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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

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Submitter Information

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General Comment

Attached is our of November 1, 2021 letter on PRA's and 10CFR53

Attachments

Hybrid Pwr to NRC ltr Nov 1 re 10CFR53 PRAs

Michael F. Keller
President
Hybrid Power Technologies LLC

November 1, 2021
10CFR53: PRA



Mr. John Tappert
Director, Division of Rulemaking, Environmental, and Financial Support
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: Hybrid Power Technologies LLC Input on the NRC Rulemaking Plan on, Risk-Informed, Technology-Inclusive Regulatory Framework; Proposed 10CFR53.

Mr. Tappert:

The various requirements contained in the proposed 10CFR53 undisputedly vastly exceed their counterparts in the existing Parts 50/52 of the Code of Federal Regulations. Such complexity is clearly inconsistent and at odd with the REF. (1) Congressional Act directing modernization of the licensing process. In particular, the Act's "risk informed" considerations are being overridden by the NRC staff attempting to create unwarranted new requirements that are not commiserate with level of risk.

This letter is directed at the use of probabilistic risk analyses, as discussed in a number of meetings involving 10CFR53, most recently on October 28, 2021. In our view, the NRC staff is excessively obsessed with the use of PRA's. Generally and historically, PRA's are not particularly noteworthy elements of the design of power plants (including nuclear units). Further, nuclear PRA's are fundamentally creatures of the regulatory process, being used to demonstrate that the public is not at undue risk from hazardous radiation potentially emitted by a nuclear plant.

An overview of historical reality is helpful.

1. Nuclear power plants destined for deployment and operation in the mid 1970's did not use formal PRA's to design the Nuclear Steam Supply System, design the Balance of Plant, or operate the plant. As I was heavily involved with all three activities, I am quite certain this statement is true. However, the use of failures and effects analyses associated with radiological releases were used to support licensing activities. At the time, formalized requirements for nuclear PRA's were in a state of flux.
2. Fast forward to the time frame of the Westinghouse AP1000. The formalized PRA approach was extensively used while some existing nuclear units began using PRA processes in conjunction with plant operations. In passing, the cost to license and subsequently build an AP1000 assumed staggering and unprecedented proportions. NRC staff involvement assumed unprecedented levels. Construction costs soared to unprecedented levels as the complications of ever more prescriptive regulatory requirements and guidance swept through the process of procuring materials and building the plant. Curiously, the AP1000 employs passive measures to provide radiological public protection for several days after a major accident. Event/dose probabilities reached angels-on-the-head-of-a-pin proportions.

Michael F. Keller
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November 1, 2021
10CFR53: PRA

3. Contrast nuclear power plants with the ubiquitous natural gas combined-cycle (NGCC) power plant. Formalized regulator approved PRA's are not used to design, build and operate these power plants. As I have been heavily involved with all three of these activities, I am quite certain I am correct. NGCC plant build costs and staff operating costs are minor fractions of those associated with nuclear power plants.

Am I contending that the NRC staff's and academia's undue fascination with PRA's has helped fuel excessive costs for nuclear power plants? Yes I am. The PRA tools need to be focused on key aspects of providing evidence that the public is properly protected from hazardous radiation and ***not*** used by the NRC staff to impose requirements on all manner of activities associated with the general design, construction and operation of the power plant. The concept of mission-creep should always be kept in mind by the NRC staff.

I can only speculate as to the roots of the NRC staff's excessive obsession with PRA's. However I suspect the problem lies with: (1) a decoupling from the practical realities of power plants; (2) the academic's penchant for believing all design and operational issues can be solved by ever more complex PRA's; and (3) the regulator's desire to control everything associated with nuclear power plants.

In closing, high-fidelity PRA's are the enemy of reasonable and efficient PRA licensing tools. The final version of 10CFR53 should absolutely avoid prescriptively detailing the particulars of PRA's. Rather, the PRA tool should be fit for the intended purpose of providing evidence that the public is at an acceptable level of radiation risk attributable to Design Basis Events. The onus is on the designer and licensee (not the NRC staff) to prove the fitness of the selected PRA tool(s).

The high-level approach we are advocating only requires a few sentences, as opposed to the extensive and complicated verbiage currently contained in the proposed 10CFR53.

We are somewhat hopeful that a proper 10CFR53 will be the end result of the development effort.

Regards,

Michael F Keller

Michael F. Keller Professional Engineer – State of Kansas
President
Hybrid Power Technologies LLC