Entergy

Entergy Operations, Inc.
River Bend Station
5485 U. S. Highway 61N
St. Francisville, LA 70775
Tel 225 381 4149
Fax 225 635 5068
jrober3@entergy.com

Jerry C. Roberts
Director, Nuclear Safety Assurance

RBG-47332

February 7, 2013

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

SUBJECT: License Amendment Request 2013-01
Battery Surveillance Requirement Acceptance Criteria
River Bend Station – Unit 1
Docket No. 50-458
License No. NPF-47

RBF1-13-0013

Dear Sir or Madam:

Pursuant to 10 CFR 50.90, Entergy Operations, Inc. hereby requests an amendment to Appendix A, Technical Specifications (TS), of Facility Operating License No. NPF-47 for River Bend Station – Unit 1 (RBS). This amendment will revise RBS Technical Specification (TS) 3.8.4, "DC Sources – Operating" Surveillance Requirements (SRs) 3.8.4.2 and 3.8.4.5. The changes to the SRs will add new acceptance criteria to address possible non-conservative conditions when the battery connection resistances are at maximum values.

Attachment 1 provides the evaluation supporting the proposed changes. Attachment 2 contains a mark-up of the affected TS page.

Entergy requests approval of this change by February 7, 2014. Once approved, the amendment will be implemented within 60 days. If you have any questions or require additional information, please contact Mr. Joseph Clark at 225-381-4177.

I declare under penalty of perjury that the foregoing is true and correct. Executed on February 7, 2013.

Respectfully,

JCR/dhw
Attachments

A001
NRR

Attachment 1: Description of proposed change
Attachment 2: Technical Specification mark-up of proposed change

cc: U. S. Nuclear Regulatory Commission
Region IV
1600 East Lamar Blvd.
Arlington, TX 76011-4511

NRC Sr. Resident Inspector
P. O. Box 1050
St. Francisville, LA 70775

Department of Environmental Quality
Office of Environmental Compliance
Radiological Emergency Planning and Response Section
JiYoung Wiley
P.O. Box 4312
Baton Rouge, LA 70821-4312

U.S. Nuclear Regulatory Commission
Attn: Mr. Alan Wang
Washington, DC 20555-0001

Public Document Room
Public Utility Commission of Texas
1701 N. Congress Ave.
Austin, TX 78711-3326

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Attachment 1

Description of Proposed Changes

1.0 DESCRIPTION

The proposed amendment would revise River Bend Station (RBS), Unit 1 Technical Specification (TS) 3.8.4, "DC Sources – Operating" Surveillance Requirements (SRs) 3.8.4.2 and 3.8.4.5. The changes to the SRs will add new acceptance criteria to address possible non-conservative conditions when the battery connection resistances are at maximum values.

These proposed changes are being added to ensure the battery assembly is capable of supplying the DC system with adequate power as designed.

2.0 PROPOSED CHANGE

The change will add a total resistance value of 45.75 E-4 ohms to SRs 3.8.4.2 and 3.8.4.5. The current individual connection limit of 1.5 E-4 ohms will remain as unchanged. No other changes are requested.

This change is the result of the determination that, while the individual resistance limits are acceptable on each connection if each of the connections were to reach the individual limits, the total battery capacity would possibly be insufficient to supply its required load.

3.0 BACKGROUND

3.1 License Basis

As discussed in the BASES of TS 3.8.4 and in Section 8.3.2 of the Updated Safety Analysis Report, the safety-related DC power system incorporates batteries into the design. The DC power system provides control power to the AC emergency power system. It also provides both motive and control power to selected safety-related equipment.

The licensing basis for this system is derived from 10 CFR 50, Appendix A, General Design Criterion 17. The DC electrical power system is designed to have sufficient independence, redundancy, and testability to perform its safety functions while assuming a single failure. The DC electrical power system also conforms to the requirements of Regulatory Guide 1.6 and IEEE-308.

The safety related Divisions 1 and 2 each contain a battery with adequate storage capacity to carry the required load continuously for at least 4 hours. The Division 3 battery has adequate storage to carry the required load continuously for at least 2 hours.

The proposed change will not modify the current design requirements of the DC power system. A new surveillance test acceptance criterion will be incorporated to maintain sufficient margin to support the total required load and battery capacity.

3.2 Technical Basis

System requirements:

The 125 VDC system is designed to provide reliable DC power to plant auxiliaries during plant startup, shutdown, normal operation, abnormal operational transients, and design basis accidents.

- Normal Operation: The safety-related battery chargers in each division are fed from their respective divisional AC power supplies to supply the loads on the DC buses and maintain the batteries in a fully charged state.

- Emergency mode: The DC power system is capable of furnishing reliable DC power for required loads during periods when AC power is not available.

- Abnormal Mode: A separate 125 VDC backup battery charger can provide power to any one of the three safety-related DC buses. During a Station Blackout (SBO) event, the Division 1 and 2 DC subsystems provide power to all loads required for coping with a loss of all AC power. Division 3 is not required for SBO.

Design Requirements:

System Performance: All safety-related DC equipment is rated to operate between 101 and 140 VDC. The minimum acceptable node voltage (i.e. voltage at the terminals of the distribution panels, motor control centers, switchgear, or inverter) shall be greater than 108 VDC at the end of the 4-hour battery duty cycle. This is based on battery sizing for a final terminal voltage of 110 VDC.

Battery Sizing Requirements: The Division 1 and 2 batteries have sufficient capacity to power their required safety loads for 4 hours per RBS Calculations E-143 and E-144. The Division 3 battery has sufficient capacity for 2 hours per RBS Calculation G13.18.3.6*09. These calculations include design margin and aging. The batteries are sized in accordance with methodology of IEEE Std. 485-1983.

Spare Capacity:

Division	Spare Capacity with Scenario		Reference
	Design Basis Event	Station Blackout Event	
1	44.18%	2.41%	E-143
2	91.26%	1.82%	E-144
3	6.61%	N/A	G13.18.3.6*09

4.0 TECHNICAL ANALYSIS

RBS design calculations use more conservative values for inter-cell resistance. Therefore, the proposed change does not affect the design basis of the station batteries.

4.1 Description of system (resistance) arrangement

The Division 1, 2, and 3 batteries each contain 60 cells. For each battery, the 60 cells are connected in series. Technical Specifications reference inter-cell, inter-rack, and inter-tier connections. These three terms all refer to the series connections between cells (cell-to-cell). The difference in the terms is due to the physical arrangement of the cells. Each battery is located in its own room. Each battery room contains two racks (one on each side of the room) to support the cells. Each rack contains 30 cells. The cells on each rack are arranged in two tiers, (upper and lower). Therefore, the batteries are arranged in four rows of 15 cells.

There are 61 connections per battery. There are 59 cell-to-cell connections and two terminal connections. Of the 59 cell-to-cell connections, there are 14 cell-to-cell connections in each of the four rows (inter-cell) for a total of 56, and three cell-to-cell connections between rows (two inter-tier and one inter-rack).

To obtain the total resistance, the 59 cell-to-cell resistances and the two terminal resistances will be added together. Multiple resistance readings are taken at the terminal connections since each conductor has its own termination lug, and the highest resistance reading at each terminal connection will be used.

Unlike the Division 3 battery which has two-post lugs, the Division 1 and 2 batteries have four-post cells, necessitating that two resistance readings be taken for each cell-to-cell connection. Of these, the higher of the two resistance readings is used.

4.2 Summary of past performances

Division 1

Feb. 2011	
Highest inter-cell resistance (micro-ohms)	27
Highest inter-tier resistance (micro-ohms)	21
Highest inter-rack resistance (micro-ohms)	14
Highest terminal resistance (micro-ohms)	19

Oct. 2009	
Highest inter-cell resistance (micro-ohms)	28
Highest inter-tier resistance (micro-ohms)	23
Highest inter-rack resistance (micro-ohms)	22
Highest terminal resistance (micro-ohms)	19

Feb. 2008

Highest inter-cell resistance (micro-ohms)	25
Highest inter-tier resistance (micro-ohms)	16
Highest inter-rack resistance (micro-ohms)	9
Highest terminal resistance (micro-ohms)	26

Division 2

Jan. 2011

Highest inter-cell resistance (micro-ohms)	29
Highest inter-tier resistance (micro-ohms)	18
Highest inter-rack resistance (micro-ohms)	13
Highest terminal resistance (micro-ohms)	29

Oct. 2009

Highest inter-cell resistance (micro-ohms)	33
Highest inter-tier resistance (micro-ohms)	23
Highest inter-rack resistance (micro-ohms)	14
Highest terminal resistance (micro-ohms)	16

Jan. 2008

Highest inter-cell resistance (micro-ohms)	32
Highest inter-tier resistance (micro-ohms)	26
Highest inter-rack resistance (micro-ohms)	11
Highest terminal resistance (micro-ohms)	24

Division 3

Feb. 2011

Highest inter-cell resistance (micro-ohms)	19
Highest inter-tier resistance (micro-ohms)	41
Highest inter-rack resistance (micro-ohms)	11
Highest terminal resistance (micro-ohms)	26

Oct. 2009

Highest inter-cell resistance (micro-ohms)	22
Highest inter-tier resistance (micro-ohms)	36
Highest inter-rack resistance (micro-ohms)	20
Highest terminal resistance (micro-ohms)	19

Feb. 2008

Highest inter-cell resistance (micro-ohms)	19
Highest inter-tier resistance (micro-ohms)	33
Highest inter-rack resistance (micro-ohms)	16
Highest terminal resistance (micro-ohms)	19

4.3 Procedural controls

TS 3.8.4 requires that the Division 1, 2, and 3 DC electrical power subsystems shall be OPERABLE. SR 3.8.4.5 specifies that the measured resistance at each inter-cell, inter-rack, inter-tier, and terminal connection will be less than 1.5 E-4 ohms.

The surveillances will be revised to obtain a total resistance value by summing the resistances obtained at each connection (using the highest resistance value where multiple readings are recorded). The surveillance will also be revised to include the additional acceptance criterion that total connection resistance will be less than or equal to 45.75 E-4 ohms.

4.4 Equipment Design and Maintenance Rule Impact

The proposed change will support the current design basis. Therefore, there is no effect on the equipment design. The safety-related batteries are included in scope of the Maintenance Rule, and no change to this program is required.

4.5 Risk Impact

The proposed change will support the current design basis. Therefore, there is no effect on the plant risk model.

4.6 Conclusion

The current design basis of the safety-related DC system is unaffected by the proposed change. The proposed addition of a new acceptance criterion will support the design safety function of the system. Past performance of the system adequately bounds the proposed change.

5.0 REGULATORY ANALYSIS

5.1 Applicable Regulatory Requirements/Criteria

The design discussed within this document is within the requirements of Regulatory Guide 1.128. This guide describes a method acceptable to the NRC staff of complying with IEEE Std. 450 – 1975 and Criteria 17 of Appendix A to 10 CFR Part 50 with respect to the physical independence of the circuits and electric equipment comprising, or associated with, the Class 1E power system, the protection system, systems actuated or controlled by the protection system, and auxiliary or supporting systems that must be operable for the protection system and the systems it actuates to perform their safety-related functions.

5.2 No Significant Hazards Consideration

A change is proposed to the River Bend Station Technical Specification (TS) 3.8.4, DC Sources – Operating, Surveillance Requirements (SR) 3.8.4.2 and 3.8.4.5. Entergy has evaluated whether a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

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

Response: No.

The proposed changes are to the surveillance requirements only. The ability of the TS surveillance to ensure that the batteries have the capacity to perform their specified safety functions with regard to accident mitigation or meeting their licensing design basis requirements is not reduced / diminished.

There are no design changes associated with this TS amendment. The DC power system / batteries will retain adequate independency, redundancy, capacity and testability to permit the functioning required of the engineered safety features. The batteries will each continue to independently provide this capacity assuming a failure of a single active component. The proposed change will not affect accident initiators or precursors, or adversely alter the design assumptions, conditions, and configuration of the facility or the manner in which the plant is operated. The proposed change will not alter the ability of structures, systems and components to perform their intended functions to mitigate the consequences of an initiating event. The proposed change does not physically alter safety related systems nor affect the way in which safety related systems perform their function. Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

Response: No

The proposed change involves only surveillance test acceptance criteria. The ability of the TS surveillance to ensure that the batteries have the capacity to perform their specified safety functions with regard to accident mitigation or meeting their licensing design basis requirements is not reduced / diminished.

There are no proposed design changes, nor are there any changes in the method by which any safety related plant structure, system, or component (SSC) performs its specified safety function. The proposed change will not affect the

normal method of plant operation or change any operating parameters. Equipment performance necessary to fulfill safety analysis missions will be unaffected. The proposed change will not alter any assumptions required to meet the safety analysis acceptance criteria. No new accident scenarios, transient precursors, failure mechanisms, or limiting single failures will be introduced because of this amendment. There will be no adverse effect or challenges imposed on any safety related system because of this amendment. Therefore, the proposed changes do 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?

Response: No

The proposed change does not reduce the ability of the TS surveillance requirements to ensure that the station batteries have adequate capacity to perform their engineered safety features functions with regard to accident mitigation and meeting their licensing design basis requirements. The lower battery inter-cell connection resistance values are more restrictive, consistent with design basis calculations and appropriately identified in maintenance procedures. The proposed changes do not physically alter safety related systems. There will be no effect on those plant systems necessary to assure the accomplishment of protection functions. The applicable radiological dose consequence acceptance criteria will continue to be met. Therefore, the proposed changes do not involve a significant reduction in a margin of safety.

Based on the above, Entergy concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92, and, accordingly, a finding of "no significant hazards consideration" is justified.

5.3 Environmental Considerations

The proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22 (9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6.0 Precedence

Similar changes to battery surveillance acceptance criteria have been approved by NRC for the Catawba, Cooper, St. Lucie, and Turkey Point plants.

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Attachment 2

Technical Specification Mark-up of Proposed Change

SURVEILLANCE REQUIREMENTS

	SURVEILLANCE	FREQUENCY
SR 3.8.4.1	Verify battery terminal voltage is ≥ 130.2 V on float charge.	7 days
SR 3.8.4.2	Verify no visible corrosion at battery terminals and connectors. OR Verify battery connection resistance is ≤ 1.5 E-4 ohm for inter-cell connections, ≤ 1.5 E-4 ohm for inter-rack connections, ≤ 1.5 E-4 ohm for inter-tier connections, and ≤ 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.	24 months
SR 3.8.4.4	Remove visible corrosion, and verify battery cell to cell and terminal connections are coated with anti-corrosion material.	24 months
SR 3.8.4.5	Verify battery connection resistance is ≤ 1.5 E-4 ohm for inter-cell connections, ≤ 1.5 E-4 ohm for inter-rack connections, ≤ 1.5 E-4 ohm for inter-tier connections, and ≤ 1.5 E-4 ohm for terminal connections.	24 months

(continued)

AND

Total connection resistance is < 45.75 E-4 ohms.