August 10, 2012

L-2012-048
10 CFR 50.90

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

St. Lucie Units 1 and 2
Docket Nos 50-335 and 50-389

RE: License Amendment Request
Station Battery Surveillance Requirement Changes

Pursuant to 10 CFR 50.90, Florida Power & Light (FPL) hereby requests to amend Renewed Facility Operating License DPR-67 for St. Lucie Unit 1 and NPF-16 for St. Lucie Unit 2. These proposed license amendment requests (LARs) revise the requirements of the St. Lucie Units 1 and 2 Technical Specifications (TS) related to station DC battery surveillance requirements for terminal connection resistances.

Please process this as a normal LAR, and once approved, the amendment shall be implemented within 90 days. There are no regulatory commitments being made in this submittal.

These changes have been reviewed by the St. Lucie Plant Onsite Review Group. A copy of this submittal is also being sent to our appointed state official pursuant to 10 CFR 50.91.

If you have any questions or require additional information, please contact Eric Katzman, Licensing Manager, at (772) 467-7734.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on August 10 . 2012

Joseph Jensen
Site Vice President
St. Lucie Plant

Enclosure

cc: Ms. Cynthia Becker, Florida Department of Health

A001
NRR

Enclosure

Evaluation of the Proposed Change

Subject: Station Battery Surveillance Requirement Changes

ATTACHMENTS:

1. TS (and/or Operating License) Page Markups

2. Retyped TS (and/or Operating License) Pages

1 SUMMARY DESCRIPTION

Pursuant to 10 CFR 50.90, Florida Power and Light Company (FPL) requests to amend Renewed Facility Operating License DPR-67 for St. Lucie Unit 1 and NPF-16 for St. Lucie Unit 2. These proposed license amendment requests (LARs) revise the requirements of the St. Lucie Units 1 and 2 Technical Specifications (TSs) related to station DC battery surveillance requirements for terminal connection resistances.

The existing Unit 1 TS Surveillances 4.8.2.3.2.b.2 and 4.8.2.3.2.c.3 and Unit 2 TS Surveillances 4.8.2.1.b.2 and 4.8.2.1.c.3 require that the resistance of each cell-to-cell terminal connection of the St. Lucie Unit 1 and 2 safety related batteries must be less than or equal to 150 micro-ohms ($\mu\Omega$). An NRC Component Design Basis Inspection (CDBI) observation at St. Lucie (Reference 13) determined that the TS 150 $\mu\Omega$ inter-cell connection resistance criteria is the allowable simultaneous limiting value for all 60 cells in a nuclear safety-related battery. The total battery internal voltage drop, which would result from the assumption that all 60 of the battery cells had inter-cell connection resistances of 150 $\mu\Omega$, would lead to reduced margins for battery voltage performance; this would not leave acceptable margin to cope with other more credible battery cell degradations.

Therefore, the St. Lucie TSs are being revised in a manner similar to those LARs recently accepted by the NRC for Catawba (Reference 8), McGuire (Reference 9), and Wolf Creek (Reference 10). In addition, this LAR adds battery resistance values (for Units 1 and 2 respectively) to clarify the change requirements to the Units 1 and 2 TSs. The resistance values are obtained from the battery monitoring and maintenance programs (implemented via preventive maintenance (PM) procedures) at St. Lucie, which are based on the IEEE 450 methodology to maintain the battery cells and connections.

2 DETAILED DESCRIPTION

Unit 1 (Unit 2) TS SR 4.8.2.3.2.b.2 (4.8.2.3.1.b.2) is being revised as follows:

> There is no visible corrosion at either terminals or connectors, ~~or the connection resistance of these items is less than 150 x 10-6 ohms,~~ and

Unit 1 (Unit 2) TS SR 4.8.2.3.2.c.3 (4.8.2.3.1.c.3) is being revised as follows:

> ~~The resistance of each b~~Battery inter-cell and inter-tier ~~cell-to-cell and terminal~~ connection resistance values are ~~is~~ less than or equal to the values below: ~~150 x 10-6 ohms,~~

Battery Connection	Connection Resistance Measurement	Resistance Value
Inter-cell	Maximum Average Inter-cell Resistance	50 μΩ
	Maximum Single Inter-cell Resistance	150 μΩ
Inter-tier	Maximum Single Inter-tier Resistance	200 μΩ

and,

3 TECHNICAL EVALUATION

The 125V DC distribution systems for St. Lucie Units 1 and 2 consist of two systems. One system is a Class 1E system and is comprised of 125V DC buses 1A, 1B, and swing bus 1AB. These buses supply safety-related loads and certain not-nuclear safety loads. The remaining buses in the system, 1C and 1D, are non-Class 1E and supply not nuclear safety related loads. The capability exists to tie these two systems together, however, during normal operation the tie breakers are key-locked open and administratively controlled.

The 125V DC distribution system consists of two redundant and independent supply trains, each with its own AC to DC power supplies (i.e., battery chargers) and a battery for backup. Safety trains 1A and 1B have two battery chargers each. These chargers supply both the normal power requirements and any recharging requirements of the batteries. Both trains have a fully charged battery, consisting of 60 cells, in parallel with the chargers to supply emergency power upon loss of offsite power. The swing bus, 1AB, has a battery charger but no battery. The swing bus battery charger ("AB") is normally kept warmed up and in standby, available for quick use if needed. The swing bus is normally tied to one of the safety trains where its normal power supply is the same as the train it's aligned (i.e., battery charger(s) with battery backup). The swing bus is normally connected to the "B" train on Unit 1 ("A" train on Unit 2). The 4160V AC and 480V AC AB buses must be aligned to the same train as the 125V DC AB bus.

The existing Unit 1 and 2 TS Surveillances provide for a 150 μΩ upper limit for the TS battery inter-cell connection resistance. This value is based on the industry Combustion Engineering Standard Technical Specifications (CE-STS), which suggested the 150 μΩ value as an upper limit. The original CE-STS is also known as NRC NUREG-0212. The original intent of the 150 μΩ upper limit appeared to be to identify degradations for a single outlier cell or a small number of anomalous cells, which had degrading connection resistances. This larger 150 μΩ value would allow for the identification and planned correction of a small number of cells, out of the 60-cell strings used for each battery at St. Lucie, without requiring the Unit be shutdown prematurely for conditions which ultimately would not have affected the overall battery operability.

However, based an NRC Component Design Basis Inspection (CDBI) observation at St. Lucie, the TS 150 μΩ inter-cell connection resistance criteria is considered the allowable limiting value for which all 60 cells in a nuclear safety-related battery could be allowed to degrade prior to

declaring the battery inoperable. The total battery internal voltage drop, which would result from the improbable condition that all 60 of the battery cells had inter-cell connection resistances of 150 μΩ, would lead to reduced margins for battery voltage performance and not leave acceptable margin to cope with other more credible battery cell degradations.

FPL is proposing TS surveillance requirements on the DC battery inter-cell and inter-tier connection resistance values to ensure that the batteries are capable of performing all required functions. The resistance values are obtained from the battery monitoring and maintenance programs (implemented via preventive maintenance (PM) procedures) at St. Lucie, which is based on the IEEE 450 methodology to maintain the battery cells and connections.

The safety related batteries at St. Lucie are manufactured by C & D Technologies Inc. (LCY-39 type). The battery performance curves for these batteries, as provided by the manufacturer, included an inherent inter-cell resistance value for the batteries' qualifications, which bounds the values of the cells installed at St. Lucie by a large margin (Reference 14).

St. Lucie controls the allowable variance in battery inter-cell connection resistance via plant procedures. Each battery inter-cell connection resistance is measured upon installation to establish the baseline value (typically in the mid 20 μΩ range on average). Any inter-cell connection resistances that degrade to more than 20% above the baseline measurement of each cell require that the condition be evaluated and corrected. This procedure control is consistent with the current industry CE-STS guidance provided in Revision 3 of NRC NUREG-1432, which relies on the methodology of IEEE standard 450-1995.

In addition, St. Lucie has obtained the actual upper design limit (average for all 60 cells for each Unit, based on the existing battery current load profile) from the battery manufacturer (C & D Technologies Inc.), which provides a very large margin above the +20% baseline-value IEEE criteria for inter-cell connection resistance. These upper limits for both Units 1 and 2 are obtained as follows:

Per vendor input, the resistance of the connection group for LCY-39 battery cell (PK02627) installed in St. Lucie Units 1 and 2 is 11.042 μΩ. This battery is rated to supply 3048 amps for 1 minute to 1.75 volts per cell (corresponding to 105V DC for a 60 cell battery). Therefore, with a resistance of 11.042 μΩ, the voltage drop across the connectors is obtained as

$$V_{drop} = 3048 amps \times 11.042 \mu\Omega = 33.66 mV$$

The maximum discharge current at St. Lucie Unit 1 is 521 Amps while the maximum discharge current at St. Lucie Unit 2 is 631 Amps (References 11 and 12, respectively).

Thus, in order to keep the voltage drop due to the connectors below the maximum allowed of 33.66mV, the maximum resistance for each Unit is obtained as follows:

$$R_{max}(Unit-1) = 33.66mV/521amps = 64.607\mu\Omega \text{ , and}$$
$$R_{max}(Unit-2) = 33.66mV/631amps = 53.344\mu\Omega$$

Thus, the upper limit for average resistance of the connectors for Unit 1 batteries 1A and 1B is 64.607 μΩ while the upper limit for average resistance connectors for Unit 2 batteries 2A and 2B is 53.344 μΩ.

To ensure full compliance with the manufacturer recommendations and the applicable NRC guidelines and IEEE standards, as delineated from Revision 3 of NRC NUREG-1432, the St. Lucie Units 1 and 2 battery maintenance procedures perform measurements of the battery inter-cell resistances for each battery on both a quarterly and an 18-month basis.

A review of the history of the inter-cell connection resistances for both Units 1 and 2 (as seen in the table below) since 2003 indicates that the maximum average resistance obtained from measurement during the 18 month preventive maintenance for Unit 1 is 20.89 μΩ; this corresponds to a 67.67% available margin to the above calculated upper limit for average resistance of the battery connectors (and a corresponding 58.23% margin to the proposed TS limit of 50 μΩ). For Unit 2, the maximum average inter-cell resistance is 23.49 μΩ; this corresponds to a 55.97% available margin to the above calculated upper limit for average resistance of the battery connectors (and a corresponding 53.03% margin to the proposed TS limit of 50 μΩ).

Also, from measurements over the same period, the maximum single inter-cell resistance is 28.4 μΩ which corresponds to a margin of 81.067% on the existing TS limit of 150 μΩ while the maximum single inter-tier resistance is 95.5 μΩ with a margin of 52.25% on the proposed TS limit of 200 μΩ.

From the foregoing, it is conservative to revise the TS limits as follows:

Battery Connection	Connection Resistance Measurement	Resistance Value
Inter-cell	Maximum Average Inter-cell Resistance	50 μΩ
	Maximum Single Inter-cell Resistance	150 μΩ
Inter-tier	Maximum Single Inter-tier Resistance	200 μΩ

The above proposed maximum inter-cell and inter-tier resistance limits are well within the capability of the safety related batteries installed at St. Lucie Units 1 and 2 and will be constantly monitored via the various battery maintenance programs already implemented in St. Lucie Plant. The proposed TS amendments are provided in the marked-up section of the Technical Specification pages.

The detailed resistance measurements taken during the 18-month battery preventive maintenance program are as presented in below.

Battery Resistance Values measured During 18 Month Preventive Maintenance Programs								
Year/Outage	Unit / Train	Work Order Number	MAX (μΩ)	Max Allowed (μΩ)	Margin (%)	Average (μΩ)	Max Allowed Average (μΩ)	Margin Average (%)
2005 / SL2-15	U2 / A Train	33014482	22.0	150	85.33	20.10	50	59.81
2003 / SL2-14	U2 / B Train	32015327	22.0	150	85.33	20.11	50	59.79
2003 / SL2-14	U2 / B Train	33014469	19.0	150	87.33	15.56	50	68.88
2006 / SL2-16	U2 / B Train	35003011	20.0	150	86.67	15.36	50	69.29
2004 / SL1-19	U1 / A Train	31014985	27.0	150	82.00	20.89	50	58.23
2005 / SL1-20	U1 / A Train	34013981	22.0	150	85.33	19.10	50	61.80
2008 / SL1-22	U1 / A Train	37012515	19.5	150	87.00	17.32	50	65.36
2004 / SL1-19	U1 / B Train	31014986	19.5	150	87.00	17.32	50	65.36
2005 / SL1-20	U1 / B Train	34013455	18.0	150	88.00	14.37	50	71.26
2008 / SL1-22	U1 / B Train	37011878	18.2	150	87.87	15.99	50	68.02
2009 / SL2-18	U2 / A Train	37026838	20.0	150	86.67	17.05	50	65.90
2009 / SL2-18	U2 / B Train	37027585	28.4	150	81.07	23.49	50	53.03
2010 / SL1-23	U1 / A Train	39002693	15.6	150	89.60	13.42	50	73.16
2010 / SL1-23	U1 / B Train	38026734	14.7	150	90.20	11.80	50	76.41
2009 / SL2-19	U2 / A Train	39011031	22.5	150	85.00	12.80	50	74.39
2009 / SL2-19	U2 / B Train	39011032	22.0	150	85.33	18.04	50	63.92

4 REGULATORY EVALUATION

4.1 Applicable Regulatory Requirements/Criteria

The regulatory requirements and criteria applicable to the 125V dc electric system safety related batteries are as follows:

Common to St. Lucie Units 1 and 2

General Design Criterion 17

The two systems which supply the 125V dc power to redundant Class 1E load groups from the two separate 125V dc buses are electrically independent and physically separated from each other. Each of the two systems has adequate capacity to supply the 125V dc power for the safety related loads required for safe shutdown of the plant.

General Design Criterion 18

The Class 1E dc system is designed to permit appropriate periodic inspection and testing.

St. Lucie Unit 1

AEC Safety Guide 6, "Independence between Redundant Standby (On-Site) Power Sources and between their Distribution Systems"

Each DC load group should be energized by a battery-battery charger combination, which should have no automatic connection to a redundant load group.

St. Lucie Unit 2

Regulatory Guide Implementation Regulatory Guide 1.6, "Independence Between Redundant Standby (Onsite) Power Sources and Between Their Distribution Systems"

The dc onsite power system is in compliance with the requirements of Regulatory Guide 1.6 because the Class 1E dc system is designed with sufficient independence to perform its safety functions assuming a single failure.

Regulatory Guide, 1.32, "Criteria for Safety-Related Electric Power Systems For Nuclear Power Plants."

The dc Power System meets IEEE 308-1971. The Class 1E dc system provides dc electric power to the Class 1E dc loads and for control and switching of the Class 1E systems. Physical separation, electrical isolation, and redundancy are provided to prevent the occurrence of common failure modes.

Regulatory Guide 1.128, "Installation Design and Installation of Large Lead Storage Batteries for Nuclear Power Plants"

Although Regulatory Guide 1.128 (R0) is not applicable to this operating license the intent of the Regulatory Guide is met because the installation procedures for the Class 1E batteries meet in general the requirements of IEEE 484-1975.

Regulatory Guide 1.129, "Maintenance, Testing, and Replacement of Large Lead Storage Batteries for Nuclear Power Plants"

As indicated in the implementation section of Regulatory Guide 1.129 (R0), the positions of this guide are to be used to evaluate submittals for construction permits (CP) applications docketed after December 1, 1977; the St. Lucie Unit 2 CP was docketed in September, 1973. Although Regulatory Guide 1.129 (R0) is not applicable to this operating license, this Regulatory Guide used to be included in Section 14.0 of the original FSAR.

The proposed changes to the TSs do not require any change to the physical plant, operating procedures, or existing surveillance practices. As such, the regulatory criteria above are not affected by these TS surveillance changes.

4.2 No Significant Hazards Consideration Determination

FPL is requesting adoption of a change to the St. Lucie Units 1 and 2 TSs, related to battery connection resistance values. The standards used to arrive at a determination that a request for amendment involves a no significant hazards consideration are included in the Commission's regulation, 10 CFR 50.92, which states that no significant hazards considerations are involved if the operation of the facility in accordance with the amendment would not:

(1) Involve a significant increase in the probability or consequences of an accident previously evaluated; or
(2) Create the possibility of a new or different kind of accident from any accident previously evaluated; nor
(3) Involve a significant reduction in a margin of safety.

As required by 10 CFR 50.91(a), an analysis of the issue of no significant hazards consideration is presented below:

(1) Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

No. The proposed change will not result in any significant increase in the probability or consequences of an accident previously evaluated, as the proposed TS change is consistent with the methodologies adopted in the LARs recently accepted by the NRC on Wolf Creek, Catawba, and McGuire. The proposed maximum limits of the inter-cell and inter-tier resistance values are based on the resistance values obtained from the battery monitoring and maintenance programs (implemented via preventive maintenance (PM) procedures) at St. Lucie, which are based on the IEEE 450 methodology to maintain the battery cells and connections. The battery monitoring and maintenance programs adopted at St. Lucie for the safety related battery inter-cell connection resistances ensure that the values remain within the required ranges of the established baseline values and will remain bounded by the proposed maximum inter-cell and inter-tier resistance values. This change does not alter any design input used in any accident analysis previously performed. The proposed change constitutes an additional limitation or restriction on the acceptable range of values of the battery inter-cell resistance required to ensure that the batteries are able to perform as designed. Therefore, the proposed change will not increase the probability or consequences of any accident previously evaluated that involves any of the safety related batteries or associated equipment powered by these batteries.

(2) Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

No. The proposed change does not involve a physical alteration of the plant. No new or different type of equipment will be installed. There is no change in the methods governing normal plant operation. The proposed change will not introduce new failure modes/effects which could lead to an accident whose consequences exceed the consequences of accidents previously analyzed. Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

(3) Does the proposed change involve a significant reduction in a margin of safety?

No. The proposed change will not involve a significant reduction in a margin of safety. The proposed maximum battery inter-cell and inter-tier resistance values are based on the actual measurements obtained over the years during the 18 month preventive maintenance activities. The measured resistance values are all less than 20% above the baseline installed values, which will ensure that design limits for battery connection resistance are not exceeded. This approach is in accordance with the IEEE 450-1995, Section D.2. This methodology also provides a lower average inter-cell connection resistance limit than both the existing TS limit of 150 $\mu\Omega$ per cell and the vendor's design limits for each St. Lucie Unit. The proposed change to the TS constitutes an additional limitation or restriction on the acceptable range of values of the battery inter-cell resistance required to ensure that the batteries are able to perform as designed. Thus, this proposed TS change will not involve a reduction in a margin of safety.

Based on the preceding, it is determined that the proposed amendment does not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated; (2) create the possibility of a new or different kind of accident from any previously evaluated; nor (3) involve a significant reduction in a margin of safety; the amendment does not involve a significant hazards consideration.

4.3 Conclusions

In conclusion, based on the considerations discussed above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

5 ENVIRONMENTAL CONSIDERATION

These proposed Technical Specification changes have been evaluated against criteria for and identification of licensing and regulatory actions requiring environmental assessment in accordance with 10 CFR 51.21. It has been determined that the proposed change meets the

criteria for categorical exclusion as provided for under 10 CFR 51.22(c)(9). The following is a discussion of how the proposed Technical Specification change meets the criteria for categorical exclusion.

10 CFR 51.22(c)(9): Although the proposed change involves a change to surveillance requirements with respect to Battery inter-cell resistance values,

(i) The proposed change involves no significance hazards consideration (refer to no significance hazards determination);

(ii) There are no significant changes in the types or significant increase in the amounts of any effluents that may be released offsite since the proposed change does not affect the generation of any radioactive effluents nor does it affect any of the permitted release paths; and

(iii) There is no significant increase in individual or cumulative occupational radiation exposure.

Accordingly, the proposed change meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Based on the aforementioned information and pursuant to 10 CFR 51.22(b), no environmental assessment or environmental impact statement need be prepared in connection with issuance of an amendment to the TSs incorporating the proposed change.

6 REFERENCES

1. St. Lucie Unit 1 UFSAR.

2. St. Lucie Unit 2 UFSAR.

3. St. Lucie Unit 1 Technical Specifications.

4. St. Lucie Unit 2 Technical Specifications.

5. IEEE Standard 450-1995, IEEE Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications.

6. IEEE Standard 308-1980, IEEE Standard Criteria for Class 1E Power Systems for Nuclear Power Generating Stations.

7. NUREG-1432 (Standard Technical Specifications for Combustion Engineering Plants), Volume 2, Revision 3.

8. Catawba LAR dated December 14, 2009 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML093500597).

9. Mcguire LAR dated December 14,2009 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML093500597).

10. Wolf Creek LAR dated December 16,2009 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML093640042),

11. FPL Calculation PSL-1FSE-05-002, Rev. 1, "Unit 1 125V DC System ETAP Model and Analysis."

12. FPL Calculation PSL-2FSE-05-003, Rev. 1, "Unit 2 125V DC System ETAP Model and Analysis."

13. NRC CDBI Inspection Report NIR 2009-006, observation documented in CR 2009-22998, "Technical Specification Battery Inter-Cell Connection Resistance Limit of 150 Micro-Ohms not Used in DC System Analysis."

14. C&D Technologies, Inc. letter to FPL from Larry A. Carson to Rick Raldiris dated October 9, 2008, titled "LCY-39 Connection Resistance Information."

Attachment 1

TS Markups

Unit 1

Page 3/4 8-11

Unit 2

Page 3/4 8-11

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

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

   1. The parameters in Table 4.8-2 meet the Category B limits,

   2. There is no visible corrosion at either terminals or connectors, ~~or the connection resistance of these items is less than 150×10^{-6} ohms,~~ and

   3. The average electrolyte temperature of 10% (60 cells total) of connected cells is above 50°F.

c. At least once per 18 months by verifying that:

   1. The cells, cell plates, and battery racks show no visual indication of physical damage or abnormal deterioration,

   2. The cell-to-cell and terminal connections are clean, tight, and coated with anti-corrosion material,

   3. ~~The resistance of each cell-to-cell and terminal connection is less than or equal to 150×10^{-6} ohms, and~~

   4. The battery charger will supply at least 300 amperes at 140 volts for at least 6 hours.

replace with insert

d. At least once per 18 months, during shutdown, by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status all of the actual or simulated emergency loads for the design duty cycle when the battery is subjected to a battery service test.

e. At least once per 60 months, during shutdown, by verifying that the battery capacity is at least 80% of the manufacturer's rating when subjected to a performance discharge test. This performance discharge test may be performed in lieu of the battery service test required by Surveillance Requirement 4.8.2.3.2.d.

f. Annual performance discharge tests of battery capacity shall be given to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% of rated capacity from its average on previous performance tests, or is below 90% of the manufacturer's rating.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

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

   1. The parameters in Table 4.8-2 meet the Category B limits,

   2. There is no visible corrosion at either terminals or connectors, ~~or the connection resistance of these items is less than 150×10^{-6} ohms,~~ and

   3. The average electrolyte temperature of 10% (60 cells total) of connected cells is above 50°F.

c. At least once per 18 months by verifying that:

   1. The cells, cell plates, and battery racks show no visual indication of physical damage or abnormal deterioration,

   2. The cell-to-cell and terminal connections are clean, tight, and coated with anti-corrosion material,

   3. ~~The resistance of each cell-to-cell and terminal connection is less than or equal to 150×10^{-6} ohms, and~~

   4. The battery charger will supply at least 300 amperes at 140 volts for at least 6 hours.

replace with insert

d. At least once per 18 months, during shutdown, by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status all of the actual or simulated emergency loads for the design duty cycle when the battery is subjected to a battery service test.

e. At least once per 60 months, during shutdown, by verifying that the battery capacity is at least 80% of the manufacturer's rating when subjected to a performance discharge test. This performance discharge test may be performed in lieu of the battery service test required by Surveillance Requirement 4.8.2.1d.

f. Annual performance discharge tests of battery capacity shall be given to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% of rated capacity from its average on previous performance tests, or is below 90% of the manufacturer's rating.

Insert for Unit 1 and 2 TS Page 3/4.8-11:

Battery inter-cell and inter-tier connection resistance values are less than or equal to the values below:

Battery Connection	Connection Resistance Measurement	Resistance Value
Inter-cell	Maximum Average Inter-cell Resistance	50 μΩ
	Maximum Single Inter-cell Resistance	150 μΩ
Inter-tier	Maximum Single Inter-tier Resistance	200 μΩ

and,

Attachment 2

Word Processed TS

Unit 1

Page 3/4 8-11
Page 3/4 8-11a

Unit 2

Page 3/4 8-11
Page 3/4 8-11a

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

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

1. The parameters in Table 4.8-2 meet the Category B limits,

2. There is no visible corrosion at either terminals or connectors and

3. The average electrolyte temperature of 10% (60 cells total) of connected cells is above 50°F.

c. At least once per 18 months by verifying that:

1. The cells, cell plates, and battery racks show no visual indication of physical damage or abnormal deterioration,

2. The cell-to-cell and terminal connections are clean, tight, and coated with anti-corrosion material,

3. Battery inter-cell and inter-tier connection resistance values are less than or equal to the values below:

Battery Connection	Connection Resistance Measurement	Resistance Value
Inter-cell	Maximum Average Inter-cell Resistance	50 μΩ
	Maximum Single Inter-cell Resistance	150 μΩ
Inter-tier	Maximum Single Inter-tier Resistance	200 μΩ

and,

4. The battery charger will supply at least 300 amperes at 140 volts for at least 6 hours.

d. At least once per 18 months, during shutdown, by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status all of the actual or simulated emergency loads for the design duty cycle when the battery is subjected to a battery service test.

e. At least once per 60 months, during shutdown, by verifying that the battery capacity is at least 80% of the manufacturer's rating when subjected to a performance discharge test. This performance discharge test may be performed in lieu of the battery service test required by Surveillance Requirement 4.8.2.3.2.d.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

f. Annual performance discharge tests of battery capacity shall be given to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% of rated capacity from its average on previous performance tests, or is below 90% of the manufacturer's rating.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

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

1. The parameters in Table 4.8-2 meet the Category B limits,

2. There is no visible corrosion at either terminals or connectors, and

3. The average electrolyte temperature of 10% (60 cells total) of connected cells is above 50°F.

c. At least once per 18 months by verifying that:

1. The cells, cell plates, and battery racks show no visual indication of physical damage or abnormal deterioration,

2. The cell-to-cell and terminal connections are clean, tight, and coated with anti-corrosion material,

3. Battery inter-cell and inter-tier connection resistance values are less than or equal to the values below:

Battery Connection	Connection Resistance Measurement	Resistance Value
Inter-cell	Maximum Average Inter-cell Resistance	50 μΩ
	Maximum Single Inter-cell Resistance	150 μΩ
Inter-tier	Maximum Single Inter-tier Resistance	200 μΩ

and,

4. The battery charger will supply at least 300 amperes at 140 volts for at least 6 hours.

d. At least once per 18 months, during shutdown, by verifying that the battery capacity is adequate to supply and maintain in OPERABLE status all of the actual or simulated emergency loads for the design duty cycle when the battery is subjected to a battery service test.

e. At least once per 60 months, during shutdown, by verifying that the battery capacity is at least 80% of the manufacturer's rating when subjected to a performance discharge test. This performance discharge test may be performed in lieu of the battery service test required by Surveillance Requirement 4.8.2.1d.

ELECTRICAL POWER SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

f. Annual performance discharge tests of battery capacity shall be given to any battery that shows signs of degradation or has reached 85% of the service life expected for the application. Degradation is indicated when the battery capacity drops more than 10% of rated capacity from its average on previous performance tests, or is below 90% of the manufacturer's rating.