

MEMORANDUM

TO: T. S. Kress
D. A. Powers
G. E. Apostolakis
FROM: J. N. Sorensen *JNS*
DATE: March 23, 1999
SUBJECT: Draft Letter on Defense in Depth - Again

A second comment has evolved to the point where I can articulate it, albeit not with great elegance.

The March 6 draft of the letter states that ". . . limiting the risk of core damage also constitutes a fundamental regulatory objective because of the large loss function associated with the hypothetical manifestation of a core damage event even if it does not lead to injuries."

It does not seem to me sufficient to assert that the large loss function associated with core damage accidents justifies its establishment as a regulatory objective. I suspect that CDF may in fact be an appropriate regulatory objective, but I don't think that either the staff or the committee has yet articulated the case.

An observer of the NRC's evolution of risk informed regulation, from the perspective of one who has no qualifications whatsoever in the discipline of PRA, could easily form the impression that the primary argument for using core damage frequency as a regulatory goal is that calculations of CDF are more defensible than calculations of more direct measures of risk.

At the Regulatory Policies and Practices Subcommittee meeting on August 27, 1997, there was a discussion among Drs. Kress, Powers and Garrick regarding the rationale for using CDF. Dr. Kress argued that CDF is closely related to risk and therefore was a suitable surrogate. Dr. Garrick argued that CDF was not closely related to risk and was therefore not a suitable surrogate. Dr. Powers argued that CDF was not closely related to risk, but that better surrogates were beyond the reach of current analytical methods. Since that meeting, Dr. Powers has, on more than one occasion, tweaked the staff about espousing risk informed regulation and proposing CDF informed regulation. The Committee has never reached closure on this issue. I believe that the difference (or the relationship) between CDF and risk needs to be addressed and disposed of if CDF is

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to be kept as the defacto basis for risk informed regulation.

One of my early lessons in engineering was that when writing specifications, the specification(s) should be on the parameter of direct interest, rather than on a surrogate. If a surrogate is used, its validity should be established as rigorously as possible. Failure to justify the relationship can lead to unintended and sometimes absurd consequences. In the case of regulation, if our concern is risk, then it would seem that the regulated quantity should be risk.

In a hallway conversation with Dr. Kress a couple of weeks ago, I raised the question of justifying CDF as a fundamental safety goal based on the "large loss function." Dr. Kress indicated that he intended the term "loss function" to include more than the licensee's economic loss. Perhaps defining in the letter what is included in the "loss function" would be sufficient. It would seem preferable, however, to establish the relationship of CDF to either risk or adequate protection.

c: J. T. Larkins
R. P. Savio