

January 27, 2003

MEMORANDUM TO: Chairman Meserve
Commissioner Dicus
Commissioner Diaz
Commissioner McGaffigan
Commissioner Merrifield

FROM: William D. Travers */RA/*
Executive Director for Operations

SUBJECT: TECHNICAL BASIS FOR REVISION OF THE PRESSURIZED
THERMAL SHOCK (PTS) SCREENING CRITERIA IN THE PTS RULE
(10 CFR 50.61)

This memorandum forwards the results of a multi-year study conducted by the Office of Nuclear Regulatory Research (RES) to re-evaluate the technical basis of 10 CFR 50.61, the pressurized thermal shock (PTS) rule which was issued in 1985. This study is discussed in the attached memorandum dated December 31, 2002 from RES to the Office of Nuclear Reactor Regulation. The results of this study provide a basis to support rulemaking to revise the PTS rule. The staff plans to continue confirmatory research activities in this area to support the rulemaking process.

Research efforts to evaluate the risk of reactor pressure vessel (RPV) failure caused by PTS have continued to improve the underlying analytical methods and data needed to evaluate the risk due to PTS. By early 1999 it appeared there was a sufficient basis to undertake a study to re-evaluate the technical basis for the rule. The PTS study was undertaken and became a major risk-informed initiative which began in advance of the other Option 3 efforts although the approach used is consistent with the Option 3 framework. The study has directly supported the goals of reducing unnecessary regulatory burden and improving efficiency, effectiveness, and realism, while maintaining safety. The staff informed the Commission of the approach to this study in SECY-00-0140 and has kept the Commission informed on progress in SECY-01-0045, SECY-01-0185, and SECY-02-0092.

Based on the detailed evaluations of the Beaver Valley Unit 1, Oconee Unit 1, and Palisades reactor pressure vessels, we have concluded that a sufficient technical basis exists to undertake a significant revision to 10 CFR 50.61. For these three plants, the mean frequency of through-wall cracking due to PTS is estimated to fall significantly below 1×10^{-6} /reactor year.

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This indicates that, even considering uncertainties, there is a significant margin against RPV failure caused by a PTS event. Our investigation included a scoping-level review of the margin between RPV failure, core damage, and large early release to enable assessment of PTS risk in terms of core damage frequency (CDF) and large early release frequency (LERF). Even making the conservative assumption that vessel failure results in core damage and large early release, the resulting CDF and LERF values would be very low. In summary, the results of the study suggest that concerns regarding PTS challenges to reactor pressure vessel integrity are effectively eliminated for any currently anticipated operational lifetime (60 to 80 years).

During the course of this study, the RES staff worked closely with the industry and NRR, and has routinely briefed the Advisory Committee on Reactor Safety (ACRS) and its cognizant subcommittees.

Attachment:
As stated

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