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300 AREA
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1. WJ Dowis
2. WK Woods
3. OE McCullough
4. PH Reinker
5. IM Fryar
6. MW Carbon
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July 26, 1951

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REPORT ON ADDITIONAL PRODUCTION CAPACITY OF HANFORD WORKS

MEETING TO FIX WATER REQUIREMENTS

On July 19 there was an informal meeting of members of the Pile Technology Division to establish the water plant requirements for Case II and Case III of the Expansion Report. Present were M. W. Carbon, R. M. Fryar, P. F. Gast, P. H. Reinker, and W. K. Woods.

In considering Case II there was some discussion about the way in which the enriched material would be used. It was finally decided that the scope of the case was limited to the use of the material for radial flattening with no increase in the maximum power taken from any one tube and no relaxation of the graphite temperature limit or the boiling consideration limit. In the final report on this case, mention will be made that the use of enriched material for front to back flattening in the tubes will produce comparable increases in output but will, however, also require an increase in the header pressure to avoid boiling consideration limitations. On the basis of radial flattening alone, full flattening would be necessary in all of the existing piles, plus C Pile, plus the one new unit in order to obtain the desired 650 megawatt increase in output. With full flattening, large orifices would be used in all the tubes of the pile so that the water flow rate requirements can be fixed from this criterion. This leads for B, D, and F Piles to 40,000 gpm, for DR and H Piles 50,000 gpm, for C Pile 62,000 gpm and for the new unit also 62,000 gpm. The header pressures would be, in these cases, the present header pressures, or in the case of C Pile and the one new unit present design header pressure at C Pile.

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In considering Case III it was first concluded that 500 pounds header pressure was the highest practical limit, to which one could go without major modifications in the present piping. This pressure was, therefore, used as a basis for predicting outputs and water requirements. With this header pressure it is expected that boiling disease limitations will fix the maximum output per tube in the existing piles at about 600 kilowatts. This leads to 750 megawatt output for the present existing piles when no enrichment is used. In the case of C Pile, with the large annulus, the limit is believed to arise from the axial temperature of the metal slugs in the high output tubes, and the production here would be 850 megawatts. This leads to a total production of 4500 megawatts for the five existing piles plus C Pile. This production would then be increased by the use of enrichment to 5500 megawatts. As in Case II, full flow will be required for all the tubes. The water flow requirements were fixed at 70,000 gpm for the existing piles and 80,000 gpm for C Pile. With the production of 5500 megawatts and assuming 85 per cent operating efficiency, metal requirements will be 4100 tons annually if the discharge level is 420 MWD per ton or 2850 tons annually if the discharge level is 600 MWD per ton. These figures provide not only the required capacity for 300 Area but also a basis for the determining required capacity of the 200 Areas.

P. F. Gast
P. F. Gast
Pile Technology Division

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