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Defining "Important to Safety"

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Determining Which Structures, Systems, Components and Functions are Important to Safety

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General Comment

See attached file(s)

Attachments

2016-03-18 Comments on ITS Nuclear Regulatory Commission

Comments of GE Hitachi Nuclear Energy on Nuclear Regulatory Commission (NRC); Request for Comment on Petition for Rulemaking PRM-50-112; NRC-2015-0213; Determining Which Structures, Systems, Components, and Functions are Important to Safety (81 Fed.Reg. 410; Jan. 6, 2016)

In the subject request for comment, the NRC indicated that it received a petition for rulemaking (PRM) request that the NRC amend its regulations to define the term "important to safety" and provide a set of specific criteria for determining which structures, systems, components (SSCs) and functions are "important to safety."

Comments

It is not clear that the lack of more definition for the term "important to safety" has been problematic. While defining more terms may be useful if a new regulatory regime is to be developed, the proposed action could be more problematic than beneficial. For the existing NRC regulatory regime, rulemaking to define "important to safety" as proposed may not be necessary for the reasons discussed below in responses to NRC specific items. Even if a definition were to be considered, it could be more appropriate to define the term in regulatory guidance specific to the particular use of the term (as in current regulatory guidance for a number of areas), rather than attempt to define the term in a broad, general context. If a proposed rulemaking activity is undertaken, it may be more appropriate to broaden the activity (within the context of 10 CFR Parts 50 and 52) to a fresh look at the classification in light of both the risk-informed approach and considering different categories of structures, systems, and components (SSCs). In addition, for any rule changes that may result, related changes to codes, standards, and guidance should be made concurrently to address the revised classification scheme.

The petitioner's request for a definition of "important to safety" and the background presented in NRC Item 1 below focus on nuclear power plant regulations in 10 CFR Part 50 and its related parts. While these comments apply in that context, it is recognized that other regulations also use the term "important to safety" as a general term. If the NRC elects to define "important to safety" for purposes of 10 CFR Parts 50 and 52, then it is important to ensure that the rulemaking remains focused on Parts 50 and 52 so that it does not inadvertently impact other parts and other types of licenses and processes. How the proposed action might be viewed in a larger context is discussed below.

Discussion of NRC Specific Requests for Comments

The NRC indicates it is seeking advice and recommendations from the public on the PRM and is particularly interested in comments and supporting rationale from the public on the following:

1. ***On January 5, 1984, the NRC issued Generic Letter 84-01, ''NRC Use of the Terms, 'Important to Safety' and Safety Related','' to address concerns on the NRC use of the terms ''important to safety'' and ''safety related'' and***

provided the NRC staff's position on safety classification. In SECY-85-119, ''Issuance of Proposed Rule on the Important-To-Safety Issue,'' dated April 5, 1985 (ADAMS Accession No. ML15322A002), the NRC staff requested Commission approval to clarify the terms ''important to safety'' and ''safety related'' through rulemaking. The proposed rule would have defined these terms generally and clarified specifically the nature and extent of certain affected quality assurance requirements. The NRC staff also looked at determining what equipment should be classified as important to safety and what requirements are imposed on this class of equipment. In the Staff Requirements Memorandum (SRM) to SECY-85-119, SRM-SECY-85-119, ''Issuance of Proposed Rule on the Important-To-Safety Issue,'' dated December 31, 1985 (ADAMS Accession No. ML15322A003), the Commission disapproved the NRC staff's proposed rulemaking actions. In the SRM, the Commission informed the NRC staff that the proposed rule did not adequately differentiate nor clarify the terms ''Important-to-Safety'' and ''Safety Related.'' The Commission reiterated in the SRM that it continues to believe that it is necessary to resolve the apparent confusion surrounding usage of the term ''Important-to-Safety.'' In SECY-86-164, ''Proposed Rule on the Important-To-Safety,'' dated May 29, 1986 (ADAMS Accession No. ML15322A005), the NRC staff recommended changes to the proposed rule in SECY-85-119 that would address the Commission comments in the SRM to SECY-85-119. In a memo from the Secretary of the Commission dated June 24, 1991 (ADAMS Accession No. ML15322A006), the request for rulemaking in SECY-86-164 was withdrawn. Please provide any new information and analysis that could provide the basis for changes to the NRC's regulations.

The regulatory processes have evolved over time. Since the time when a definition of "important to safety" was being considered, the NRC and the industry have moved in the direction of less prescriptive regulations and toward a risk-informed, performance-based regulatory approach and oversight process. For nuclear reactors, examples include (1) 10 CFR 50.69, risk-informed categorization and treatment of SSCs; (2) 10 CFR 50.65, for monitoring the effectiveness of maintenance for both safety-related and nonsafety-related SSCs; (3) regulatory guidance for plant-specific, risk-informed decision-making; and (4) the Reactor Oversight Process.

The move toward greater use of risk insights is based on the 1995 Commission Policy Statement, Use of Probabilistic Risk Assessment Methods in Nuclear Regulatory Activities. This policy statement recognized that a probabilistic approach could enhance and extend the traditional, deterministic approach by (1) allowing consideration of a broader set of potential challenges to safety, (2) providing a logical means for prioritizing these challenges based on risk significance, and (3) allowing consideration of a broader set of resources to defend against these challenges.

In addition, the NRC has issued two additional design certification rules, both which employ passive safety features that included a classification of nonsafety-related SSCs

that have regulatory treatment. Other activities involve interactions with international regulatory agencies in cooperation for industry growth, both domestic and global, and harmonization of industry codes and standards.

The proposed rulemaking should be viewed from a risk-informed or performance-based perspective and considering the NRC risk policy goals. Defining the term could limit the current degree of flexibility in the regulatory processes that provides opportunities to define the scope of a requirement on a topic-specific basis through development of guidance. Including a prescriptive definition could limit the flexibility that is needed to implement risk-informed and performance-based requirements. Indeed, the items included in the proposed definition are generally addressed in regulatory guidance and are already implemented or identified in licensing basis documents. There are other terms used in requirements or guidance that may need to be redefined or reconsidered if "important to safety" is defined.

2. ***The NRC requests specific examples where the lack of a formal NRC definition (i.e., codified in 10 CFR chapter I) of the terms, ''safety related,'' and ''important to safety'' directly resulted in adverse consequences to external stakeholders. The NRC's evaluation of the cost and benefits of adopting a formal definition would be enhanced if commenters provided a quantitative estimate of the costs and/or unachieved benefits due to the lack of formal definitions of these two terms.***

No information is provided for this item. However, defining "important to safety" could have an impact on the current status of a number of existing regulatory approvals, including licensing basis documents, design certifications, programs, and guidance documents that may not be completely consistent (or may need to be confirmed to be consistent) with a definition. If the NRC elects to define "important to safety," it could be important to determine if the subset of safety-related SSCs is properly defined, or if it is too broad, in light of the years of experience in implementing nuclear regulatory processes. These efforts could have negative costs and benefits to external stakeholders that might not be offset by positive benefits.

3. ***What regulations would have to be revised to reflect the new definition, and what would be the nature (objective) of the revision for each provision of the regulation which must be revised?***

No attempt is made to review existing regulations and guidance at this time. However, such a review would be necessary in order to ensure that the purpose and objectives for defining "important to safety" are achieved through a rulemaking effort that should give consideration to the impact on other requirements. Examples of such considerations are provided below.

Not only would regulations and guidance that currently use the term "important to safety" need to be reviewed, but the requirements and guidance that do not use either "safety-related" or "important to safety" would also need to be reviewed, and possibly

amended, if a definition of "important to safety" is included in 10 CFR 50.2, "*Definitions.*" Other subsets of "important to safety" SSCs may already be used in a particular context, but not within the subset of safety-related SSCs. The examples above of risk-informed regulations and processes may need to be reconsidered. A review would need to first focus on 10 CFR Part 50, and then expand to related regulations and guidance to ensure that there are no inconsistencies in the use of the term as it would be defined.

Examples of mitigation rules that do not currently use the term "important to safety," but for which nonsafety-related SSCs may be credited for actions that are important to safety, could be within the definition and may need to be amended:

- 10 CFR 50.62 "*Requirements for reduction of risk from anticipated transients without scram (ATWS) events for light-water-cooled nuclear power plants.*"
- 10 CFR 50.63 "*Loss of all alternating current power.*"

NRC regulations in 10 CFR Part 50, Appendix B, "*Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants,*" do not currently define QA requirements for nonsafety-related SSCs which are determined to be important to safety. However, 10 CFR Part 50, Appendix A, Criterion 1, "Quality standards and records, provides that SSC important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety functions to be performed. To remain consistent with Appendix A, requirements that may be added to Appendix B would need to be based on the importance of the safety functions to be performed. For example, for design certification and new license applications, SRP 17.5, Section II.U (Rev. 1, 08/2015), addresses QA requirements for the following categories of SSCs: "Nonsafety-related SSCs that are significant contributors to plant safety" and "Nonsafety-Related SSCs Credited for Regulated Events."

Requirements in 10 CFR 50.49 would need to be reviewed, as it defines a specific scope of electric equipment important to safety covered by the regulation. If the general definition would create a conflict with the scope, then 10 CFR 50.49 may need to be amended. This could result in changes to environmental qualification programs and procurement specifications that exist or would be developed in the future.

Regulatory guidance has been developed, modified, and maintained with certain assumptions regarding the scope of important to safety as it relates to the subject of the guidance. Reviews may indicate a need for revisions to the guidance in light of the definition of "important to safety" to ensure that the term is not misused.

4. ***What, if any, guidance would be needed to implement the new definition, and what should be the scope, level of detail, and content of the guidance?***

The existing regulatory guidance would need to be reviewed and revised to be consistent with the definition of "important to safety." It may not be necessary to issue new guidance specifically related to explaining the definition.

Other Considerations

This information is provided as another viewpoint if the NRC elects to proceed with a rulemaking to further define or to modify the existing classification framework in the existing regulations. Rather than defining "important to safety," which has been understood as a broader set of SSCs, of which "safety-related" is a subset, the NRC could consider amending its regulations to bring the NRC safety classification framework into alignment with other modern and global nuclear regulatory frameworks, which generally include multi-tiered classifications. Several examples of modern and global nuclear regulatory frameworks with multi-tiered safety classifications are provided below.

- IAEA, in Safety Guide SSG-30 recommends a four-tiered nuclear safety class framework, comprising Safety Categories 1, 2, 3 and Not Categorized.
- Finland Radiation and Nuclear Safety Authority (STUK) in its new Regulatory Guides on nuclear safety (YVLs) in general and regulatory guide B.2 specifically which require that a nuclear facility's structures and components be grouped into the Safety Classes 1, 2, 3 and Class EYT (i.e.; non-nuclear safety).
- U.K Health and Safety Executive's (HSE) Office for Nuclear Regulation (ONR), in its new Safety Assessment Principles (SAGs) for Nuclear Facilities Technical Assessment Guides (TAGs) which require a four-tiered safety class framework, comprising Safety Classes 1, 2, 3 and Not Categorized.

These examples of modern and global nuclear regulatory frameworks with multi-tiered safety classification frameworks cover all aspects of nuclear power plant structures, systems, and components in a cross-disciplinary manner. They are not limited or specific to the Instrumentation and Control (I&C) discipline; although it may be appropriate to consider different classification schemes for certain categories of SSCs.

According to the World Nuclear Association in its September 2015 report, "Safety Classification for I&C Systems in Nuclear Power Plants", the countries of Canada, France, India, Japan, Korea, Russia, Switzerland and Germany all use similar multi-tiered safety classification frameworks (Reference 1).

Changing an existing nuclear safety classification framework may be complex and challenging. Such an effort likely involves significant effort and time by that country's nuclear regulator and industry communities. However, there are two recent examples

of it being done; 1) Finland's STUK and its new set of YVLs and 2) UK's ONR SAGs and TAGs. It is interesting to note that these changes to the nuclear safety classification frameworks were and are being undertaken concurrent with on-going new nuclear power plant activities covering standard plant design assessments and site-specific licensing, engineering, procurement and construction. In the case of Finland's STUK, it has explicitly addressed that there may be differences in the application of new regulations to operating plants. This is done in YVL B.2, Section titled "Rules for application", 2nd Paragraph, 1st Sentence, which states:

> *When considering how the new safety requirements presented in the YVL Guides shall be applied to the operating nuclear facilities, or to those under construction, STUK will take due account of the principles laid down in Section 7.a. of the Nuclear Energy Act (990/1987): The safety of nuclear energy use shall be maintained at as high a level as practically possible. For the further development of safety, measures shall be implemented that can be considered justified considering operating experience, safety research and advances in science and technology.*

Current observations may indicate that a combination of deterministic and risk-informed approaches is used to assess applicability of the new YVLs to operating plants. Therefore, a global precedent has been set that it is possible for a nuclear regulator responsible for an operating fleet to change (i.e., modernize) their safety classification framework.

Most global nuclear regulatory frameworks include at least three unique safety classification levels used to categorize all plant structures, systems, and components as well as system functions and equipment. The NRC is encouraged to consider if the regulatory change to develop a new multi-tiered safety classification framework would be appropriate as an alternative approach to defining "important to safety."

The formal adoption by the NRC of a three- or four-tiered nuclear safety classification framework would not be inconsistent with other NRC concepts which have developed over time and which may imply the need for additional explicit safety classifications. Examples include the concepts of:

- 10 CFR 50.69. "Risk-informed categorization and treatment of structures, systems and components for nuclear power reactors" which defines a 4-tiered safety classification scheme based on a probabilistic risk analysis (PRA) approach.
- Regulatory Guide 1.201, "Guidelines for categorizing Structures, Systems and Components in Nuclear Power Plants according to their Safety Significance" which defines a 4-tiered classification framework.

- Regulatory Guide 1.206, “Combined License Applications for Nuclear Power Plants”, Section C.IV.9, “Regulatory Treatment of Non Safety Systems” (RTNSS) with Standard Review Plan, 19.3 Regulatory Treatment of Non Safety Systems for Passive Advanced Light Water Reactors.”
- Augmented quality for nonsafety-related SSCs used to mitigate beyond design basis events such as station blackout and software common-cause failure.

The petitioner’s alphabetic list of functions and systems included in the petition for rule-making is a reasonable definition of a “middle” nuclear safety classification with the exception of item a) covering safety-related structures, systems and components. This approach identifies that this is essentially a new category and that it would no longer support the concept of “safety-related” being a subset of “important to safety.” Moving away from the use of “important to safety” and identifying a new class (e.g., nonsafety-related SSCs that are significant contributors to plant safety) could be less confusing.

Reference

1. World Nuclear Association, CORDEL Digital Instrumentation & Control Task Force, “Safety Classification for I&C Systems in Nuclear Power Plants – Current Status and Difficulties,” Table 2 (page 9).

http://www.world-nuclear.org/uploadedFiles/org/WNA/Publications/Working_Group_Reports/safety-classification-for-iandc-systems-in-npps.pdf