 3.8.4.3

Visual inspection of the battery cells, cell plates, and battery racks provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance.↑

Insert
B 3.8.4.3

The 12 month Frequency for this SR is consistent with IEEE-450 (Ref. 9), which recommends detailed visual inspection of cell condition and rack integrity on a yearly basis.

SR 3.8.4.4 and SR 3.8.4.5

Visual inspection and resistance measurements of intercell, interrack, intertier, and terminal connections provide an indication of physical damage or abnormal deterioration that could indicate degraded battery condition. The anticorrosion material is used to help ensure good electrical connections and to reduce terminal deterioration. The visual inspection for corrosion is not intended to require removal of and inspection under each terminal connection. The removal of visible corrosion is a preventive maintenance SR. The presence of visible corrosion does not necessarily represent a failure of this SR provided visible corrosion is removed during performance of SR 3.8.4.4.

Reviewer's Note: The requirement to verify that terminal connections are clean and tight applies only to nickel cadmium batteries as per IEEE Standard P1106, "IEEE Recommended Practice for Installation, Maintenance, Testing and Replacement of Vented Nickel - Cadmium Batteries for Stationary Applications." This requirement may be removed for lead acid batteries.

The connection resistance limits for SR 3.8.4.5 shall be no more than 20% above the resistance as measured during installation, or not above the ceiling value established by the manufacturer.

The Surveillance Frequencies of 12 months is consistent with IEEE-450 (Ref. 9), which recommends cell to cell and terminal connection resistance measurement on a yearly basis.

(continued)

Insert B SR 3.8.4.3

The presence of physical damage or deterioration does not necessarily represent a failure of this SR, provided an evaluation determines that the physical damage or deterioration does not affect the OPERABILITY of the battery (its ability to perform its design function).

Insert B SR 3.8.4.3

The presence of physical damage or deterioration does not necessarily represent a failure of this SR, provided an evaluation determines that the physical damage or deterioration does not affect the OPERABILITY of the battery (its ability to perform its design function).

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.8.4.1 Verify battery terminal voltage is \geq [120] V on float charge.	7 days
SR 3.8.4.2 Verify no visible corrosion at battery terminals and connectors. <u>OR</u> Verify battery connection resistance [is \leq [1.5E-4 ohm] for inter-cell connections, \leq [1.5E-4 ohm] for inter-rack connections, \leq [1.5E-4 ohm] for inter-tier connections, and \leq [1.5E-4 ohm] for terminal connections].	92 days
SR 3.8.4.3 Verify battery cells, cell plates, and racks show no visual indication of physical damage or abnormal deterioration.	[12] months
SR 3.8.4.4 Remove visible corrosion and verify battery cell to cell and terminal connections are [clean and tight, and] coated with anti-corrosion material.	[12] months
SR 3.8.4.5 Verify battery connection resistance [is \leq [1.5E-4 ohm] for inter-cell connections, \leq [1.5E-4 ohm] for inter-rack connections, \leq [1.5E-4 ohm] for inter-tier connections, and \leq [1.5E-4 ohm] for terminal connections].	[12] months

(continued)

that could degrade battery performance

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.8.4.2 (continued)

acceptable based on operating experience related to detecting corrosion trends.

SR 3.8.4.3

Visual inspection of the battery cells, cell plates, and battery racks provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance. ↑

Insert
B 3.8.4.3

The 12 month Frequency for this SR is consistent with IEEE-450 (Ref. 7), which recommends detailed visual inspection of cell condition and rack integrity on a yearly basis.

SR 3.8.4.4 and SR 3.8.4.5

Visual inspection and resistance measurements of inter-cell, inter-rack, inter-tier, and terminal connections provides an indication of physical damage or abnormal deterioration that could indicate degraded battery condition. The anti-corrosion material is used to help ensure good electrical connections and to reduce terminal deterioration. The visual inspection for corrosion is not intended to require removal of and inspection under each terminal connection.

The removal of visible corrosion is a preventive maintenance SR. The presence of visible corrosion does not necessarily represent a failure of this SR, provided visible corrosion is removed during performance of this Surveillance.

Reviewer's Note: The requirement to verify that terminal connections are clean and tight applies only to nickel cadmium batteries as per IEEE Standard P1106, "IEEE Recommended Practice for Installation, Maintenance, Testing and Replacement of Vented Nickel - Cadmium Batteries for Stationary Applications." This requirement may be removed for lead acid batteries.

(continued)

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.8.4.1 Verify battery terminal voltage is \geq [129] V on float charge.	7 days
SR 3.8.4.2 Verify no visible corrosion at battery terminals and connectors. <u>OR</u> Verify battery connection resistance [is \leq [1.5 E-4 ohm] for inter-cell connections, \leq [1.5 E-4 ohm] for inter-rack connections, \leq [1.5 E-4 ohm] for inter-tier connections, and \leq [1.5 E-4 ohm] for terminal connections].	92 days
SR 3.8.4.3 Verify battery cells, cell plates, and racks show no visual indication of physical damage or abnormal deterioration.	[12] months
SR 3.8.4.4 Remove visible corrosion and verify battery cell to cell and terminal connections are [clean and tight, and] coated with anti-corrosion material.	[12] months
SR 3.8.4.5 Verify battery connection resistance [is \leq [1.5 E-4 ohm] for inter-cell connections, \leq [1.5 E-4 ohm] for inter-rack connections, \leq [1.5 E-4 ohm] for inter-tier connections, and \leq [1.5 E-4 ohm] for terminal connections].	[12] months

(continued)

that could degrade battery performance

BASES

SURVEILLANCE
REQUIREMENTS
(continued)SR 3.8.4.3

Visual inspection of the battery cells, cell plates, and battery racks provides an indication of physical damage or abnormal deterioration that could potentially degrade battery performance. ↑

Insert
B 3.8.4.3

The 12 month Frequency of this SR is consistent with IEEE-450 (Ref. 8), which recommends detailed visual inspection of cell condition and inspection of cell to cell and terminal connection resistance on a yearly basis.

SR 3.8.4.4 and SR 3.8.4.5

Visual inspection and resistance measurements of inter-cell, inter-rack, inter-tier, and terminal connections provides an indication of physical damage or abnormal deterioration that could indicate degraded battery condition. The anti-corrosion material is used to ensure good electrical connections and to reduce terminal deterioration. The visual inspection for corrosion is not intended to require removal of and inspection under each terminal connection.

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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.

The 12 month Frequency of these SRs is consistent with IEEE-450 (Ref. 8), which recommends detailed visual inspection of cell condition and inspection of cell to cell and terminal connection resistance on a yearly basis.

(continued)

Insert B SR 3.8.4.3

The presence of physical damage or deterioration does not necessarily represent a failure of this SR, provided an evaluation determines that the physical damage or deterioration does not affect the OPERABILITY of the battery (its ability to perform its design function).