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SUBJECT: Responds to NRC request for info re reactivity effects of
 steam generator crevice flushing. Reactivity impact of RCS
 temp increase from 200 F to 330 F examined. Adequacy of
 shutdown margin evaluated by comparing reactivity insertion.

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Donald C. Cook Nuclear Plant Unit Nos. 1 and 2
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74
REACTIVITY EFFECTS OF STEAM GENERATOR
CREVICE FLUSHING

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Attn: H. R. Denton

Dear Mr. Denton:

In response to a request from the NRC staff, we have examined the reactivity impact of a Reactor Coolant System (RCS) temperature increase from 200°F to 330°F that is required for steam generator crevice flushing. During crevice flushing, all four steam generators are conditioned with hydrazine as needed and boric acid, pressurized with nitrogen, and heated to approximately 300°F via the reactor coolant. The steam generators are then repeatedly depressurized, drained, and refilled to flushing level. During the heating and cooldown that will occur intermittently in this process, there will be changes in reactivity, and I&MECo was requested to evaluate the adequacy of the shutdown margin because Cook Plant cores have a positive isothermal temperature coefficient at the beginning of life. This was performed by comparing the reactivity insertion due to positive temperature coefficient with the shutdown margin available via the RCS boron.

During crevice flushing, the boron concentration in the RCS will be maintained at the level required for 68°F. This shutdown boron concentration assumes that the most reactive RCCA is stuck out of the core, although all rods are known to be inserted. The shutdown boron also provides a 100 ppm (~1000 pcm) allowance for boron depletion and a 100 ppm (~1000 pcm) allowance for conservatism. The depletion of the overall plant inventory of boric acid is less than 1%. For Unit 2, Cycle 6, the total reactivity margin due to the above is approximately 3191 pcm. The reactivity insertion due to positive isothermal temperature coefficient and RCS temperature increase from 200°F to 330°F at beginning of life is approximately 410 pcm for Unit 2, Cycle 6. Since the reactivity insertion is substantially less than the margin available, adequate shutdown margin is maintained. We believe that this large margin supports the availability of the shutdown margin for both units and for all cycles.


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At end of life, the isothermal temperature coefficient is negative and therefore RCS temperature increase does not cause reactivity insertion. During the process of steam generator crevice flushing, the RCS temperature may drop slightly. Since shutdown boron concentration for 68°F is maintained, adequate shutdown margin is maintained for cooldown from 330°F.

This document has been prepared following Corporate procedures which incorporate a reasonable set of controls to insure its accuracy and completeness prior to signature by the undersigned.

Very truly yours,


M. P. Alexich
Vice President

cm

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