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1. 300 File DATE August 5, 1949

2. *C. S. Kotelof*3. *W. J. Lee*

4.

SUBJECT P Division Monthly Report for

July, 1949

File

E. P. Lee

COPY No.

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HW-14043-A

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DeclassifiedBy Authority of RLD-CG-4AS Dyer 11/7/90J. C. Lee 11/26/90McEick 11-26-90 P DIVISION

August 5, 1949

JULY, 1949

This document consists of

10 pages

I. GENERAL

The B and F piles operated at 275 MW and the D pile at 305 MW throughout the month except for outages listed under Area Activities.

A total of 57.5 tons of metal, at an average concentration of 363 MWD/ton, was discharged from the piles during the month. This included 41.9 tons of Class V (alpha-rolled, triple-dipped, completely transformed) metal at an average concentration of 397 MWD/ton which was discharged without difficulty. A portion of this material was inspected and appears to be satisfactory for exposures at this concentration.

II. ORGANIZATION AND PERSONNEL

Number of Employees on Payroll - July, 1949

Beginning of Month 320

End of Month 316

Net Decrease 4

One operator was transferred to the Power Division and one to the S Division. Two operators were removed from the roll after they were killed in an airplane accident July 24. One operator terminated voluntarily and one was placed on leave of absence due to sickness in the family. Two operators were rehired to fill vacancies.

E. P. Lee visited the City Galvanizers Company of Portland, Oregon, on July 27, 1949, to inspect nozzles which were being processed for H Area.

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III. AREA ACTIVITIES

PILE SUMMARY	PILE B	PILE D	PILE F
Time Operated (%)	90.4	87.8	90.0
Operating Efficiency (%)	88.4	85.0	87.0
*Power Level (MW)	275	305	275
*Inlet Water Temperature (°C)	20.3	20.3	20.4
*Outlet Water Temperature (Maximum °C., 10 tubes, 0.240" Zone)	60.9	63.9	61.4
Number of Scrams	0	2	2
Number of Purges	2	1	2
Molium Consumption (cu. ft.)	27,598	50,081**	28,879
Metal Discharged (tons)	17.52	26.44	13.54
Inhours Gained (this month)	1	12	22
*Inhours Poisoned	523	538	539
*Inhours in Rods	75	65	50

* Month end figures.

** Includes 15,500 cu. ft. used in maintaining pressure on the DR pile.

PILE BUILDING

Outage Breakdown

Date of Outage	Scheduled		Unscheduled	Length of Outage (Hours)
	Metal Discharged	Maintenance		
(1) 7-5-49			F	0.1
7-5, 6, 7	D			38.4*
7-7-49	B			36.3*
(2) 7-9-49			D	0.1
7-12-49	F			24.9
7-19-49		F		22.2
(2) 7-20-49			F	0.2
7-20, 21, 22	D			50.2*
(3) 7-23-49			D	0.7
7-25-49	B			35.2*
7-27-49	F			27.2*

* Includes outage to discharge temporary poison

- (1) Unit scrammed due to failure of #3 Beckman.
- (2) Unit scrammed due to failure of #2 Beckman.
- (3) Unit scrammed due to error in by-passing Beckman for standardization.

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On July 12 a Critical "Y" power condition was declared and the B and D piles began the prescribed shutdown; F pile was already down for a scheduled outage. The Critical "Y" condition was cleared before either B or D pile was completely down and nominal level operation was immediately resumed.

Operating Experience

Production tests having operational significance are reported below:

105-81-P (Probe Test of Top Central Tubes)

The tubes listed below successfully passed probes as indicated:

1.480"	1.485"
4667-B	4573-B 4374-D
	4680-B 4674-F
	4373-D

105-114-P (Van Stone Corrosion Studies)

The thermocouple wells on the aluminum nozzles located on the rear of tubes 3666-F and 3672-F were inspected for corrosion on July 19 and found to be in good condition.

105-168-P (Replacement of Pile Helium Atmosphere with CO₂)

The CO₂ concentration in the pile atmospheres was maintained at 40% at B and D piles and at 60% at F pile throughout the month. No unexpected changes in operating conditions were observed at any of the piles.

105-214-P (Supplement B Silica Feed Reduction)

The silicate concentration in the process water at the F pile was maintained at 0 ppm throughout the month of July. An apparent reduction of pressure build-up has been observed in the central part (.240 zone) of the pile. The outside zones continue to build up at approximately the same rate as before the silicate concentration was reduced. The concentration at B and D piles remains at 2.5 ppm with no significant operating changes noted. Further study is in progress.

105-260-P (Increase in Power Level)

D pile operated at 305 MW throughout the month. There were significant periods of operation at lower levels after shutdowns, notably during periods of operation with temporary "P" columns in the pile. High exit water temperatures encountered following startup prohibited operation at 305 in several instances. This

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is being corrected by increasing orifice sizes in the offending tubes. No unusual or unexpected conditions have been observed at the higher levels.

One tube, 4280-F, which contained Class IV (alpha-rolled, triple-dipped, partially transformed) material, was discharged with difficulty during the outage of July 27. Forces up to 4000 pounds were required to discharge the metal from this tube.

A total of 41.9 tons of Class V (alpha-rolled, triple-dipped, completely transformed) metal was discharged without incident during the month at an average concentration of 397 MWDT/ton. Inspection of a portion of this metal indicated that this type metal is satisfactory for exposures at this concentration. Routine examination of test tonnages of this type metal will be scheduled at three month intervals to check on the effect of longer elapsed time for exposures at this concentration.

Four process tubes were replaced during the month, (channels 1459-D, 1163-F, 3071-F and 1184-F). The old tube was removed from channel 1488-D and the nozzles sealed and shielded pending installation of a new tube. Extreme difficulty was experienced and forces as high as 6750 pounds thrust were required to remove the tube.

Mechanical Experience

All horizontal and vertical safety rods are in satisfactory operating condition with the following exceptions:

- #27-B - This rod binds when half-way in the unit. A thimble traverse revealed a maximum displacement of $1\frac{1}{2}$ " toward the far side 21 feet below the top of the thimble. The rod is tied out pending replacement of the rod and rod guide.
- #35-B - This rod slipped out of the upper limit switch several times during testing before start-up on July 27. It is tied out pending investigation of the brake and clutch.
- #23-D - This rod has a leaking thimble. At month end it is tied out and the thimble plugged to prevent gas loss pending replacement of the thimble.
- #33-F - Difficulty is still being experienced with binding of this rod. Further efforts will be made to correct this condition.

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Work of an unusual nature performed on safety rods during the month included:

1. Leak testing of all vertical safety rod thimbles at D Area and of 13 at F Area.
2. The binding of #26-F Vertical Safety Rod was relieved on July 19 by installing a new off-set short rod guide and a flexible "knuckle jointed" rod.
3. No. 33-D Vertical Safety Rod thimble, reported leaking earlier (HW-13793-A), was replaced on July 6. Severe corrosion was observed just below the rod guide. The old thimble parted at this weakened point but the lower portion was removed without difficulty.

During the shutdown for the outage of July 7 at B Area, a partial failure of the vertical safety rod control circuit occurred due to the burning out of the winch motor and wiring of #17-B Vertical Safety Rod. The wiring and motor were replaced and were operating normally at month end. The exact cause of the failure has not yet been determined.

Indications of a process tube water leak became evident at the B pile during the month. The amount of condensate collected from the circulating gas gradually increased from about 12 pints per day to 100 pints per day, and the gas analyses revealed abnormal amounts of moisture below row 6 and between rows 79 and 87. Hydrostatic tests were run on several tubes in this section and led to the discovery of the leak in tube 0283-B. This tube was discharged and isolated from the water system, and at month end the condensate collected from the circulating system had decreased to 27 pints per day. It is planned to replace the tube and determine the exact location of the leak.

Boroscopic examination of the front 10 feet of 19 tubes at B Area, and 2 tubes at F Area which have operated without front dummies, revealed the presence of corrosion products in this portion of the tube. Further investigation of this problem is under-way.

An inspection of the baffles in the downcomer at 100-F Area on July 12 revealed a vertical crack in the weld of #3 and #7 baffles and a horizontal crack in #4 baffle; all approximately 12 feet down from the top. The condition is somewhat worse than that observed a year ago. Further investigation is planned.

The outward motion of the far side of the pile at D Area continued as in the previous month at a rate of approximately 0.10 inches per month except for minor inward deviations which were noted during the last three days of the month. No upward motion of the top shield has been observed.

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Pile Development

1. Four auxiliary pannolit gauges for each orifice zone were installed at 100-F Area on July 21. These gauges are so connected that any one can be placed in use whenever it is necessary to remove a regular pannolit gauge from the system for recalibration or repair. Continuous monitoring of the inlet water pressure of every tube is assured and any off-standard condition will be immediately detected by the regular alarm system. Similar installations will be made in the other operating areas.
2. The Bailey power indicator at D Area was modified for the increased flow resulting from orifice changes, and the range was increased to cover higher operating levels.
3. A television camera unit was set up in the discharge area at 100-F Area on July 27, and a test made on its performance during the discharge of several tubes. The installation is also being tested during pile operation at month end. At completion of these tests, the equipment will be examined to ascertain the effect of gamma radiation and neutron bombardment on the equipment and to determine the feasibility of using such equipment for observation, inspection and control of remote equipment for future and existing piles. (See Document HDC-1338, H. J. White to Filo, 7-11-49.)
4. The mobile hydraulic ram and mandril reported previously (HW-13793-A) was used to discharge the stuck charge in tube 4280-F on July 27. The time required to discharge the tube, as anticipated, was less than half that required with previously available equipment.

GAS PROCESSING BUILDING

Operation of these buildings was normal during the month.

Due to the presence of abnormal amounts of moisture in the circulating gas, the 115-B Building driers were placed on a four hour cycle in place of the regular 24 hour cycle.

SPECIAL HAZARDS

The gamma intensity of the beam at the top far edge of the F pile increased from 3.2 r/hr at the end of June to 4 r/hr at month end.

A beam of approximately 10 mr/hr has been reported at the top far side of the B pile.

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300 AREA - METAL FABRICATION

Production Statistics

Production for the month of July was as follows:

Billots Produced	28 Tons
Rods Machined	76 Tons
Baro Plocos Machined	58 Tons
Acceptable Plocos Canned	64 Tons

Molt Plant

The casting yields were as follows:

	<u>June</u>	<u>July</u>	<u>To Date</u> <u>1949</u>
Billot	68.5	71.4	68.3
Solid Metal	84.0	87.8	85.9

Approximately 50% of the TXB charged this month was processed from pickled chips as compared with 30% in June. This increase, along with a concerted effort to improve quality resulted in the higher yield for July.

When the "A" generator was started on July 7, faulty field coils in the generator throw an over-load on the compensator causing the insulation to be burned off. The necessary repairs were completed and the generator was returned to service on July 29. Billot production during the repair period was reduced approximately 50%.

Eight additional billots were cast in conformance with Production Test No. 314-59-M, (Effects of Furnace Pressure on Quality of Remelted Uranium).

Machining

Machining yields were as follows:

	<u>% Yield</u>		
	<u>June</u>	<u>July</u>	<u>To Date</u> <u>1949</u>
	70.8	72.8	69.5

An improvement in rod quality and diameters of stock machined during the latter part of the month resulted in a higher machining yield.

On July 21, 1949 twenty rods were gamma extruded from Hanford billots in conformance with Production Test No. 313-109-M, (Heat Treating Uranium by Electrical Induction).

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Chip Recovery

The Chip Recovery yield was as follows:

% Yield		
<u>June</u>	<u>July</u>	<u>To Date</u> <u>1949</u>
90.1	91.1	90.5

The entire Chip Recovery process was operated five shifts, with the press being operated an additional seven shifts. Seventy-one percent of the chips processed were pickled and 23,825 pounds of TXB were produced.

The material burned in the Oxide Burner was as follows:

Weight Out - Pounds		
<u>June</u>	<u>July</u>	<u>To Date</u> <u>1949</u>
25,290	31,899	143,313

This operation was continued on a two-shift five-day week schedule.

Canning Operator

The canning yield was as follows:

% Yield		
<u>June</u>	<u>July</u>	<u>To Date</u> <u>1949</u>
93.0	91.8	91.2

Canning rejects, by cause, were:

	%		
	<u>June</u>	<u>July</u>	<u>To Date</u> <u>1949</u>
Non Seating	0.6	1.0	0.8
Marred Surface	2.0	2.3	2.5
AlSi on Outside of Can	1.4	1.5	1.1
Frost Test	1.7	1.4	2.2
Bad Welds	0.6	0.8	0.7
Miscellaneous	0.7	1.2	1.5
	7.0	8.2	8.8

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The canning yield fell below the record yield established last month because of slight increases in all major rejects except frost test. Further effort is being made to improve quality through the education of operating personnel.

The following special request pieces were canned:

<u>Request No.</u>	<u>Contents</u>	<u>No. of Pieces</u>
SR 40-7	Plutonium Oxide	3
ORNL 111	Metallic Cobalt	11
ORNL 113	Scandium Oxide	2

In addition 18 receptacle slugs and 548 lead slugs were canned.

Slug Recovery

	<u>% Recovered</u>		<u>Average Wt. - Lbs.</u>	
	<u>July</u>	<u>To Date 1949</u>	<u>July</u>	<u>To Date 1949</u>
Z Slugs	87.8	88.1	3.920	3.913
X Slugs	10.9	9.8	3.856	3.858
Rejects	1.3	2.1	—	—
	100.0	100.0		

Inspection and Testing

Autoclave rejects were as follows:

	<u>June</u>	<u>July</u>	<u>To Date 1949</u>
	0.10/M	0.00/M	0.05/M

No autoclave failures occurred in July.

None of the penetration samples taken during the month were penetrated to within 0.015" of the outer can wall.

The "as received" quality of cans, caps, and sleeves inspected was as follows:

	<u>% Usable (4")</u>		
	<u>June</u>	<u>July</u>	<u>To Date 1949</u>
Aluminum Cans	94.3	95.9	94.7
Aluminum Caps	99.2	98.1	95.5
Steel Sleeves	*	*	87.5

* No sleeves were inspected during the month.

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Material Handling

A total of 150 tons of alpha-rolled rods was received from Simonds Saw and Steel Company. Twenty-four tons of oxide (MD-6) were shipped to Mallinckrodt Chemical Works.

305 Test Pile

The test pile was operated on a one-shift five-day week schedule. A total of 96 tests was run on canned slugs, 43 on billet eggs, 378 on graphite bars, and the following on special work requests:

<u>Request No.</u>		<u>No. of Tests</u>
91	To determine amount of boron residue on a glass beaker.	5
92	To aid in the calibration of the test stringer, determine the effects of bars completely filled with boron-impregnated graphite powder.	4
93	Irradiate gold foil to standardize radiation detection instruments to be used in analyzing data under 105-225-PT.	1
94	To determine flux ratio inside and outside of a slug.	3

Special Hazards

No unusual conditions developed during the month.

Development

The evaluation of crucibles, having a 1 1/2" lip around the top, has been completed in the bronze furnaces. The furnace element life has been extended by at least one-third or to three weeks as compared with two weeks for the standard crucible. This represents a savings in maintenance costs of about \$700.00 per month for the four bronze furnaces. Two furnaces have already been converted to the flange type crucible and the remaining two will be converted next month.

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