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Date: Tue, Oct 9, 2007 9:45 AM
Subject: Transmittal of Comments on Draft Regulatory Guide DG-1148 - (72 Fed. Reg. 41,793 (July 31, 2007))

In the referenced Federal Register Notice, the U.S. Nuclear Regulatory Commission Staff requested comments concerning proposed revisions to its regulatory guidance on qualification of safety related battery chargers and inverters. The comments provided herein are submitted on behalf of the Nuclear Utility Group on Equipment Qualification.

<<DG-1148 Final NUGEQ Comments.pdf>>
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October 8, 2007

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

SUBJ: Comments on Draft Regulatory Guide DG-1148, "*Qualification of Safety-Related Battery Chargers & Inverters for Nuclear Power Plants*," (72 Fed. Reg. 41,793 (July 31, 2007))

Ladies and Gentlemen:

In the referenced *Federal Register Notice*, the U.S. Nuclear Regulatory Commission ("NRC") Staff requested comments concerning proposed revisions to its regulatory guidance on qualification of safety related battery chargers and inverters. The comments provided herein are submitted on behalf of the Nuclear Utility Group on Equipment Qualification ("NUGEQ" or the "Group").¹

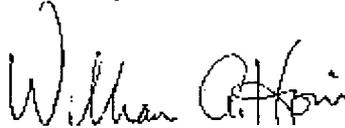
The enclosed comments and recommended DG-1148 changes are intended to help clarify the NRC guidance and make it consistent with accepted industry practice and currently regulatory guidance regarding the qualification of electrical equipment typically located outside containment in mild environment plant areas

¹ The NUGEQ is comprised of member electric utilities in the United States and Canada, including NRC licensees authorized to operate over 90 nuclear power reactors in the United States. The NUGEQ was formed in 1981 to address and monitor topics and issues related to equipment qualification, particularly with respect to the environmental qualification of electrical equipment pursuant to 10 C.F.R. § 50.49.

Chief, Rules and Directives Branch
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U.S. Nuclear Regulatory Commission
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We appreciate the opportunity to comment on DG-1148. Please feel free to contact the NUGEQ if the NRC Staff would like further information or clarification on any of these comments. The NUGEQ apologizes for the slight delay in submitting these comments.

Sincerely,

A handwritten signature in black ink, appearing to read "William A. Horin". The signature is written in a cursive style with a large initial "W".

William A. Horin
Counsel to the Nuclear Utility Group
on Equipment Qualification

Enclosure: DG-1148 – NUGEQ Comments

DG-1148 - NUGEQ Comments (10/8/2007)

(Applicable DG-1148 text precedes NUGEQ Comment and NUGEQ Recommendation)

1. Regulatory Position (1) - Clause 5.2.2.4 of IEEE Std 650-2006 should be supplemented to specify the following criterion for ignoring cycling as an aging factor:

The mechanical cycling of connectors is expected to be less than 10 times during the qualified life or service life of the battery chargers and inverters.

NUGEQ Comment: The NUGEQ disagrees because a single arbitrary number of cycles does not adequately recognize the wide variety of connector design capabilities which exist. Clause 5.2.2.4 states: “*When mechanical cycling of connectors can be shown to occur very infrequently, cycling need not be considered as an aging factor for qualification.*” The NUGEQ believes that “infrequently” should be related to the published design capabilities of the connector. The NUGEQ suggests that infrequent be interpreted to mean less than 10% of the published design cycles. Furthermore, many commercial/industrial connectors are tested to several military and commercial standards, such as ASTM B794-2003, “Standard Test Method for Durability Wear Testing of Separable Electrical Connector Systems Using Electrical Resistance Measurements.” Compliance with such standards is a valid basis to establish the cycle qualification of connectors and ignore connector cycling as an aging mechanism.

NUGEQ Recommendation: Delete the sentence beginning – “*The mechanical cycling of connectors . . .*” and replace with the following:

Connector mechanical cycling can be ignored as an aging factor if the expected number of cycles during the qualified life or service life of the battery chargers and inverters is infrequent (i.e., less than 10% of the cycle design in the published connector specification). If the design capability has not been published then infrequent means less than 10 times during the life of the battery chargers and inverters. Connector mechanical cycling can also be ignored as an aging factor if the expected number of cycles is less than the capability established by connector testing based on military or commercial standards such as ASTM B794-2003, “Standard Test Method for Durability Wear Testing of Separable Electrical Connector Systems Using Electrical Resistance Measurements.”

2. Regulatory Position (2) - Due to the complexity of static battery chargers and inverters, Clauses 5.3.1.6 and 5.3.1.7 of IEEE Std 650-2006 should be supplemented to specify that testing is the preferred method of qualification for environmental stress test and seismic tests.

NUGEQ Comment: The NUGEQ believes RP2 is unnecessary because it is redundant to existing IEEE 650 guidance. Additionally, RP2 references Clauses 5.3.1.6 and 5.3.1.7; both clauses specify testing requirements and do not address other qualification methods. RP2 is unnecessary because Clause 5,

Qualification, states: *"The qualification of Class 1E static battery chargers and inverters shall be established by analysis and test as outlined in this clause."*

The standard justifies and clarifies this guidance in Clause 1.2, Purpose, which states, in part: *"The qualification methods in this standard employ a combination of type testing and analysis. Operating experience is of limited use as a sole means of qualification,"* and *"In general, battery chargers and inverters are too complex to be qualified by analysis alone, although analysis is effective in the extrapolation of test data and the determination of the effects of minor design changes to equipment previously tested."*

NUGEQ Recommendation: Delete RP2. The NRC might consider adding text to either the Introduction or Discussion sections stating that the NRC agrees with IEEE 650 which specifies that the qualification of Class 1E static battery chargers and inverters shall be established by analysis and test.

3. Regulatory Position (3) - Clause 5.3.1.6 of IEEE Std 650-2006 should be supplemented to specify that functional performance data should be continuously monitored during the qualification testing.

NUGEQ Comment: The NUGEQ disagrees with RP3 and the need to continuously monitor performance data during the Clause 5.3.1.6 environmental stress test which demonstrates performance at normal temperature extremes. The NUGEQ agrees with the current IEEE-650 guidance which requires modifying voltages and loads and measuring characteristics at the end of the high and low temperature plateaus and at ambient conditions before and after the thermal cycle.

Battery chargers and inverters are typically installed in mild environments; yet, the RP3 guidance exceeds similar guidance in Regulatory Guide 1.89 (RG1.89) regarding harsh environment equipment. RG1.89 in § C.3.d states, in part, *"Performance characteristics that demonstrate the operability of equipment should be verified before, after, and periodically during testing throughout its range of required operability"* (emphasis added).

Finally, the NUGEQ believes the NRC guidance would be difficult to implement. Clause 5.3.1.6 requires documentation of specified performance data at maximum, nominal, and minimum input voltages, and maximum and minimum loads. It would be inappropriate, unnecessary, and very difficult to continuously modify voltages and loads and measure characteristics during the entire test which can be 36 hours in duration.

NUGEQ Recommendation: Delete RP3.