NRCREP - Draft Regulatory Guide DG-1154 and DG-1155 Request for Comment

From: "BELL, Russ" <rjb@nei.org>
Date: 11/20/2006 5:57 PM
Subject: Draft Regulatory Guide DG-1154 and DG-1155 Request for Comment

9/22/06
71FR 55517
(7)

November 20, 2006

Chief, Rules and Directives Branch
Office of Administration
U.S. Nuclear Regulatory Commission
Mail Stop T6-D59
Washington, DC 20555-0001

SUBJECT: Draft Regulatory Guide DG-1154, *"Installation Design and Installation of Vented Lead-Acid Storage Batteries for Nuclear Power Plants"*, and Draft Regulatory Guide DG-1155, *"Maintenance, Testing, and Replacement of Vented Lead-Acid Storage Batteries for Nuclear Power Plants"* Request for Comment

PROJECT NUMBER: 689

On behalf of the nuclear industry, the Nuclear Energy Institute (NEI)[1] is pleased to submit the following response to the *Federal Register* notice, dated, September 22, 2006, *Volume 71, Number 184,* which invited written comments on the Proposed Revision 2 of Regulatory Guide 1.128 (DG-1154), *"Installation Design and Installation of Vented Lead-Acid Storage Batteries for Nuclear Power Plants"*, and Proposed Revision 2 of Regulatory Guide 1.129 (DG-1155), *"Maintenance, Testing, and Replacement of Vented Lead-Acid Storage Batteries for Nuclear Power Plants."*

Sincerely,

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Nuclear Energy Institute
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Enclosures

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[1] NEI is the organization responsible for establishing unified industry policy on matters affecting the nuclear energy industry. NEI's members include all entities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel fabrication facilities, nuclear material licensees, and other organizations and individuals involved in the nuclear energy industry.

E-RIDS=ADM-03

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Template=ADM-013

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Mail Envelope Properties (456232CC.AB2 : 17 : 35506)

Subject:	Draft Regulatory Guide DG-1154 and DG-1155 Request for Comment
Creation Date	Mon, Nov 20, 2006 5:53 PM
From:	"BELL, Russ" <rjb@nei.org>
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NUCLEAR ENERGY INSTITUTE

Russell J. Bell
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NUCLEAR GENERATION DIVISION

November 20, 2006

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Enclosure1 provides specific comments, questions, and recommendations from the NEI Combined License Issues Task Force. Enclosures 2 and 3 provide comments from EPRI on each Regulatory Guide (RG) respectively. A few comments are highlighted below:

- For DG-1154, the new Regulatory Guide 1.128 should not specify additional requirements (e.g. HVAC) or compliance with other Regulatory Guides (e.g. 1.189) that are not part of a plant's licensing basis as noted in the comments provided.

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- For DG-1155, it is more appropriate to keep the NRC guidance consistent with the IEEE requirement to perform temperature adjustments after battery testing rather than before testing as proposed by the NRC.

- The Design Control Document Tech Specs for new plants do not and will not cover all of the testing outlined in this proposed version of DG-1155. The industry believes that these additional items can be addressed outside of Tech Specs.

We appreciate the opportunity to comment on the draft documents. If you have any questions regarding this effort please contact Leslie Kass at (202) 739-8115; lck@nei.org.

Sincerely,

Russell J. Bell

Enclosures

c: Mr. William S. Raughley, NRC
Mr. Stephen C. O'Connor, NRC
NRC Document Control Desk

Comments / Questions on DG-1154 & 1155

DG-1154

DG-1154 is a proposed revision 2 of Regulatory Guide 1.128, "Installation Design and Installation of Vented Lead-Acid Storage Batteries for Nuclear Power Plants". The draft RG endorses IEEE Standard 484-2002. Both the ESBWR and AP-1000 Design Certification Documents (DCDs) state that they are in compliance with earlier versions of the IEEE standard. No significant issues were identified by this review, but several questions /comments are listed below. The applicable section of the DG is called out for reference.

1. Section C.6 (a); is testing every cell versus every tenth cell necessary? What is basis for NRC requiring more tests that the IEEE standard?
2. Section C.9 (f); The Hydrogen tests & verifications that the DG requires have not been performed previously based on reviewers' experience. Does the NRC have ideas /expectations on how these surveys should be done? Industry may need funds to develop a methodology.
3. Section C.9 (b); what are "environmental hazards"?
4. Section C.9 (d) & (f); It appears that the DG-1154 imposes ventilation requirements and testing that are not based on actual operation of the battery. Hydrogen is not developed during a recharge because the recharge of a battery is a highly efficient conversion process and water is not disassociated. Hydrogen is developed by overcharging a charged battery, e.g. a battery on extended equalize charge, or high temperature in the battery room (e.g. lack of AC). If one was concerned about Hydrogen generation, the charger should be temperature compensated to lower the charging current as temperature increases and conversely raise the charging current as temperature decreases.

DG-1155

DG-1155 is a proposed revision 2 of Regulatory Guide 1.129, "Maintenance, Testing and Replacement of Vented Lead-Acid Storage Batteries for Nuclear Power Plants". The draft RG endorses IEEE Standard 450-2002. Both the ESBWR and AP-1000 Design Certification Documents (DCDs) state that this Reg Guide is not applicable to design certification, thus compliance with the RG it is the responsibility of the COL applicant.

Testing of 1E batteries is also covered by plant Technical Specifications (TS). A comparison of the AP-1000 and ESBWR TS with the requirements of DG-1155 was performed, and several differences were noted (see Table 1). Industry reviewers believe that the requirements from DG-1145 outside of TS will be addressed via station procedures and programs, and that no changes to the generic TSs proposed will be required. Does the NRC plan on requiring additional TS items to meet the DG-1155 items?

Table 1. Comparison of DG-1155 & Tech Specs \

DG-1155	IEEE-450-2002	Requirement	Tech Spec	Requirement	Differences
C.2	No requirement (section 5.2)	1E Battery float current and voltage measured & recorded weekly	AP-1000: SR 3.8.1.1 / SR 3.8.7.1 ESBWR: SR 3.8.1.1 / SR 3.8.4.1	Battery terminal voltage > float voltage 1 per 7 days / Battery float current < limit 1 per 7 days	None
	5.2.1 Monthly Checks	a. Float voltage	Refer to above	Refer to above	IEEE standard requires 1 / month float voltage check; DG-1155 requires 1 / 7 days, which is reflected in AP-1000 & ESBWR Tech Specs.
		b. Battery general appearance & cleanliness	None	None	
		c. Charger output & current	None	None	Tech Specs SR 3.8.1.2 requires Battery Charger test 1/24 months
		d. Electrolyte levels	AP-1000: SR 3.8.7.3 ESBWR: SR 3.8.4.3	Each battery connected cell electrolyte level > limit 1 / 31 days	None
		e. Cracks in cell or leakage	None	None	
		f. Corrosion checks	None	None	

DG-1155	IEEE-450-2002	Requirement	Tech Spec	Requirement	Differences
C.2	5.2.1 Monthly Checks (cont'd)	g. Ambient temperature	None	None	Both ESBWR & AP-1000 HVAC for 1E battery rooms are not safety related; Power Generation requirement for temperature control (reference DCD section 8.3.2 & 9.4)
		h. Pilot cell voltage & electrolyte temperature	AP-1000: SR 3.8.7.2,4 ESBWR: SR 3.8.4.2,4	Check Pilot cell voltage & electrolyte temperature within limits 1 / 31 days	None
		i. Float charging current or pilot cell specific gravity	See item C.2 above (float current check 1 / 7 days)	See item C.4 above	Float current checked with voltage on a daily basis per Tech Specs
		j. Unintentional battery grounds	None	None	Grounds will cause alarms which require response
		k. Battery monitoring systems	None	None	
	5.2.2 Quarterly Checks	a. Voltage of each cell	AP-1000: SR 3.8.7.5 ESBWR: SR 3.8.4.5	Verify each battery connected cell voltage above limit	None
C.2	5.2.2 Quarterly Checks (cont'd)	b. Specific gravity of 10% of cells if battery float charging current is not used to monitor state of charge	See item C.4 above	See item C.4 above	Float current checked with voltage on a daily basis per Tech Specs for State of Charge (SOC) check

DG-1155	IEEE-450-2002	Requirement	Tech Spec	Requirement	Differences
		c. Electrolyte temperature of 10% or more of the battery cells	None	None	Check Pilot cell electrolyte temperature within limits 1 / 31 days per AP-1000 SR 3.8.7.4 & ESBWR SR 3.8.4.4; no requirement for 10% of cells to be checked on quarterly basis.
	5.2.3 Yearly Checks	a. Specific gravity and temperature of each cell	None	None	
		b. Cell condition (detailed visual)	None	None	
		c. Cell to cell terminal connection resistance	None	None	
		d. Structural integrity of battery rack / cabinet	None	None	
C.5	6.1 Acceptance Testing	a. DG requires Service Test for Acceptance test following initial installation	None	None	Tech Specs do not cover initial or post-maintenance testing
	6.2 Performance Testing	a. Performance test within first 2 years of service	AP-1000: SR 3.8.7.6 ESBWR: SR 3.8.4.6	Performance Test 1 / 60 months (5 years)	Service Test 1 / 24 months should bound this requirement

DG-1155	IEEE-450-2002	Requirement	Tech Spec	Requirement	Differences
		b. Period performance testing; interval not greater than 25% of expected service life			No specific discussion in Tech Specs on this. A typical expected service life for a lead calcium battery is between 10 and 20 years. A 25% test interval at a minimum would equate to 1 / 2.5 years. The Service Test 1 / 2 years should cover this requirement.
		c. Annual performance testing if battery degraded or at 85% of service life and capacity < 100%	AP-1000: SR 3.8.7.6 ESBWR: SR 3.8.4.6	Annual performance testing if battery degraded or at 85% of service life and capacity < 100%	None
C.5	6.2 Performance Testing	c. Performance testing 1 / 24 months if battery degraded or at 85% of service life and capacity >/= 100%	AP-1000: SR 3.8.7.6 ESBWR: SR 3.8.4.6	Performance testing 1 / 24 months if battery degraded or at 85% of service life and capacity >/= 100%	None
		d. Optional baseline / benchmarking testing	None	None	

DG-1155	IEEE-450-2002	Requirement	Tech Spec	Requirement	Differences
C.4	6.3 Service Testing	a. DG requires Service Test on interval not to exceed 24 months	AP-1000: SR 3.8.1.3 ESBWR: SR 3.8.1.3	Battery Service Test 1 / 24 months	None
C.6	6.4 Modified Performance Testing	a. IEEE std states Modified Performance Test may be used in place of Service Test; DG states acceptable, BUT same test method should be used throughout battery life.	AP-1000: SR 3.8.1.3 ESBWR: SR 3.8.1.3	Note in TS allows Modified Performance Test in lieu of Service Test	Requirement to assure same test method throughout battery life not captured in Tech Specs.

EPRI DG-1154 Comments

Document Name/Number:
DG-1154
Installation Design and Installation of Vented Lead-Acid Storage Batteries for Nuclear Power Plants

Section	Priority (Hi, Med, Low)	Regulatory Basis	Description of the Issue	Proposed Alternate
B Discussion, 1para, last sentence	3		Improved wording of the sentence	"As such, IEEE-Std. 484-2002 is applicable ...a battery in a fully charged state and provide power to the direct current (dc) loads.
C Regulatory Position Item 2	2	A Plant may not have committed to the requirements of RG 1.189	Most plants will have some type of alarm for fire protection and other conditions but if a plant chose to only have only a control room alarm and not local or vice-versa, this could constitute an additional requirement.	The requirements for alarms that relate to plant conditions were considered outside of the scope of this standard and should be part of the general plant design.
C Regulatory Position Item 5	2	A Plant may not have committed to the requirements of RG 1.100	The requirements of RG 1.100 should be reviewed in light of which version of IEEE 344 it has endorsed. The current version is IEEE-344-2004.	Make the adoption of RG 1.100 an and/or option in the new item being suggested.
C Regulatory Position Item 6	3		It is not clear if this is a requirement for all battery banks in the plant or just those that will provide power to Class IE loads	Accept this change with the addition "for Class IE batteries or batteries that will support Class IE such as swing batteries".
C Regulatory Position Item 7	2	A Plant may not have committed to the requirements of RG 1.129. Also, it is not clear if RG 1.129 has been revised to incorporate changes in IEEE 450-2002	IEEE 450-2002 provides a couple of alternatives to acceptance testing. One is to test at the factory and then perform a service test or if applicable a modified performance test upon	Recommend that for Class IE installations, a test of the battery be performed after installation and that test can be either an acceptance test, a service test, or a modified performance test to confirm battery capability.

Document Name/Number: DG-1154 Installation Design and Installation of Vented Lead-Acid Storage Batteries for Nuclear Power Plants				
Section	**Priority (Hi, Med, Low)**	**Regulatory Basis**	**Description of the Issue**	**Proposed Alternate**
			installation.	
C Regulatory Position Item 9 (b)	2		How does the term "environmental hazards" differ from wind, flood and earthquake?	Any additional environmental hazards should be spelled out in this RG.
C Regulatory Position Item 9 (c)	3		The requirement for spill containment is spelled out in IEEE Std. 344-2002. If there is a concern for additional spill containment, there is an IEEE Std. that addresses Spill Containment.	The current requirement is sufficient to cover this issue.
C Regulatory Position Item 9 (d) – "(e)"	2	This is a new requirement. Ventilation Air flow sensors are not called out in any reference regulation of industry standard	A plant can choose to use natural circulation to handle the removal hydrogen from the battery room.	This requirement should be left to the design of the battery room. Since ventilation is critical during overcharging events and natural circulation is an option if there are enough air exchanges, this appears to be an unnecessary requirement.
C Regulatory Position Item 9 (d) – "(f)"	2		Item f constitutes a requirement associated with Fire Protection which is outside the scope of IEEE 484-2002.	The room designed to receive the battery should have the features called for in the design criteria for the room.
C Regulatory Position Item 9 (f) – "(e)"	2		The capability to remove hydrogen from the battery room is a function of the ventilation system design.	This should be left up to the ventilation design to determine how many air exchanges can be performed by the system. This is not a battery function.

EPRI DG-1155 Review Comments

Document Name/Number:
DG-1155
Maintenance, Testing, and Replacement of Vented Lead-Acid Storage Batteries for Nuclear Power Plants

Section	Priority (Hi, Med, Low)	Regulatory Basis	Description of the Issue	Proposed Alternate
B Discussion 1st para, 4th Sentence	3	Correction	Clarification of the wording	This recommended practice...the battery in a fully charged state and provides power to the direct current (dc) loads.
B Discussion 2nd para, 5th sentence	3	Correction	Clarification of wording	Remove the word "that" after ensure
C Regulatory Position 3 (d)	2		The proposed wording is for this section makes a valid point of ensuring that the battery is actually accepting a charge; however, the discussion is not, it makes recommendations that are just "additional anecdotal things to do (e.g., three hourly readings)	Suggest dropping the current wording in Item (d) and use the information provide in Annex A of the IEEE 450-2002.
C Regulatory Position 7	2		If performing a service or modified performance test, a battery should be tested in its "as-found" condition and the temperature can not be adjusted.	Depending on the type of test being performed, the temperature adjustment should be done after the test is performed.
C Regulatory Position 8	2		Appendix I has been referred to C 6. Also, it has been suggested that Annex A be used for Item C 7	Suggest revisiting the idea of wholesalely excluding Annexes A through K. There may be some items that would enhance the RG it the Annexes were selectively utilized.