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October 31, 1972

Mr. John F. O'Leary, Director
Directorate of Licensing
U.S. Atomic Energy Commission
Washington, D. C. 20545

Subject: Letter dated October 30, 1972
re: Discovery of a fuel rod end plug in the reactor
R. E. Ginna Nuclear Power Plant Unit No. 1
Docket No. 50-244

Dear Mr. O'Leary:

Enclosed is a corrected page 2 for the above letter. You will note under item 3, pg. 2 the word "resting" was misspelled.

Very truly yours,

Janet T. Strachan

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Secretary to Mr. Amish

50-244
Inquiry

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2. Westinghouse experimental data with a 4 x 4 channel array completely blocked at the lower nozzle plate has shown that the flow disturbance extended less than 20 inches axially. Extending these results indicates a single channel blockage would affect the flow field for approximately 5 inches. This local effect could only cause an equally local DNB effect. Considering the importance of enthalpy on critical heat flux, the Ginna reactor has a DNB margin of greater than 40% at the reactor inlet. This is a much greater margin than would be required to cover any DNB effect associated with the local flow disturbance.

   At the top of a fuel assembly, there would be no effect because the upper part of the fuel rod contains a gas plenum (approximately 6 inches long).

3. If the end plug is resting at the bottom of the lower plenum, having fallen to this location during refueling shutdown, the local velocities are very low and would not lift the end plug. Hence, it would remain at the bottom of the lower plenum.

4. If the end plug was on the lower core plate or diffuser plate, the flow velocity under normal operation would provide sufficient lift force to potentially lift the end plug and lodge it in the vicinity of the bottom edge of the fuel rods. While this case is possible, it requires some rather idealistic conditions for its actual occurrence. It is most probable that eddy currents will move the end plug horizontally in tumbling fashion between flow streams. Assuming the end plug maneuvers directly into a flow stream lift forces can carry it up against a fuel assembly bottom nozzle and, since the nozzle holes are slightly larger in diameter than the diameter of an end plug, with near perfect alignment, the end plug can enter into a bottom nozzle flow hole. The plug would not pass beyond that point, however, since under normal condition each of the four fuel rods above the flow hole cover a quadrant of the hole such that the remaining space is too small to permit passage. The consequences of this flow blockage were evaluated earlier.

   In the event that a top end plug should become loose and separated from its fuel rod, normal flow through an assembly also can lift the top end plug. Again assuming proper alignment, the end plug can be carried through the adapter plate slots which are large enough to permit passage.

   It is generally concluded that, although normal flow can lift and carry an end plug from the bottom core plate or from the top of the fuel rods and is a necessary condition for such occurrence, it is not a sufficient condition. The unlikely conditions of near perfect alignment with flow holes and direct positioning in flow streams are also necessary.