

July 21, 2003

MEMORANDUM TO: Ledyard B. Marsh, Director
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

FROM: Michael E. Mayfield, Director /RA/
Division of Engineering Technology
Office of Nuclear Regulatory Research

SUBJECT: TRANSMISSION OF REPORT: USE OF THE "EDY" FORMULA

This report describes the general basis for some refinements that could be made to the vessel head susceptibility calculation, or the so-called "time-at-temperature" model used to compute the susceptibility of CRDM penetrations to cracking and leakage. The report discusses the origin and meaning of the "Q", or activation energy for the initiation of cracking. It also contains a synopsis of how variations in the materials properties (yield strength and grain boundary carbide coverage, in particular) affect the susceptibility to stress corrosion crack initiation and growth. This report also points out that the model focuses on the crack growth in Alloy 600, and does not account for cracking in Alloy 182, the closure weld alloy, which has been found cracked in many of the actual field observations.

Transmission of this report satisfies a milestone in the D-B LLTF Recommendations Task Force Action Plan. This report was completed in February, 2003, and has been circulated for comments from NRR and RES colleagues. This version of the report includes additional discussion based on those comments.

Attachment: As stated

Distribution:

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