February 25, 2004

Dr. Rosa L. Yang, Area Manager
Electric Power Research Institute
3412 Hillview Avenue
Palo Alto, CA 94304

Dear Dr. Yang:

At the public meeting with NRC on October 24, 2003, EPRI expressed concern about the type of test that is being performed at Argonne National Laboratory (ANL) to assess the embrittlement criteria in 10 CFR 50.46(b). We are performing ring-compression tests as agreed at our meeting with your staff (also Framatome, Westinghouse, and ANL) last June. At the October meeting, however, EPRI and other industry representatives ask for a change from ring-compression tests to impact tests in the ANL program.

We agree that the basis for determining acceptance criteria in 10 CFR 50.46(b)(1) and (2) should not be changed at this time. However, during the meeting in October, industry representatives claimed that the original basis (ductility as measured by ring-compression tests) was changed in 1988 to a new basis (strength as measured by impact tests) as part of the best-estimate rule change in 10 CFR 50.46. We do not agree that this change took place.

The confusion arises from a staff report (NUREG-1230, 1988), which was cited as a reference for changes to 10 CFR 50.46 that were made in 1988. In that report, there is a recommendation that Chung and Kassner's criteria be used for predicting cladding failure due to thermal shock and fuel handling. These cladding-thickness criteria were based on their impact tests (NUREG/CR-1344, 1980), which have been cited as demonstrating that the current criteria (2200^{o}F temperature limit, and 17% oxidation limit) are conservative with respect to cladding failure during quenching.

The criteria that were recommended in NUREG-1230 were never adopted. Changes to the rule in 1988 were confined to the specification of acceptable evaluation models in 50.46(a). The Statement of Consideration for the rule change (53 FR 35999) comments on the acceptance criteria in 50.46(b) and states, ". . . that the Commission did not give consideration to altering them in the final rule." Thus, our review of the record shows that the basis for the temperature and oxidation limits in 50.46(b)(1) and (2) was not changed in 1988. Therefore, the basis for the current regulation is still the retention of non-zero ductility rather than the maintenance of cladding strength. NUREG reports may contain results and recommendations, but they do not by themselves constitute agency positions or alter regulations.

Although the current effort was intended to result in minimal changes to the acceptance criteria in 10 CFR 50.46, the NRC is always open to suggestions for other changes. If EPRI is proposing to change the underlying basis for the regulation from ductility to strength, we are willing to consider changes to the regulation that reflect this approach. This approach would most likely require an assessment of LOCA-related loads as well as an assessment of fuel rod strengths. Load assessment is not currently in our research plans. Such a change would

necessitate a revision of the scope, funding, and schedule of our cooperative research programs. We would welcome an industry initiative to define these loads and, if desired, to petition to NRC for a rule making under 10 CFR 2.802.

I hope that these comments clarify the status of the underlying basis for the embrittlement criteria in 10 CFR 50.46 and the availability of a process to change the rule. Please let me know if you have any further questions on this subject.

Sincerely,

/RA/

Farouk Eltawila, Director
Division of Systems Analysis and Regulatory Effectiveness
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