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LTR-REA-00-708
December 22, 2000

Proj 690

Mr. Sam Lee
US Nuclear Regulatory Commission
License Renewal and Standardization Branch
Washington, DC 20555-0001

Subject: Interpretation of GALL Section XI.M13 "Reactor Vessel Surveillance"

Dear Mr. Lee:

There have been a number of discussions involving our utility colleagues regarding the interpretation of one of the paragraphs in the subject GALL section. Specifically, Paragraph 6 that reads as follows:

> *If an applicant has a surveillance program that consists of capsules with a projected fluence exceeding the 60-year fluence at the end of 40 years, the applicant withdraws one capsule at an outage in which the capsule receives a neutron fluence equivalent to 60-year fluence and tests the capsule in accordance with the requirements of ASTM E185. If available, one capsule should remain in the vessel at all times. Additional capsules should be removed and placed in storage, depending on whether the licensee is considering a second renewal period (i.e. 80 years of operation). Any changes in anticipation of additional renewals, should be discussed with the staff.*

A further clarification of the intent of this paragraph would be important to Westinghouse as well as to utilities that operate Westinghouse 3-loop and 4-loop reactors that have neutron pad style reactor internals structures. The key characteristic (from a reactor vessel surveillance viewpoint) of these reactor internals designs is that the surveillance capsule lead factor (for all capsule positions) is quite large, e.g. on the order of 3.5 to 5.0. Recall that the lead factor is the ratio of the fast neutron exposure rate seen by the surveillance capsules to that seen by the peak location at the inner surface of the reactor vessel.

Two different interpretations of the above paragraph from the GALL report have been voiced. These positions are summarized below. At issue is whether or not to leave a surveillance capsule in the reactor and whether or not to irradiate a surveillance capsule to an 80-year-equivalent fluence now. We would appreciate it very much if you would review these comments and provide clarification of the NRC's intent.

Interpretation 1: The NRC recommends (in the GALL report) that a surveillance capsule should remain in the vessel for the life of the plant and that this capsule can satisfy the requirement to "continuously monitor the neutron exposure of the reactor vessel." Further, the reactor vessel material specimens in this capsule are unimportant.

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Interpretation 2: In the "license renewal lessons learned" context, the phrase "if available" refers to more than simply having a spare surveillance capsule available. In addition, there needs to be a low lead factor capsule position available. For plants like Calvert Cliffs (with wall mounted surveillance capsules) or plants like Turkey Point (with surveillance capsule positions on the thermal shield that have either low lead factors or positions that actually lag behind the peak exposure of the reactor vessel) it does make sense to leave the surveillance capsules in the vessel. However, for plants with high lead factors, this effectively destroys the surveillance specimens by over-exposing them relative to the reactor vessel. For example, in 40 years in a plant with a lead factor of five, the specimens will have received a neutron exposure equivalent to what the reactor vessel would see in 200 years of reactor operation. This appears to be contradictory to the direction given in Paragraph 4 that calls for the preservation of surveillance specimens.

Interpretation 1: A surveillance capsule may be irradiated now to a neutron fluence that is equivalent to an 80-year reactor vessel fluence without any discussion with the NRC staff. Such a discussion would only need to be held if the utility was considering an "additional renewal" (i.e. beyond 80 years of operation) to 100 years of operation.

Interpretation 2: In the "license renewal lessons learned" context wherein the NRC has considered license renewals of 20 years (to 60 years), the "additional renewals" that should be discussed with the staff would be the second renewal from 60 to 80 years. The concern here is that in plants with high lead factors (five, for example), a capsule would receive an 80-year fluence in just 16 years of reactor operation. The irradiation conditions in the first 16 years of operation may be significantly different than those seen 40 or more years from now. Given that, it seems imprudent to irradiate a surveillance capsule to an 80-year fluence now without first discussing these plans with the NRC staff.

Thank you for your consideration of these issues. I look forward to your reply. Please feel free to contact me if you have any questions or would like additional information on this request for clarification. I may be reached by telephone at 412-374-4891 or by email at FeroAH@Westinghouse.com.

Very truly yours,
Westinghouse Electric Company

Arnold H. Fero, Principal Engineer
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cc: Mr. Cristopher I. Grimes, USNRC
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