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UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D.C. 20555-0001

Aug. 2, 2001

MEMORANDUM TO: J. Sorensen, S. Bahadur, J. Larkins, and R. Savio

MEMORANDUM #: AWC-107.2001

FROM: A. W. Cronenberg

SUBJECT: Review of Jack Sorensen Memo: *Some Observations on Risk-Informing Appendices A & B of 10-CFR-50*

Overview Comments: This memo is well written and presents a good insight as to overall purpose and value of the General Design Criteria (GDC) for the safe design of LWR plants. It is on par with your prior reports on *Defense in Depth* and *Safety Culture*. I agree with your bottom-line conclusions, namely that:

(a) As currently written, the GDC do not appear the be an impediment to continued agency efforts at risk informing regulations or granting licensee burden reduction.

(b) Wether or not the GDC remain unchanged or rewritten to reflect risk input, the fact remains that the GDC are useful and necessary, as they provide the guiding principles for the design of LWRs to assure an adequate level of safety. There is a need for some statement of such design criteria, wether risk informed or not.

(c) If major changes in the regulatory framework are to be undertaken, then possibly a rewrite of the GDC in risk terms might prove useful. However, short of such a major restructuring to risk-based regulations, as opposed to risk-informed, no great benefit is seen from a rewrite of the GDC.

Your report provides sufficient discussion and examples that support these observations.

My major comment/critique relates to report style rather than substance. At the start of my reading, I found myself paging back and forth, looking for a statement of the purpose/intent of this study/report, why it was undertaken, and its intended use. I think some introductory remarks in this regard would be helpful. I also see a need for a more structured report, to facilitate ease of reading, such as an up-front Executive Summary (brief summary of report

purpose, scope, observations/conclusions) and Introduction providing not only a description of the GDC and their purpose, but an outline of the report structure to accomplish your aim. For example, your report might be structured as follows.

> **Title Page**
> **Executive Summary** (summary of report purpose, scope, observations/conclusions)
> **Table of Contents** (provides reader an index of report contents/structure)
> **Introduction** (description of GDC, report purpose, report outline to accomplish your aim)
> **Chapter 1**: Structure of GDC and Description of Appendix A
> **Chapter 2-6**: Incorporate your sections into separate chapters
> **Chapter 7**: Report Observations, Conclusions, and Recommendations

With regards to my suggestion of an Introduction providing some guidance as to report structure, the following is abstracted from my report on margins and provides an example of what I suggest.

> From Introduction in Cronenberg's Margin Report: To address concerns regarding potential margin reductions owing to power uprates and plant life extensions, this report is structured as follows. Chapter 1 examines how the concept of "margin" has been incorporated into the regulatory process, specifically in the Code of Federal Regulations (CFR), the General Design Criteria (GDC) for Nuclear Power Plants, Regulatory Guidance (RG), and the Standard Review Plan (SRP). Chapter 2 provides examples of how regulatory margin requirements and guidance are often subsumed into national engineering and design codes, specifically the ASME Boiler and Pressure Vessel Code. Chapter 3 then explores potential margins impacted by a power uprate license action, with specific application to the Edwin Hatch uprate application. Such estimates largely center on a comparison of component operational conditions or predicted loads (stress) with specified design limits for that component. Chapter 4 presents a similar study of margins impacted by plant life extension, which center on estimates of the so-called cumulative usage factor (CUF) for cyclic/fatigue loadings on passive components. These estimates are compared to the allowable CUF limit of one. Chapter 5 provides a discussion of how margin reductions for individual components might be integrated into a more holistic/integrated assessment for the plant as a whole, making use of risk analysis techniques. Report observations, conclusions, and recommendations are summarized in Chapter 6.

The suggestion of a better report structure should facilitate ease of reading, particularly for those unfamiliar with why you undertook this study. My comments is this regard, in no way subtract from what I believe provides a good review of the GDC, their bottom-line purpose, and your very clear indication of the utility, or lack thereof, should the agency attempt a rewrite of the GDC in risk language.