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Integrated Action Plan to Modernize Digital Instrumentation and Controls Regulatory Infrastructure

Comment On: NRC-2016-0068-0001
Integrated Action Plan to Modernize Digital Instrumentation and Controls Regulatory Infrastructure;
Preliminary Draft Action Plan for Comment

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General Comment

At the March 30, 2016 meeting NRC asked several questions about the draft Digital Instrumentation and Control (I&C) Improvement Plan:

1. Is NRC focused on the correct regulatory challenges and timing: working on the highest priorities; what is not needed; and what is missing?
2. Are there regulatory challenges that need to have more detailed working group plans to address in near-term?
3. Does the plan have the right scope and assumptions for detailed working group plans?
4. What does near-term success look like from an external stakeholder standpoint?

Comments from NewClear Day, Inc. are provided in the attached file.

Attachments

NewClear Day Comments on NRC DI&C Improvement Plan

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NewClear Day Comments on NRC's Integrated Action Plan to Modernize Digital Instrumentation and Controls Regulatory Infrastructure

At the March 30, 2016 meeting NRC asked several questions about the draft Digital Instrumentation and Control (I&C) Improvement Plan:

1. Is NRC focused on the correct regulatory challenges and timing: working on the highest priorities; what is not needed; and what is missing?
2. Are there regulatory challenges that need to have more detailed working group plans to address in near-term?
3. Does the plan have the right scope and assumptions for detailed working group plans?
4. What does near-term success look like from an external stakeholder standpoint?

Summary Response to Question 1: The issues of the treatment of digital common cause failures (CCF) and the nexus of the CCF to 10 CFR 50.59 evaluations are the two key issues that must be addressed to meet the Commission objective expressed in SRM-SECY-15-0106 that "NRC requirements and guidance should not pose an unnecessary impediment to advancement in nuclear applications of digital technology."

NewClear Day recommends the following order of priority for the elements of the Digital I&C Improvement Plan:

1. Assess Commission Policy on Potential Common Cause Failures
2. Improve Guidance for Using DI&C in Existing Nuclear Power Plants Using 10 CFR 50.59
3. Regulatory Document Infrastructure Improvements
4. Guidance for Evaluation of Proposed Alternatives to Regulatory Guides and Endorsed Standards
5. Improvement in Regulatory Consistency from Licensing to Inspection
6. DI&C Licensing Process
7. DI&C Topical Report Evaluation and Update Process

The task action plans related to updating endorsements of IEEE Standards 603 and 7-4.3.2 should be deferred until the broader direction setting aspects of the tasks to identify regulatory document infrastructure improvements and evaluate alternatives to regulatory guides and endorsed standards are completed. Two technical topics and one management topic are missing: updating commercial grade dedication guidance for digital devices to better address devices of limited functionality, reassessing the prescriptive focus of the software development review guidance in Branch Technical Position (BTP) 7-14, and defining the change management activities necessary to shift the current digital I&C review culture to the new paradigm with the objective of ensuring effective implementation. The 2007 effort with the digital I&C interim staff guidance documents stopped short of ensuring effective and consistent implementation of the interim staff guidance; consequently, the expected results in enabling operating plant modernizations based on the deployment of digital I&C technology and approving highly integrated controls rooms in new plant designs was not achieved.

Summary Response to Question 2: Yes, there needs to be near-term actions to address the broader direction setting aspects of the tasks to identify regulatory document infrastructure improvements and evaluate alternatives to regulatory guides and endorsed standards. These actions must be focused on a clean slate approach to modernizing the NRC's digital I&C regulatory infrastructure to be performance-based rather than prescriptive and technology neutral to the extent practical.

Summary Response to Question 3: No. The plan does not clearly convey the right scope and assumptions for the detailed working group plans for two overarching the two overarching aspects (one technical and the other regulatory) important to establishing a clear and unambiguous “roadmap” for digital implementation. The CCF effort must clearly be focused on shifting the current regulatory paradigm that a digital device must be assumed to have a design defect that will be triggered concurrent with any abnormal operating occurrence (AOO) or postulated accident (PA) with the worst possible consequences that can be envisioned. Instead, the perspective must change to recognizing the improvements in industrial digital technology used in safety-critical applications and how the attributes of those systems can be used narrow the scope of credible CCFs that must be assumed to exist and require mitigation or demonstration that the consequences can be tolerated. Similar, the regulatory guidance infrastructure modernization effort must take a clean-slate approach to digital development quality assurance controls to move away from the dated and overly prescriptive approach currently defined in BTP 7-14, the associated Regulatory Guides, and the endorsed standards. That framework is based on outdated microprocessor-based software development processes that do not reflect modern tool-based industrial development processes used in safety-critical applications.

Summary Response to Question 4: Near-term success would consist of a change in the regulatory framework that addresses the two overarching aspects (one technical and the other regulatory) important to establishing a clear and unambiguous “roadmap” for digital implementation. The issue of digital CCF (acknowledged to be a beyond design basis design consideration) would be treated consistent with other beyond design basis considerations that are within the current regulatory framework. Digital CCF would be treated as an element to be considered in a good design that is subordinate to the more important design basis considerations rather than be the single controlling aspect of digital I&C designs. Similarly, the review guidance and review methods used for the digital development process would be defined at a technology-neutral and performance-based level (in a manner similar to that defined in ASME-NQA-1-2008) rather than the specification of thousands of low-level (but mandatory) requirements that are based on outdated microprocessor-based software development processes. Importantly, long-term success must be defined as achieving operating plant modernizations based on the deployment digital I&C technology and the approval of highly integrated controls rooms in new plant designs. These long-term results must be measured and achieved without frequent or excessive management intervention by industry or NRC.