WESTINGHOUSE ELECTRIC CORPORATION
ASTRONUCLEAR LABORATORY

PROJECT NERVA - THERMAL DESIGN INFORMATION

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Date: September 28, 1962

Title: Screening Location Change

We have the following comments on your letter of September 22 regarding screen location change from support plate to shield.

The removal of screens from the support plate holes will reduce the overall support plate pressure drop measurably. This in turn will tend to reduce the flow through the hanger section in the support plate. While critical flow areas in the hanger section are being enlarged to permit more flow through these areas, it cannot be assured that this will be adequate until flow tests on this assembly are made in the WANL laboratory. Therefore, acceptance of screen removal requires that we request that final drilling of the support plate should not be carried out until these flow tests have been completed. (Flow tests are scheduled to be completed by the end of November.) If at this time it is found that flow through the

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hanger sections with the available pressure drop due to an unrestricted support plate is not adequate, special drilling procedures which would provide built-in flow restrictions in the 1/2" holes would be required.

When the screen is put on the upstream side of the nozzle end shield support plate, the per cent void in the shield support plate must increase if the pressure drop is to be maintained. As an example, if we use 1/4" diameter orifice holes (approximately 10% void) in the plate without a screen, the pressure drop would be about 2.7 psi. If the pressure drop were held at about 2.7 psi and the screen of 0.010" diameter with 0.010"x 0.010" opening put in, the per cent void required would increase to about 17 to 20%.

The above situation is used as an example and the 2.7 psi ΔP chosen is perhaps higher than desired. To reduce the ΔP to approximately 1 psi across the shield support plate would require approximately 30% void in the support plate using 0.010" diameter wire with 0.010"x 0.010" opening.

The attachment of the screen to the shield support plate would have to be positive in all areas surrounding the center end plug penetration through the shield support plate to assure no short circuit of the flow through the screens.

SIGNED

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