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February 24, 1983
Fort St. Vrain
Unit No. 1
P-83076

Mr. John T. Collins
Regional Administrator
Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 1000
Arlington, TX 76011

DOCKET NO.: 50-267

SUBJECT: FSV Plateout Probe Report GA-A16764

REFERENCES: 1) Phillip C. Wagner (NRC) letter to O.R. Lee (PSC), 12/6/82, (G-82390)

2) D.W. Warembourg (PSC) letter to G. Kuzmycz (NRC), 9/27/82 (P-82419)

Dear Mr. Collins:

A letter from Mr. Phillip C. Wagner to Mr. O.R. Lee dated December 6, 1982 transmitted a copy of the Los Alamos National Laboratory (LANL) report, "Analysis of the Iodine Fission Product Plateout Probe Measurements from the Fort St. Vrain High-Temperature Gas-Cooled Reactor. LANL has performed an independent evaluation of the information contained in GA-A16764, "Radiochemical Analysis of the First Plateout Probe from the Fort St. Vrain High-Temperature Gas-Cooled Reactor," which PSC submitted to NRC via letter P-82419, dated September 27, 1982.

LANL's report offers an explanation of the discrepancy between measured iodine activity levels in the plateout probe and the activity levels one would predict based upon data which have been obtained with the iodine monitor. To explain the discrepancy, three assumptions were deemed necessary by LANL: (1) data were obtained 30

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to 38 days after reactor shutdown and were not corrected to reactor shutdown, (2) the data were undercounted by a factor of two, and (3) iodine monitor data for iodine-135 should be corrected by a factor of three, while iodine-133 data should not be so corrected. The total effect of these three assumptions was to bring the plateout probe results into closer agreement with the iodine monitor results.

PSC and GA have reviewed the report and the assumptions it contains. Although LANL's efforts to resolve this discrepancy are appreciated, the assumptions do not hold up under scrutiny and it seems that further clarification regarding use of the plateout proble and iodine monitor is necessary.

A review of the assumptions, prepared by the GA staff, is enclosed.

With regard to use of the plateout probe and the iodine monitor, the latter is, as explained in Section 7.3.7 of the Fort St. Vrain FSAR, an experimental device which is used infrequently and which is not used in the normal surveillance of primary coolant activity. The plateout probe is, as explained in Section 7.3.6 of the FSAR, the device relied upon to monitor the activity of condensible fission products. While the iodine activity levels measured by these instruments differ, both of the instruments indicate that iodine activity is well below the limits of Technical Specification LCO 4.2.8.

Efforts are underway at PSC and GA to explain the discrepancy between the two instruments. A possible explanation is that the iodine monitor data are incorrect due to contamination of primary coolant helium in the xenon collection traps. A recent special test of the iodine monitor has revealed such contamination.

Thank you for the opportunity to comment on this report. If you have any questions regarding our comments, please contact us.

Very truly yours,

Laurence Brey

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HLB/JPL:pa

Enclosure

EVALUATION OF ASSUMPTIONS MADE IN REVIEW OF FSV PLATEOUT PROBE REPORT

1. Assumption: Gamma counts were obtained 38 days after reactor shutdown and were not corrected to reactor shutdown.

   Evaluation: The gamma activities in the tube segments were obtained 15 days after reactor shutdown and were corrected to reactor shutdown on November 9, 1981. Unfortunately, LANL was given a draft version of the plateout probe report, that made no mention of whether the counts were corrected. In the final version of the report GA-A16764, the tube gamma activities were summarized in Table 4-2. A footnote to Table 4-2 notes that all activities were decayed to reactor shutdown. This is in accord with standard radiochemistry practice.

2. Assumption: The tube section gamma activities were undercounted by a factor of two.

   Evaluation: We certainly agree that in radiochemistry work a number of errors can affect the final result. Such errors can be minimized by careful calibration with known NBS gamma standards.

   As stated in the report, the tube sections were put into 2 dram poly vials for gamma counting. The data were then compared to NBS counting standards having gamma energies that cover the range of interest. The counting standards are water solutions inside 2 dram poly vials. Because of the relative absorption of the 364 keV I-131 gamma line in the water standard compared to the thin metal in the tube sections, it is possible that the tube sections were slightly overcounted (not undercounted). In any case the correction would be only a few percent rather than the assumed factor of two.

   This discussion does not preclude the possibility of other errors such as variations due to counting statistics, possible errors in background subtraction, and other problems associated with low counting samples. Such errors, however, are usually random and are not necessarily "one sided" as the report suggests.

3. Assumption: The factor of three correction should be applied to the I-135 iodine monitor data but not to the I-133 data.

   Evaluation: The correction factor of X3 is normally applied at FSV to all gamma activities found in the chilled charcoal counting traps used in the iodine monitor. This correction factor was discovered by PSC and GA chemists when the apparent gamma activity in trap samples of primary coolant were compared

directly with grab samples. The grab sample is a standard 120 cm^3 serum vial which has been checked and calibrated a number of times at FSV using NBS standard gamma activities. When the comparison was made, the trap sample counts for all isotopes were consistently factors of 2 to 3 below the grab sample counts. The factor of 3 was then applied to all trap counts to bring them in line with the standard grab counts. There is no logical reason why the correction factor should be applied to one isotope and not another. There is a logical reason, however, why selective correction should not be applied. In Fig. 4-9 of GA-A16764 the iodine plateout constant, rp, is plotted as a function of decay constant. The lines through the iodine monitor data are intentionally drawn to be linear, which is in accord with the theory of adsorption of radioactive species. This theory states that at equilibrium, the rate of adsorption of a radioactive species is a linear function of its decay constant. If the correction factor were applied only to one isotope and not the other, then this apparent linear relationship would be violated. We believe, therefore, that the interpretation of the iodine monitor results given in the GA probe report is reasonable, and that the correction suggested in LANL's report is not appropriate.