JUN 07 1994
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**Cover Sheet for a Hanford
Historical Document
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Released 1994

**Prepared for the U.S. Department of Energy
under Contract DE-AC06-76RLO 1830**

**Pacific Northwest Laboratory
Operated for the U.S. Department of Energy
by Battelle Memorial Institute**

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 7 Pages No. 12
 16 Copies Series 12

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August 9, 1946

100 AREAS

July 30 through August 6
 (For Technical Progress Letter No. 109)

PhysicsD Pile

The D Pile was shut down for 21-1/2 hours on July 30 for the discharge of 105 regular tubes. This push represented an effective fraction of 6.9%. No poison or special columns were changed.

Further repairs were attempted on the B Test Hole. It was found impossible to repair the leak in the water system, so that it was necessary to disconnect the water supply from this hole. To prevent annealing of the graphite samples during subsequent high-temperature operation of the test hole, fourteen casings of samples were removed before the pile started up. The remaining three casings could not be retrieved at the time. An effort to remove those is to be made at the next shutdown.

F Pile

The F Pile was shut down for about 15-1/2 hours on July 31 but no metal was discharged. The pile operated at 50 MW below rated level throughout the remainder of this report period.

The shutdown time on July 31 was used for the performance of maintenance work, inspections, and special tests. The unit was purged for one hour. A leak in the external piping of the B Test Hole assembly was repaired. The soft spot in the top of the downcomer was inspected and found satisfactory. The special cask and equipment for the insertion of Special Request No. 11 were tested in the B Hole. A satisfactory procedure for charging this sample has been worked out and the cask has been sent to Chicago for loading.

The stool plug in the graphite stringer section from the "D" Test Hole was removed. This section was removed from the pile on June 20, 1946.

It is expected that future shutdowns without metal discharges will be helpful as a basis for comparison with shutdowns during which metal is discharged in evaluating the effects of discharging irradiated metal. A change in the rod configuration, however, makes it impossible to draw any conclusions from the shutdown of this week.

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General

The reactivity status of the piles at the end of this report period was as follows:

<u>Reactivity absorbed by</u>	<u>Reactivity, inhours</u>	
	<u>D Pile</u>	<u>F Pile</u>
Xenon	497	435
Permanent poison and special columns	306	334
Bismuth columns	16	16
Rods	40	69
C ₀ W	<u>-77</u>	<u>-66</u>
Reactivity of cold, clean pile	782	788

Six capsule slugs from the two capsule columns which were pushed from the D Pile on July 23 were radioautographed and cut by means of the underwater cutting wheel.

Water, Corrosion and Engineering

Process Water Control and Pressure Drop Studies

The iron content in the process water averaged 0.025, 0.007 and 0.014 ppm at B, D and F, respectively.

The rates of pressure drop increase for D and F were -0.13 and 0.30 lbs./sq. in.)(day), respectively.

Purging

The F Pile was purged with about 100 ppm Super Col for one hour on July 31. The pressure drop above base in the 0.240 inch orifice zone, based on Sample Room B data, was reduced from 7.1 lbs./sq.in. to -2.0 lbs./sq.in.

Corrosion

Tubes 1674 and 2478 which contained graphite sample capsules were discharged at D on July 23 after exposures of 341 and 348 days, respectively. Examination of the slugs discharged from these tubes indicated that there were three slightly blistered slugs in Tube 1674 and no blistered slugs in Tube 2478.

Graphite Expansion

In anticipation of the eventual binding of standard slugs in bowed process tubes, consideration has been given to the use of short slugs of standard diameter. If the uranium slug length were reduced from 8 inches to 4 inches and the end cap thickness were reduced from 0.350 to 0.175 inches, there would be no loss of pile reactivity from use of the short slugs. Calculations indicate that reduction of end-cap thickness to 0.175 inches would result in a maximum increase of 17°C, in temperature at the center of the exposed end, under current operating conditions, at rated level. Data from CMX, although in poor agreement with the absolute corrosion rates observed in the piles, indicate that this temperature rise would increase the corrosion rate about three-fold. Since no significant corrosion has ever been observed on the end caps of exposed slugs, it is believed that the use of 0.175-inch end-caps will introduce no hazard to pile operation.

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Front, far-side, and rear facos at D and F were surveyed with a rod and transit on July 23 and 24. The initial survey was made three months previous. Results showed that the central region of the side shields at each area had been displaced outward about 1/8 inch, but no motion of the end shields was observed during this period.

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