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May 24, 1946

100 AREAS
May 14 through May 20
(For Technical Progress Letter No. 98)

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14 Pages
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Physics

D Pile

The D Pile operated at rated level throughout this report period except for a shutdown of about 16-1/2 hours on May 14. Down time was used for regular metal discharge and maintenance work.

The reactivity of the pile continues to show a net change of essentially zero. During periods of equilibrium operation the rate of gain is still about one inhour per day but these gains are nullified by losses from frequent discharges.

F Pile

The F Pile was operated at 50 MW below rated level throughout the week. There was a scheduled shutdown on May 15 and a scram on May 17. The scram was caused by a slipping clutch on a vertical safety rod which permitted the tripping of the No. 2 safety circuit. Because the xenon had not yet returned to saturation following the shutdown of May 15 a large excess was available for restarting the unit even though about 40 minutes were required to locate and correct the cause of the scram.

During the shutdown on May 15 all of the horizontal rods were examined for abrasion such as that recently found on No. 2 rod. Nothing other than minor scratches was found on any of the rods. The jamming of No. 2 rod is now believed to have been caused by a foreign body found in the gears of the rod drive.

Since the installation of the thermohm element in the A sample room location, the L and N power level recorder has given readings in good agreement with the power calculated from a mercury thermometer located at the same place. Checks between this mercury thermometer and the temperatures at the inlet to the retention basin show continuing agreement. It now appears that the problem of obtaining a reliable measure of the power level of the F unit has been solved.

There was no net change in the reactivity of the unit during the week. The losses produced by metal discharge were balanced by gains during the rest of the week.

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General

The following describes the reactivity status of the operating piles at the end of the week:

<u>Reactivity Absorbed by</u>	<u>Reactivity, 1h</u>	
	<u>D</u>	<u>F</u>
Xenon	497	434
Permanent poison columns	299*	313
Bismuth	16	16
Rods	43	50
CoW	-70	-66
Special Columns	10	18
Reactivity of cold, clean pile	795	765

*Includes 36 1h myralloy column

The status of the Special Requests program remains unchanged since the last report.

Surveys of the storage basin of the B Pile, in which a small amount of heavy metal was liberated during the cutting of a capsule slug, indicated that the activity deposited on objects removed from the water is somewhat greater than normal. Chips from the cutting wheel at the bottom of the basin registered a maximum reading of approximately 4000 mr/hr on the underwater chamber. A second cut is to be made to remove the active metal from the capsule before efforts are made to clean up the basin.

Water, Corrosion and Engineering

Process Water Control and Pressure Drop Studies

The iron content of the process water averaged 0.029, 0.025 and 0.027 ppm at B, D and F Areas, respectively. These values are considerably higher than normal and attempts are being made to reduce these by changing conditions at the filter plants. The coagulant feed rate was increased, on May 20, from 30 ppm to 35 ppm on the south half of the D filter plant. This may improve coagulation of the water prior to filtration and thus reduce the resultant iron content of the filtered water. It is also planned to increase the silicate feed rate to the water at D, starting May 21, from 5-6 ppm to 10 ppm in an effort to provide more protection against film formation. During the past week the coagulant feed rate at F was increased from 25 ppm to about 29 ppm and this has indicated some improvement in the iron content of the filtered water.

The rates of pressure drop increase for D and F Areas were 0.86 and 0.63 lbs./ (sq.in.)(day).

Control Rod Abrasion

In view of the abrasion and scratches found on Control Rod No. 2 at F on May 9, it was felt desirable to examine the other horizontal rods at F. This examination was made on May 15. All of the drive racks were found to be clean and in good shape

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with the exception of the rack for Rod No. 5 where two pieces of steel about 1/2 inch long and about the size of ten gauge wire were found. These pieces were crushed flat by the pinion gear. The pinion gear of Rod No. 6 was found to have been cutting on the aluminum along the side of the rack for nearly the entire length of the rack. The only rod which showed any appreciable amount of abrasion or scratching was No. 2 where one large gouge the entire length of the rod was found to be fairly deep. This scratch was not straight, indicating that it probably was caused by some loose object. No loose object which could have caused this scratching was found at the time of the examination.

Graphite Expansion

Vertical Thimble No. 27 at B was removed to make measurements on the alignment of the graphite blocks surrounding this hole. With the thimble removed, the opportunity was taken to inspect the appearance of the graphite blocks using a borescope. No evidence of any cracking or crumbling of the graphite could be detected. It is intended to measure bowing of graphite at this location with a plumb bob.

Satisfactory measurement of outward bowing of process tubes of B Pile has been obtained, using a transit in a fixed position to sight on a moving illuminated target which is pulled through the tube. Tube 2496 is bowed about 4/32-inch outward (toward the far side) and tube 2451 is bowed about 2/32-inch outward (toward the near side). In agreement with the prediction from the above data, the central tube 2474 was found to be bowed about 1/32-inch toward the far side. In all, seven tubes have been traversed. In contrast with the results obtained from measurements of vertical bowing, it was found that the ends of the gun barrels had moved outward, eliminating the sharp change in curvature previously observed at the ends of the gun barrels. The data obtained are considered so satisfactory that similar measurements are to be made at D and F.

Adapters have been fabricated for the pneumatic tube jack, which will permit the movement of the gun barrels to be checked independently of the aluminum tube, and will permit the aluminum tube movement to be checked independently of the gun barrels. Also, improved tube movement measuring devices have been developed.

These new devices were given a preliminary test on replaced tube 3671 at B Pile this past week.

Moving the two gun barrels and the replaced aluminum tube as a unit, it was found that less than 1/32-inch movement was obtained at forces less than 750 lbs. 3/32-inch movement in and out was obtained with 875 lbs. force; 6/32-inch movement in and out at 1000 lbs. force and 6/32 to 13/32-inch movement in and out at 1125 lbs. and 1250 lbs. force. At 1375 lbs. force, full movements of 1 inch on the front face, and 30/32 inch on the rear face were obtained on 3 successive jackings in and out. Then the movement dropped off to 20/32 inch on front face and 18/32 inch on rear face for two successive jackings. The decrease in movement was such that it was apparent that the front gun barrel was seating but the rear gun barrel was not seating. A force of 1500 lbs. was then used to draw the tube forward enough to seat the rear gun barrel.

With the rear gun barrel seated, the aluminum tube and rear gun barrel were fixed rigidly in place. The front nozzle was removed and the jack was connected to the front gun barrel with one of the new adapters. Forces of 500 to 700 lbs. were found necessary to move this gun barrel in and out 1/4 inch while it still was about 1/2 inch from seating. Forces of 800 to 950 lbs. was necessary to seat it and to withdraw it after it was seated.

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Then with the nozzles off of both ends of the tube, and with both gun barrels seated and held firmly in place, the aluminum tube was fitted to the jack by the second adapter. It was found that forces of about 500 lbs. were necessary to move the tube backward and forward through the graphite and the two fixed gun barrels. Tests are being continued.

W E Jordan

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100-300 Technical

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