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10 CFR Part 53: Risk-Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors

Comment On: NRC-2019-0062-0012

Preliminary Proposed Rule Language: Risk-Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors

Document: NRC-2019-0062-DRAFT-0034

Comment on FR Doc # 2020-24387

Submitter Information

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General Comment

Please find attached a comment on the scope of risk function, requesting that it should be limited to containment. Also, the comment suggests that all design elements not related directly to containment be designed to commercial standards.

Attachments

comment1

Comment on use of “reasonable assurance” NRC-2019-0062

The comment

This comment, in particular use of the qualifier “reasonable assurance,” was summarized during the public comment period in the November 18, 2020 NRC Public Meeting.¹ The Nuclear Regulatory Commission (The Commission) responded that the term is used in other regulation. This comment expresses an ongoing concern that the term “reasonable assurance” should not be used in connection with “adequate protection” as a regulatory requirement for technical specifications in license applications.

The regulations should state what is required of the licensee’s “License Application” that, in turn, should reflect what the Commission deems necessary for adequate protection. This reviewer further notes that, in fact, the term “reasonable assurance” does appear in the Atomic Energy Act of 1954 (AEA) with “adequate protection”; for example in Section 189, Hearings and Judicial Reviews,

“...it shall allow operation during an interim period under the combined license.”

and again in Section 192, Temporary Operating License,

“...here is reasonable assurance that operation of the facility during the period of the temporary operating license in accordance with its terms and conditions will provide adequate protection to the public health and safety and the environment during the period of temporary operation ...”

Where Congress uses the term “reasonable assurance” in connection with “adequate protection” it refers to interim or temporary relief from full assurance of adequate protection as required in Section 182, License Applications, for the facility (final) technical specifications. The use by Congress seems to be consistent with the understanding as stated in the previous comment on the Federal Register website (on 11/27/2020) that addition of the term infers uncertainty as to whether or not adequate protection is met.

¹<https://www.nrc.gov/pmns/mtg?do=details&Code=20201300>. Accessed 7 December 2020.

On the concern

This reviewer's ongoing concern is addition of the qualifier "reasonable assurance" to adequate protection leaves open the possibility that adequate protection is not being met in a plant's licensed condition. The public trusts the Commission is able to define the conditions that must be met for adequate protection; this reviewer's understanding is that, by statute, the Commission has complete control over the conditions that must be met for adequate protection. It seems that conditions required by the AEA are either met or not; if they are not met, the Commission should not grant a license or license amendment as applicable. In summary, if the Commission is either unable or unwilling to assert license conditions it requires for adequate protection are met in a plant license, the public should rightfully be skeptical about adequate protection of their health and safety.

Summary of Background

The proposed rule language in 10 CFR Part 53, "Risk-Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors," includes the wording *reasonable assurance* of adequate protection:

"Each advanced nuclear plant must be designed, constructed, operated, and de-commissioned such that there is reasonable assurance of adequate protection of the public health and safety and the common defense and security." (Proposed language in §53.20, Subpart B - Technology-Inclusive Safety Requirements)²

This reviewer's understanding is that the AEA indicates license applicants would provide materials to the Commission so that the Commission can make a determination that the licensee's proposed technical specifications would provide adequate protection to the health and safety of the public. Although "reasonable assurance of adequate protection" is allowed to be assessed by the Commission for interim conditions, contrary to License Applications called for in the AEA, in the proposed rule, the "adequate protection" standard is qualified by "reasonable assurance."³

The reasonable assurance qualification along with the required unqualified "adequate protection" charge in the AEA creates unnecessary confusion on the regulation's intent and additionally implies the Commission may be unsure adequate protection is met. In this reviewer's opinion, the term "reasonable assurance" should not be added in this new regulation regardless whether it appears elsewhere in regulation; if used elsewhere, it is equally unnecessary and confusing and should be removed as part of the transformative

²<https://www.regulations.gov/comment?D=NRC-2019-0062-0012>, also <https://www.regulations.gov/docket?D=NRC-2019-0062>

³This reviewer believes that Section 182, bearing on License Applications would apply to the Technical Specifications the Commission would evaluate. Again this reviewer believes that interim conditions is not the right standard for a license application.

regulatory structure asked for in the Nuclear Energy Innovation and Modernization Act (NEIMA).

Bibliography

- Bernoulli, J. (1713). *Ars conjectandi*. Impensis Thurnisiorum, fratrum.
- Cardano, G. (1663). Liber de ludo aleae. *Opera omnia 1*, 262–276.
- Cardano, G. (1961). *The book on games of chance:(Liber de ludo aleae)*. Holt, Rinehart and Winston.
- Doorn, N. and S. O. Hansson (2011). Should probabilistic design replace safety factors? *Philosophy & Technology 24*(2), 151–168.
- Hansson, S. O. (2004). Philosophical perspectives on risk. *Techné: Research in Philosophy and Technology 8*(1), 10–35.
- Hansson, S. O. (2009). From the casino to the jungle: Dealing with uncertainty in technological risk management. *Synthese 168*(3), 423 – 432.
- Kolmogorov, A. N. (1933). Foundations of probability.

Reviewer background & statement on motivation

My experience extends to most nuclear power settings, US Navy nuclear operator (submarine service), fuel manufacture, national laboratory tests (LOFT program), and experience as Shift Technical Advisor, Unit Reactor Engineer, Probabilistic Risk Analyst at a large commercial PWR power station, and in academia, teaching undergraduate and graduate nuclear engineering courses and nuclear engineering research in university settings. Experience in nuclear power has led me to believe that careful regulation of nuclear power technology is absolutely essential, and that the Commission, as it is has been designed to regulate following the AEA, is certainly the most effective United States regulatory authority. Before Bernoulli’s observation, it was understood that assigning numerical probabilities in the absence of large data sets is unreliable. The Commission’s historical reliance on engineering physics in regulatory prescription has been so successful that there are effectively no data available to obtain a numerical accident probability in domestic commercial nuclear power accidents. This lack of data has implications for risk in regulation that concerns me.

Motivation for this comment goes further than a concern that a “reasonable assurance of adequate protection” standard might be confusing in regulation; “reasonable assurance” may be construed to imply that numerical values could be derived for the probability

of radioactive material release from advanced reactor core melt accidents where data are nonexistent.⁴ If Bernoulli was mistaken, one may imagine a utilitarian argument could be devised to obtain transitive ordering of safety in alternative designs based on probability of consequential accidents in the absence of data; regulation could be devised whereby designs below some maximum “risk level,” as a probability of consequence, could be deemed acceptable. In my opinion, Hansson’s 2009 “Tuxedo Fallacy” warning against probability assignment in reasonably complex technological systems should be heeded as we go forward with risk-informed regulation.⁵ Finally, it seems Congress has it right, “reasonable assurance of adequate protection” should only be used in temporary assessments.

⁴Engineered protective systems ensure it is (fortunately) unlikely there will ever be sufficient consequential radioactive release data that probabilities can be reliably determined in either existing or advanced reactors.

⁵See <https://www.nrc.gov/reading-rm/basic-ref/glossary/risk-informed-regulation.html> for the Commission statements on risk-informed regulation. Website accessed 3 January, 2021.