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Defining "Important to Safety"

Comment On: NRC-2015-0213-0005
Determining Which Structures, Systems, Components and Functions are Important to Safety

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General Comment

I have worked for 41 years in the nuclear business having contributed to the design, and assessment of reactor systems, supported USNRC activities, and participated in the development of national, international, and IAEA standards for electrical, instrumentation, and control systems for nuclear power plants.

Systems important to safety that are not also classified as safety-related systems play a vital role in the safety of nuclear power plants. They act to prevent deviations to plant operations that, if unchecked, can challenge safety systems. They also provide backups to mitigate the consequences of accidents that are not fully controlled by safety systems. Recently I studied the contributions of instrumentation, control (I&C), and human system interface (HSI) to accidents that involved significant core damage. [1] One conclusion of this study is that many of the I&C and HSI systems that contributed to these accidents were not safety systems. The Kemeny Commission report on the TMI-2 accident also highlighted this issue. [2]

NRC regulations (10CFR50) provide requirements for many systems important to safety and make it clear that quality assurance requirements apply to all systems important to safety. Nevertheless, it is my experience that the lack of a clear definition of the term "important to safety" results in inconsistent application of NRC requirements. This creates a hazard that independent assessment and check of many critical systems, functions, and operations might not be performed.

Consequently, I agree with the petitioner that a clear definition of the term Important to Safety is needed.

Furthermore, a term is needed for the sub-category "important to safety but not safety-related." The lack of a name for this important category makes it easy to ignore.

I recommend that the CFR include simple definitions for the term important to safety, and for a new term describing items that are not safety-related, but still important to safety. Given the global nature of today's nuclear industry it would be desirable to have terms and definitions that are consistent, or at least compatible with, the IAEA definitions and classification schemes. [3, 4]

I do not, however, agree that the detailed definition proposed by the petitioner should be ossified in regulations. The specifics are likely to change with the new generations of plants now being developed and deployed. Therefore, I suggest that it is more appropriate to locate the details in industrial standards and reg. guides.

Most of the world has defined three safety classes within the important to safety category. NRC has, de facto, such a system consisting of safety systems, systems important to safety with enhanced requirements, and other systems important to safety. In the NRC structure, however, the enhanced requirements were, in many cases, developed ad hoc for each system involved. NRC may wish to rationalize this system by developing, or encouraging the development of, common criteria for such systems as part of defining the term important to safety.

References:

[1] Severe Nuclear Accidents, Lessons Learned for Instrumentation, Control, and Human Factors. EPRI 2002005385 (2015).

[2] Staff Report to the President's Commission on The Accident at Three Mile Island, Reports of the Technical Assessment Task Force, Vol. I, p 58, US Government Printing Office (1979).

[3] IAEA Safety Glossary, IAEA (2007).

[4] Safety Classification of Structures, Systems, and Components in Nuclear Power Plants, SSG-30, IAEA (2014).