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VICE PRESIDENT  
NUCLEAR OPERATIONS  
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February 28, 2012

Mr. Eric J. Leeds  
Director, Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

**Subject:** Concerns Associated with NRC Release of Regulatory Issue Summary 2011-12, Revision 1, "Adequacy of Station Electric Distribution System Voltages"

**Project Number: 689**

Dear Mr. Leeds:

This letter outlines concerns the Nuclear Energy Institute (NEI)<sup>1</sup> has with the content and application of NRC Regulatory Issue Summary (RIS) 2011-12, Revision 1 (ML113050583). This RIS was issued on December 29, 2011, and is intended to clarify the NRC staff's technical positions on existing regulatory requirements specified in General Design Criteria (GDC) 17 to 10 CFR Part 50, Appendix A. Our concerns have been expressed previously on draft versions of the RIS through the public comment process and during public meetings. Review of the final RIS finds that many of industry stakeholder comments have not been adequately dispositioned. We believe that implementation of methods identified in the RIS can result in plant changes that are contrary to safety. The purpose of this letter is to communicate what continues to be the primary issues of concern and identify the steps necessary to resolve these concerns.

### **Implementation of RIS is Contrary to Operational Safety and Plant System Reliability**

In our comments on a draft version of the RIS and through public meetings, we identified safety concerns with the implementation of certain RIS positions on degraded voltage protection. We noted that implementation will result in increased instances of separation from offsite power, unnecessarily stress the emergency diesel generators, and increase the likelihood of "double

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

sequencing<sup>2</sup>.” These concerns were generally dismissed by staff statements that “proper design of the plant electrical system...should provide more than adequate operating margin, preventing unnecessary separation from offsite power.”<sup>3</sup> While this statement is valid, we believe that the methods called for by the RIS fail to recognize that proper design of electrical systems requires margin to be established for all facets of operation and that a balance must be maintained for often competing requirements.

To illustrate our concerns, an industry technical working group performed analyses for six different nuclear power stations using the methodology described in the RIS. These analyses, as documented in the attachment, were performed to determine the degraded voltage relay (DVR) setpoint necessary to support two key RIS positions: 1) DVR based on starting voltage requirements of safety related equipment and 2) initiation of an event at the DVR setpoint.

The analysis results demonstrate that setting the DVR on the basis of providing motor starting protection will likely result in increased DVR setpoints. Either method used to calculate available starting voltage is shown to potentially raise the DVR analytical limit, forcing an increase in the dropout setting and therefore the reset setting. This will reduce if not eliminate the margin between required switchyard operating voltage and anticipated post-accident voltage, increasing the probability of a LOOP from DVR timeout. In the case of one method, the results demonstrate a significantly higher DVR setting will be required along with potential elimination of switchyard operating voltage margin. Operating in such a manner would be unreliable and would not reflect actual system conditions expected during a response to a design basis event. The resulting minimum switchyard voltages required for DVR reset are unrealistic, if not unattainable, and would be counter to Transmission Operator criteria. Although analyzing motor starting voltage requirements based on the DVR setting is purported in the RIS to demonstrate that DVRs would provide protection against all eventualities regarding the voltage response of the non-Class 1E electrical system, it fails to do so. To the contrary, since a voltage relay only measures voltage (and not power system capacity), any proposed analytical technique must assume some level of power system capacity, thereby violating the stated purpose of the protective function, which is to provide protection against any conditions.

These analyses demonstrate that it is vital that guidance for degraded voltage protection be developed and implemented in a manner that fully takes into account the impacts on operational and transient conditions.

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<sup>2</sup> Double sequencing refers to an unintended sequence of operations at a nuclear power plant during which safety and accident mitigation loads automatically start, shut down, and restart in rapid succession when called on to operate. This occurs when, for some combination of reasons, safety bus voltages fall below acceptable levels after the plant is shut down and mitigation loads are started. The buses must be isolated and then repowered from diesel generators or some alternate offsite source. Following this, shutdown and mitigation loads can be restarted.

<sup>3</sup> Response To Public Comments On Docket Id NRC-2011-0013 Proposed Generic Communications: Draft NRC Regulatory Issue Summary 2011-xx: “Adequacy of Station Electric Distribution System Voltage”, ML113050588.

**A Regulatory Guide is the appropriate vehicle for guidance contained in the RIS**

The RIS states that it is intended to "clarify the NRC staff's technical position on existing regulatory requirements...specified in General Design Criteria (GDC) 17 to 10 CFR Part 50, Appendix A." The RIS goes on further to state that "This RIS does not transmit any new requirements or staff positions."

In our comments on the draft RIS, we questioned the appropriateness of issuing technical positions via a RIS instead of a regulatory guide. We noted that the level of prescription in the RIS far exceeds the general design criteria contained in GDC-17 and, as such, is more appropriate as regulatory guidance that would outline a set of methods and techniques that the NRC staff finds acceptable for meeting regulatory requirements, but not necessarily the only set.

Our comments also noted the regulatory evolution of degraded voltage protection that has resulted in protection being provided through a number of different approaches that were previously reviewed by NRC and found to comply with GDC-17. These different approaches are memorialized in the licensing bases of individual plants. Despite clear evidence of an evolution of regulatory guidance and clear differences between the RIS and previously issued guidance, the RIS maintains that it "does not transmit any new requirements or staff positions." Our comments, noting the differences between prior guidance and the staff positions contained in the RIS, were generally dismissed by a statement that the staff position is "consistent" with prior guidance. Consistency is not an appropriate test for determining if current staff positions have changed.

The RIS effectively bypasses the requirements of 10 CFR 50.109 by stating that NRC staff has maintained a single set of consistent positions that have remained unchanged and that these positions have been consistently applied in the reviews of plants licensed since the 1971 issuance of GDC-17. This has led to, and will continue to lead to, instances where the adequacy of previously approved licensing bases are challenged through the inspection process and licensees are forced to modify their previously approved designs to comply with the most recent interpretation of staff positions contained in the RIS with no measureable improvement in plant safety.

We believe that the RIS should be withdrawn and that a regulatory guide should be developed. This is necessary to make it clear that alternative methods and solutions to meet GDC-17 requirements are possible and will be deemed acceptable if they provide a basis for compliance with applicable regulatory requirements. Whether guidance is provided in a RIS or regulatory guide, we believe it is incumbent on NRC to provide a clear and coherent basis for technical positions, with a clear nexus to regulatory requirements and to provide justification for why alternative methods currently in use by licensees are not appropriate.

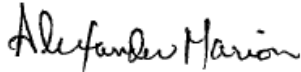
Working Group 4.7 of IEEE Subcommittee SC-4, "Auxiliary Power" is currently drafting a revision to Annex A of IEEE 741-1990, "IEEE Standard Criteria for the Protection of Class 1E Power Systems and Equipment in Nuclear Power Generating Stations", to provide guidance on setting degraded and loss of voltage relays and their associated time delays. We believe that this effort provides the best

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opportunity to develop durable guidance to support degraded grid voltage protection configurations that ensure adequate steady state voltages at the terminals of all equipment necessary for accident mitigation during both accident and non-accident conditions.

If you have any questions or wish to discuss this important topic further, please feel free to contact me or John Butler at 202.739.8108; [jcb@nei.org](mailto:jcb@nei.org).

Sincerely,

A handwritten signature in black ink that reads "Alexander Marion". The signature is written in a cursive style with a large, stylized 'A' and 'M'.

Alexander Marion

Attachment

c: Mr. Bruce A. Boger, NRR, NRC  
Mr. Daniel H. Dorman, NRR, NRC  
Mr. Patrick L. Hiland, NRR/DE, NRC  
Mr. James W. Andersen, NRR/DE/EEEB, NRC