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Chief, Rules Review and Directives Branch  
U. S. Nuclear Regulatory Commission  
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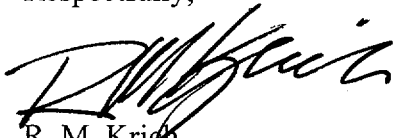
Subject: Response to Request for Comment, Draft NUREG 1709 "Selection of Sample Rate and Computer Wordlength in Digital Instrumentation and Control Systems"

References: (1) Volume 64, Federal Register, Page 58107 (64 FR 58107), dated October 28, 1999

This letter provides Commonwealth Edison (ComEd) Company comments on the draft NUREG described in Reference 1.

We appreciate the opportunity to provide our input.

Respectfully,



R. M. Krich  
Vice President - Regulatory Services

Attachment

## Attachment

### **Commonwealth Edison Company Comments on Draft NUREG 1709 "Selection of Sample Rate and Computer Wordlength in Digital Instrumentation and Control Systems"**

- 1. Mathematical validation should not be recommended where a program of Electro Magnetic Interference (EMI) / Radio Frequency Interference (RFI) validation and reduction and a program of signal noise monitoring, reduction, and filtering is utilized in conjunction with industry experience relative to acceptable cycle time for the particular control system.**

Draft NUREG-1709 expands the recommendation to apply this document beyond the traditional Safety Related classification. Systems that are important to safety or have a requirement for high functional reliability are stated to be within the scope of the document. Thus, NUREG-1709 will apply to systems under consideration for upgrade to digital control that are non-Safety Related. While NUREG-1709 does stipulate many items that are important to a stable overall system, it will add burden to the design process to validate and document many of the issues identified in the "review guidelines." Many of these are taken care of by vendor design and experience with product line equipment that has demonstrated process stability in similar applications at other power plants or process industries. Other items in the review guidelines will require extensive testing to validate frequency spectrums and then show mathematically the appropriate cycle times. There is ample industry experience that applies directly to control applications in the power plant for non safety related systems. For example, applications such as Boiling Water Reactor (BWR) pressure regulator systems need relatively fast total cycle times (i.e., on the order of 50 milliseconds). However, BWR Reactor Water Level Control systems need medium range total cycle times (i.e., approximately 250 milliseconds or less) to provide stable and yet responsive control. Other systems such as the BWR Reactor Recirculation Systems do not need such fast cycle times and will perform acceptably with relatively slow cycle times (i.e., 500 milliseconds or less). Each of the above referenced systems is non-Safety Related. Appropriate input filtering and appropriate Analog-to-Digital (A/D) converter process times are known by the vendors and take care of aliasing problems. Vendors have addressed stability issues in the design of their products for the process control industry, which, in many cases, has applications that exceed the design requirements of nuclear power plant process control. Recommendations for mathematical validation will not add significant value to the overall design process.

- 2. No additional mathematical analysis or modeling should be recommended to demonstrate worst case transient compliance with signal compatibility if the EMI /RFI and noise analysis has been completed for the system. These analyses will envelope plant conditions for normal operation and transients.**

The draft NUREG-1709 may require some extensive modeling to obtain representation of signal spectrums during worst case transients. Many of the concerns implicit in the NUREG-1709 emanated from early problems as digital systems were first introduced to the power plant. These resulted primarily from early digital systems that used 8-Bit technology, which created large steps in the end signal to the driven components. With

advances in technology, modern systems available to us now use much higher resolution and very fast processor speeds that create very fine control signals.

For Safety Related systems, several vendors are in process with the NRC to obtain Safety Evaluations (SEs) on their entire product lines to qualify them for Safety Related applications. The issues addressed in this NUREG-1709 should be covered at the vendor level during the SE process with the NRC. Following the guidance in Draft NUREG-1709 will necessitate that we obtain detailed vendor design information to provide written evidence of the consideration of all the "Review Guidelines" in our design process. It will also result in performing additional calculations or even modeling to demonstrate signal frequency spectrums that would be obtained in the worst case transients for Safety Related functions.

**3. Accuracy and uncertainty calculations should be required only for those systems currently requiring accuracy and uncertainty calculations.**

The draft NUREG-1709 Review Guideline (RG) 1 allows a sliding scale of application "as safety significance decreases," for the strict application of this guideline which asks for accuracy/uncertainty calculations. This will allow the reviewer undefined latitude to request calculations of uncertainty for applications that previously would not have required such calculations.

**4. Similarly, error calculations should be required only for those systems currently requiring error calculations.**

Draft NUREG-1709 RG3 also allows a sliding scale of application "as safety significance decreases," for the strict application of this guideline which asks for error calculations. RG3 should also only be applicable to systems currently requiring error calculations.