Enclosure 3
Staff Responses to Public Comments on Draft Regulatory Guide DG-1154
(Proposed Revision 2 to Regulatory Guide 1.128)

Originator	DG-1154 Section	Specific Comments	NRC Comment Resolution
NEI 11/20/2006 cover letter (ML063260405)	general comment 1	For DG-1154, the new RG 1.128 should not specify additional requirements (e.g., HVAC) or compliance with other RGs (e.g.) that are not part of the plant's licensing basis as noted in the comments provided.	The staff of the U.S. Nuclear Regulatory Commission (NRC) agrees in part. The wording was unclear in both the 1978 Revision of RG 1.128 and DG-1154. The staff has revised the guide to clarify that the items for air flow sensors and alarms in the control room are recommendations, as are the fire detection sensors, instrumentation, and alarms for battery rooms. The staff has also clarified the wording in Regulatory Positions 9(b), (c), (f), and (g) to avoid misinterpretation. With regard to the general nature of the comment, the footnote on the first page of the revised guide explicitly states that "Regulatory guides are not substitutes for regulations, and compliance with them is not required." Also, the Introduction states that this guide describes a method that the NRC staff considers acceptable for use in complying with the agency's regulations; as such it does not affect the licensing basis, and an applicant could propose a different method. Also see the staff's response to NEI general comment 2 below. DG-1154 did not specify additional recommendations. As explained in the last paragraph of the Discussion, this revision updates the regulatory positions in Revision 1 of RG 1.128 by (1) deleting those that have been incorporated into IEEE Std 484-2002; (2) adding a regulatory position to update and carry forward the use of other IEEE standards, recommendations, and requirements applicable to nuclear power generating station batteries, which were contained in IEEE Std 484-1975 but deleted in IEEE Std 484-2002; (3) updating and carrying forward the regulatory positions for preventing fires in battery rooms based on the current NRC guidance in Regulatory Guide 1.189, "Fire Protection for Operating Nuclear Power Plants"; and (4) updating and carrying forward past regulatory positions that took exception to IEEE Std 484. Items (4) and (3), respectively, apply to HVAC and compliance with other RGs.

Originator	DG-1154 Section	Specific Comments	NRC Comment Resolution
Enclosure 1, page 1 of NEI 11/20/2006 letter. (ML063260405)	general comment 2	ESBWR and AP1000 Design Certification Documents state they are in compliance with an earlier versions of the IEEE standard.	The NRC staff agrees; however, no change is required. The Introduction states that this RG describes a method that the NRC staff considers acceptable for use in complying with the agency's regulations. This "acceptable" method is based on the latest available information. If a revised standard provides a better method than the previous edition, the NRC typically proceeds to endorse the newer standard as part of the method. Also, note that the IEEE has adopted similar view. For example, Section 2 of IEEE Std 484-2002 lists referenced dated standards that shall be used in conjunction with Std 484 and states that when the references are superceded by an approved revision, the revision shall apply.
	C.6(a)	Is testing every cell versus every tenth cell necessary? What is the basis for NRC requiring more tests than the IEEE standard.	The NRC staff agrees in part and has revised the guide to clarify that "(a) The pilot cell determined by sampling shall not be used to support maintenance and test measurements in IEEE Std 450 as endorsed by Regulatory Guide 1.129, unless that pilot cell has been verified through measurement of each cell's specific gravity and float voltage to be representative of the average of the entire battery."
	C.9(b)	What are "environmental hazards"?	The NRC staff agrees and has revised the guide to delete environmental hazards and add radiation.
	C.9(f)	The hydrogen tests and verification 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.	The NRC staff disagrees; no change is required. This guidance has been in place since 1978. In NUREG-1805, "Fire Dynamics Tools (FDT^s): Quantitative Fire Hazard Analysis Methods for the U.S. Nuclear Regulatory Commission Fire Protection Inspection Program," dated December 2004, Chapter 16, "Calculating the Rate of Hydrogen Gas Generation in Battery Rooms," describes what we believe to be a common method and practice for estimating hydrogen gas release rates from design and field data.

Originator	DG-1154 Section	Specific Comments	NRC Comment Resolution
	C.9(d) & (f)	It appears that DG-1154 imposes ventilation requirements and testing that are not based on actual operation of the battery. Hydrogen is not developed during 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 ACO). 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.	The NRC staff agrees in part and has revised the guide as stated in the first paragraph of NEI general comment 1. Also this is not new; this position carries forward the position from the 1978 version of RG 1.128. Also, see the staff's response to EPRI comment C.9(d). Hydrogen gas is released from the acid electrolyte in the battery during charging (overcharging). Chapter 16 of NUREG-1805 describes how hydrogen gas is generated and accumulated, and how the ventilation requirements relate to battery operating parameters. IEEE Std 484-2002 does not address the design of the charger.
EPRI comments Enclosure 2 of NEI 11/20/2006 letter (ML063260405)	B	Revise wording in Discussion, first paragraph, last sentence to read, "As such…maintains the battery in a fully charged ***state*** and provides ***power to*** the direct current (dc) loads."	The NRC staff agrees.
	C.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 have only a control room alarm and not local or vice-versa, this could constitute additional requirements. Propose that 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.	The NRC staff disagrees; no change is required. See the staff's response to NEI general comments 1 and 2, above. In RG 1.189, Section 6.1.7, "Station Battery Rooms," provides design criteria for protection against fires and explosions, including a *recommendation* that battery room automatic fire detection should be provided to alarm locally; this is not a requirement. In addition, this RG carries forward the position from the 1978 version, which endorsed the latest industry fire protection methods for battery rooms (including fire protection alarms). Further, the subject is appropriate given that IEEE Std 484-2002 specifically recommends that the battery should be protected against induced phenomena, such as fire and explosions. Also, see the staff's response to EPRI comment C.9(d), below.

Originator	DG-1154 Section	Specific Comments	NRC Comment Resolution
	C.5	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. Propose making the adoption of RG 1.100 an and/or option in the new item being suggested.	The NRC staff disagrees; no change is required. This RG references IEEE Std 344 and RG 1.100 *without citing specific dates* in order to allow the flexibility suggested by EPRI. Also, see the staff's response to NEI general comments 1 and 2, above.
	C.6	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 1E loads. Propose accepting this change with the addition "for Class IE batteries or batteries that will support Class IE such as swing batteries."	The NRC staff disagrees; no change is required. Both IEEE Std 484-2002 and this regulatory position apply to vented lead-acid batteries and should not be limited as suggested.
	C.7	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 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. Recommend that for Class 1E installations, a test of the battery be performed after the installation and that test can be either an acceptance test, a service test, or a modified performance test to confirm battery capability.	The NRC staff agrees in part and has revised this regulatory position (now C.8) to state, "Upon initial installation, the battery's capability shall be demonstrated by completing a service test or modified performance test in accordance with IEEE Std 450, as endorsed by Regulatory Guide 1.129. If factory tests did not include capacity tests, the battery's capacity shall also be demonstrated by completing a performance test or modified performance test in accordance with IEEE Std 450, as endorsed by Regulatory Guide 1.129." Regarding the comment about RG 1.129, see the staff's response to NEI general comments 1 and 2, above. DG-1155 is the proposed revision of RG 1.129 to address IEEE Std 450-2002.
	C.9(b)	How does the term "environmental hazard" differ from wind, flood, and earthquake." Suggest any additional environmental hazards should be spelled out in this RG.	The NRC staff agrees. See the staff's response to NEI comment C.9(b), above.
	C.9(c)	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. Propose the current requirement is sufficient to cover the issue.	The NRC staff agrees in part and has revised the guide accordingly; see the staff's response to Mark Clark's comment C.9(c), below. Battery spill containment is not addressed in either IEEE Std 344-2004 or the earlier 1997 version. In addition, this revision of RG 1.128 carries forward the position from the 1978 version.

Originator	DG-1154 Section	Specific Comments	NRC Comment Resolution
	C.9(d)	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 of hydrogen from the battery room. The 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 appear to be an unnecessary requirement.	The NRC staff agrees in part and has revised the guide as stated in the first paragraph of NEI general comment 1. See the last paragraph of the staff's response to that comment. This position is not new and carries forward the recommendation from the 1978 version of this RG. Temperatures that degrade battery performance are well-understood. In addition, accumulation of hydrogen gas during battery operation can result in an explosion. Consequently, the National Fire Protection Association (NFPA) consensus standards (such as Section E 2.12 of NFPA 805, "Performance-Based Standard for Fire Protection for Light-Water Reactor Electric Plants," 2001) recommend battery room hydrogen accumulation limits of 1 percent, air flow sensors, loss-of-ventilation alarms in the control room, and fire protection design features. RG 1.189 is similar to industry standards. Given the importance of battery room ventilation, it is appropriate that IEEE Std 484 has addressed battery room ventilation since 1978. As stated in the response to NEI comment 1, an applicant may propose an alternative design.
	C.9(f)	Item f constitutes a requirement associated with Fire protection which is outside the scope of IEEE-484-2002. Propose the room designed to receive the battery should have the features called for in the design criteria for the room.	The NRC staff disagrees; no change is required. This is within the scope of IEEE Std 484-2002, in which Section 5.0, "Installation Design Criteria," Subsection 5.1, "Location," states that the battery should be protected against induced phenomena, such as fire and explosions. For more detail, see the staff's responses to NEI general comments 1 and 2 and EPRI comment C.9(d), above.
	C.9(f) and (e)	The capability to remove hydrogen from the battery room is a function of the ventilation system. Propose 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 function of the battery.	The NRC staff disagrees; no change is required. See the staff's responses to NEI general comment 1 and EPRI comment C.9(d), above. The amount of hydrogen generated is a function of the battery, and is used to calculate how much hydrogen can be removed from the battery room. Chapter 16 of NUREG-1805 describes how the battery parameters relate to ventilation requirements.

Originator	DG-1154 Section	Specific Comments	NRC Comment Resolution
Mark Clark, Wadsworth, TX (ML063260380)	B	IEEE 484 is a recommended practice, not a standard. For consistency, delete the abbreviation Std from all locations. Suggest IEEE ~~Std~~ 484-2002, was developed by the IEEE 484 Working Group ~~on Vented Lead-Acid Battery Installation, Station Design Subcommittee~~ of the *IEEE Power Engineering Society Stationary Battery* ~~Power Generation~~ Committee, *(previously IEEE Standards Coordinating Committee SCC-29)* and was approved by the *IEEE-Standards Association* Standards Board on September 12, 2002.	The NRC staff disagrees; no change is required. The nomenclature used in the NRC's RGs is the same as that used by IEEE. For example, see the cover sheet of the recommended practice, which specifies '"IEEE Std 484-2002." IEEE Std 484-2002 identifies the sponsor as the group mentioned in the comment, and also states that the standard was developed by the working group.
	B	Revise to read, "In addition…during *freshening, equalize, and (minimal) float* charging."	The NRC staff disagrees; no change is required. The term "charging" encompasses all possible charging scenarios.
	B	Revise to read, " ~~It is common *practice*~~*Conformance to IEEE 450-2002 endorsed by Reg. Guide 1.129 Rev. 2 includes recommendations for periodic* ~~to~~ *inspection of* battery cell plates for conditions that are known to result in degradation of battery performance~~., including excessive accumulation of lead sulfate, growth of the positive plates against the container, and evidence of excessive cell plate corrosion. In addition~~ *To perform these inspections,* the battery cells must be arranged on the racks to allow for inspection of cell plates.	The NRC staff disagrees; no change is required. IEEE Std 450-2002 provides for maintenance inspections that do not include inspections of the cell plates as indicated in the comment. (In the forthcoming revision of RG 1.129, the NRC's endorsement of IEEE Std 450-2002 will clarify that maintenance should include cell inspections.)
	C.4	Change "shall" to "must."	The NRC staff disagrees; no change is required to be consistent with IEEE terminology.

Originator	DG-1154 Section	Specific Comments	NRC Comment Resolution
	C.6	Delete the sentence that precedes the quotation. There is no technical basis for this change. The pre-charge readings if taken before the post-installation discharge test are only used for the freshening charge and have no value as records of battery condition. If the freshening charge occurs after the post installation discharge test, then the requirements of IEEE 450 supersede this requirement.	The NRC staff disagree with this comment, but has revised Regulatory Position 6 for other reasons; see the staff's response to NEI comment 6. IEEE recommends that the freshening charge should be after installation and before connection to the system. As such, freshening after the post-installation discharge test is not preferred.
	C.7	Revise to state, "Upon initial installation, ~~an acceptance~~ *a service test or modified performance test* shall be conducted in accordance with IEEE ~~Std~~ 450, as endorsed by Regulatory Guide 1.129." If a factory acceptance test was not performed, then a modified performance test or a combination of a performance test and service test is required. The purpose of this requirement is to demonstrate the ability of the battery to meet the TS requirements of the load profile and capacity. IEEE 450 defines an acceptance test as a capacity test which does not meet the intent to demonstrate the high rate capability in the as installed condition. IEEE 450 allows us to take credit for the factory acceptance for up to 2 years following installation. However, if the factory test is omitted, then in order to demonstrate that battery meets the capacity requirements an installation capacity test is required. This is a 10 CFR 50 Appendix B requirement and does not need to be included in this Reg. Guide.	The NRC staff agrees in part. See the staff's response to EPRI comment C.7.
	C.8	Delete the sentence that precedes the quotation.	The NRC staff disagrees; such a change is inconsistent with the NRC's regulatory guide standards and conventions.

Originator	DG-1154 Section	Specific Comments	NRC Comment Resolution
	C.9(b)	"Environmental Hazards" is an ambiguous term. The author needs to clarify what types of environmental hazards are to be protected against or delete this change.	The NRC staff agrees. See the staff's response to NEI comment C.9(b).
	C.9(c)	Revise to state, "Where portable or stationary water facilities are provided within the battery room, their design ~~should provide for neutralizing and containing spilled acid electrolyte, and~~ should preclude any inadvertent spilling of water from these facilities onto the battery itself." The deleted text is redundant with the existing wording and is not required.	The NRC staff agrees and has revised this regulatory position as suggested.
		Add Subsection 6.2.2 k that specifically includes the endorsement of Informative Annex A for measuring intercell connection resistances.	The NRC staff disagrees; no change is required. Annex A only provides examples of how to take intercell resistance measurements; other methods (such as those in IEEE Std 450-2002, Annex F) are available.