



FRAMATOME ANP, Inc.

October 17, 2003
NRC:03:069

Farouk Eltawila, Director
Division of Systems Analysis and Regulatory Effectiveness
Office of Nuclear Regulatory Research T10-E32
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Confirmation of Existing Cladding Embrittlement Criteria

Ref.: 1. Letter, James F. Mallay (Framatome ANP) to Ashok C. Thandani (NRC), "ANL High Burnup Test Program," NRC:03:068, October 17, 2003.

Dear Farouk:

I am sending a letter to Dr. Thadani today (Reference 1, with copy to you) stating Framatome ANP's endorsement of a September 9 letter from EPRI on the ANL high burnup test program. This letter provides additional detail in support of our position on this topic. We believe the current regulations concerning cladding embrittlement criteria for both Appendix K and "best estimate" evaluation models must not be revised (50.46(a)(1)).

Following the ECCS rulemaking hearing in 1972, an ECCS rule was issued in early 1974 that provided substantial conservatism in the evaluation model (Appendix K) and in the acceptance criteria (now embodied in 50.46(b)). Following an extensive evaluation in the mid-1980s, a revised rule was issued in September 1988 that added guidance for a "best estimate" model (50.46 (a)(1)(i)) and clarified the requirement for retained ductility for cold, post-accident conditions (50.46(b)(2)).

The development of this latter revision, concerning retained ductility, is the critical issue addressed in this letter. The current regulations on maximum cladding oxidation are based on the information available in 1973 as well as considerable testing done in the following years. The NRC decided, in formulating the 1988 rule, that impact tests were sufficient for demonstrating adequate, post-accident cladding performance. There has not been any testing performed since 1988 to question this decision.

Because of the emphasis placed on the desirability of using best estimate models, both in the regulations (the very first paragraph in 50.46) and in subsequent regulatory guidance that was intended to encourage the use of such models, the reactor vendors mounted major initiatives to develop new computer codes. Each of these new best estimate models required an investment of several million dollars and several years of work. There are now a number of plants licensed, or about to be licensed, that apply these new methods.

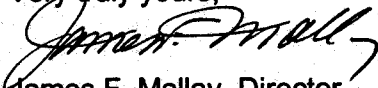
These new evaluation models are highly integrated methods that incorporate a determination of a series of uncertainties on many key parameters. Any change to these models, such as the calculation of oxidation, would require a re-determination of uncertainties, a repeat of the

validation process, and a reanalysis of those plants already licensed using the current models. Although any given change may appear to be straightforward, nearly any change would require a huge effort that would involve a large fraction of the time and effort needed for the original development work.

We therefore conclude that basic parameters, such as acceptable oxidation levels and their method of calculation, must not be changed. Unless substantial evidence is accumulated based on the same experimental techniques previously used (namely, impact tests) that seriously question the adequacy of the existing acceptance criteria, it is imperative that the regulations not be revised.

Framatome ANP urges the NRC to conduct the planned tests at ANL in a manner to confirm the adequacy of the current regulations, including the use of impact tests.

Very truly yours,



James F. Mallay, Director
Regulatory Affairs

cc: F. Eltawila
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