Regulatory Guide Periodic Review

Regulatory Guide Number:	**1.158, Revision 2**
Title:	**Qualification of Safety-Related Lead Storage Batteries for Nuclear Power Plants**
Office/division/branch:	**RES/DE/ICEEB**
Technical Lead:	**Liliana Ramadan**
Staff Action Decided:	**Revise**

1. What are the known technical or regulatory issues with the current version of the Regulatory Guide (RG)?

The NRC issued Regulatory Guide (RG) 1.158 in February 1989 to endorse, with certain clarifications, the Institute of Electrical and Electronics Engineers (IEEE) Standard (Std.) 535-1979, "IEEE Standard for Qualification of Class 1E Lead Storage Batteries for Nuclear Power Generating Stations." In 2006 the IEEE revised IEEE Std. 535 to address fundamental changes in nuclear plant designs and the corresponding impact on its battery cells of operating at duty cycles up to 72 hours vs. the typical duty cycles of 8 hours or less. However, at that time industry experience did not support 72 hour duty cycles using the methods delineated in IEEE Std. 535-2006. Therefore, the NRC did not endorse IEEE Std. 535-2006 and did not issue an update to RG 1.158 until longer duty cycles were appropriately addressed. In 2013 the IEEE revised IEEE Std. 535 to refine the methods and type-test procedures for two different battery applications. One application would be for duty cycles equal to or less than 8 hours and the other application would be for duty cycles greater than 8 hours. The revised IEEE Std. 535 demonstrates and outlines the qualified process for both applications to ensure battery performance. The revised IEEE Std. 535 provides comprehensive guidance for the qualification of batteries with an additional normative annex. The staff's review of the revised IEEE Std. determined that RG 1.158 should be revised to support new reactor license applications, design certifications, and applications for license amendments. RG 1.158 needs to better align with the revised IEEE Std. to address current methods and procedures.

2. What is the impact on internal and external stakeholders of <u>not</u> updating the RG for the known issues, in terms of anticipated numbers of licensing and inspection activities over the next several years?

The staff anticipates that a few license applications to use the updated IEEE Std. 535 in the next several years. In addition, there are currently 4 new nuclear power plants under construction and the NRC staff is beginning the design certification review for the NuScale small modular reactor. These activities will benefit from having access to the most current guidance for battery qualifications. Additionally, operating plants would benefit from guidance. The revision to RG 1.158 would incorporate the latest information

in IEEE Standard 535-2013 which has been revised since 2006 but not endorsed. It would increase the consistency between regulatory positions and other supporting guidance, and review practices. By doing so, the NRC would ensure that the RG guidance available in this area is current, and accurately reflects the staff's position.

3. What is an estimate of the level of effort needed to address identified issues in terms of full-time equivalent (FTE) and contractor resources?

NRC staff requires approximately 0.2 FTE to revise the RG. No contractor support is anticipated.

4. Based on the answers to the questions above, what is the staff action for this RG (Reviewed with no issues identified, Reviewed with issues identified for future consideration, Revise, or Withdraw)?

The NRC staff concludes that a revision of RG 1.158 is warranted to address the most current methods, procedures and operating experience.

5. Provide a conceptual plan and timeframe to address the issues identified during the review.

The NRC staff plans to develop a draft guide by the second quarter of FY2017, and issue it for public comment by the fourth quarter of FY2017.

NOTE: This review was conducted in September 2016 and reflects the staff's plans as of that date. These plans are tentative and are subject to change.