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FILE 300 N

DATE April 14, 1969

SUBJECT P Division Monthly Report
for March - 1949

To File

FROM E. P. Lee

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P DIVISION

MARCH - 1949

#18 - Monthly Report
 #18 - E. P. Lee
 #19 - R. O. Mehan
 #20 - P. E. Lowe
 #21 - W. P. McCue
 #22 - W. W. Windsheimer
 #23 - A. B. Greninger
 #24 - 300 File
 #25 - 700 File

April 14, 1949

I. GENERAL

All piles operated at 275 M. W. throughout the month except for the outages listed under Area Activities in this report. The average "time operating efficiency" was 91.4%.

A total of 47 tons of metal was discharged from the piles during the month.

During the month, 16.5 tons of alpha-rolled, triple-dipped metal were discharged without difficulty at a nominal concentration of 320 MWD per ton. Inspection of selected tubes of this material indicated that exposures at this level are satisfactory. In view of these results the program of stepwise increases in concentration will be continued, with the next test tonnages being discharged at a nominal concentration of 360 MWD per ton.

The nominal monthly production rate of acceptable canned pieces was reduced from 90 tons to 60 tons on March 28. This curtailment of production was possible in view of the favorable inventory of slugs available for charging DR and H piles. All 300 Area operations are now on a one shift, five-day week.

II. ORGANIZATION AND PERSONNEL

Number of Employees on Payroll - March 1949

Beginning of Month	372
End of Month	335
Net Decrease	37

Thirty-five operators were terminated under a planned reduction of force and two operators terminated voluntarily. One steno-typist C was transferred to the Design and Construction Division and one steno-typist A was added to the roll, transferring from the Service Divisions.

III. AREA ACTIVITIESPILE SUMMARY

	<u>PILE B</u>	<u>PILE D</u>	<u>PILE F</u>
Time Operated (%)	95.1	88.2	90.9
Operating Efficiency (%)	94.5	86.9	89.5

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PILE SUMMARY (Continued)

	<u>PILE B</u>	<u>PILE D</u>	<u>PILE F</u>
*Power Level (L.W.)	275	275	275
*Inlet Water Temperature (°C)	6.6	6.4	6.1
*Outlet Water Temperature (Maximum °C., 10 tubes, 0.240" zone)	48.5	44.9	51.2
Number of Scrums	0	1	1
Number of Purges	2	1	2
Helium Consumption (cu. ft.)	49.883	147,060***	64,300
*Metal Discharged (tons)	16.56	19.83	10.52
**Inhours Gained (this month)	31	8	20
*Inhours Poisoned	379	484	435
*Inhours in Rods	85	75	61

* Month end figures.

** Does not include increased reactivity due to CO₂ in gas system.

*** See explanation under Gas Processing Building.

PILE BUILDING

Outage Breakdown

<u>Date of Outage</u>	<u>Scheduled</u>	<u>Length of</u>
	<u>Metal Discharged</u> <u>Maintenance</u>	<u>Outage (Hours)</u>
3-1-49	B	17.5
3-2-49	D	21.1
3-2-49	F	23.1
3-8-49	D	20.2
**3-12-49		0.3
3-15-49	F	23.9
3-21-49	B	18.6
*3-22 & 3-23	D	46.6
***3-24-49		0.2
3-29-49	F	20.3

* Includes 3.3 hours on the 24th to discharge poison.

** Scram due to unexplained surge on #2 Beckman.

*** Scram due to failure of #1 Beckman.

Operating Experience

Production Tests having operational significance are reported below:

105-81-P (Probe Tests of Top Central Tubes)
The tubes listed below successfully passed the probes indicated:
1.485"
4670-B 4674-D
4677-B 4674-F

105-103-P (Corrosion Rates at Elevated Temperatures)
The minimum thickness of 8 rear Van Stone flanges was measured on March 23. The minimum thickness measured was 0.037", and no immediate repairs are planned.

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105-168-P (Replacement of Pile Helium Atmosphere with CO₂)
CO₂ concentrations were held at the following levels throughout the month with no significant changes in operating conditions observed:

B Area - 25%
D Area - 40%
F Area - 40%

105-237-P (Total Stored Energy of Processed Tube Blocks)
Tube No. 3169-F, which was removed during February in order to mine graphite under this production test, was replaced on March 15. Tube No. 1884-F was removed during this same shutdown and graphite samples taken from the channel. At month end the channel is plugged with grooved steel dummies shielded with lead and paraffin front and rear. Additional samples will be taken from this channel during April.

Tube No. 2794-F, which contained gamma-extruded, eight-inch metal at 200 MWD/ton, was discharged with difficulty during the shutdown of March 29. Forces of 6500 pounds per square inch were required to discharge the metal. Inspection of the slugs from this tube revealed one badly distorted "dog-leg" piece and several other blistered pieces.

Mechanical Experience

Vertical Safety Rod #33 at B Area failed to operate satisfactorily when tested on March 21 during the regular shutdown, because of rust accumulation between the tip and guide. This condition will be corrected during the next scheduled outage.

Vertical Safety Rod #14 at D Area, which was found to be binding in the rod guide during the start-up of March 23, was tied out pending corrective action at the next outage.

Other work of an unusual nature on safety rods during the month included:

1. An additional 15 new stainless steel vertical safety rods were installed in the piles during the month. There are now 56 of these rods installed in the three piles as follows: B Area - 19; D Area - 20; F Area - 17. The completion of this project will await delivery of 30 additional stainless steel rod guides.
2. A specially fabricated stainless steel "knuckle-jointed" vertical safety rod was installed in #27 position at F Area on March 15 in an effort to compensate for the extreme bowing of this thimble. The rod was fabricated with seventeen 22-inch joints which give the rod approximately three times its original flexibility. This rod is now operating satisfactorily.
3. A cadmium plated tip with a thermocouple installed was substituted for the regular tip on #18 V.S.R. at F Area during the March 29

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outage. Temperature readings will be taken during operation to supply information needed in connection with the third safety flashing tests now under way. This rod will be out of service until the first outage in April.

4. The operation of #4 Horizontal Safety Rod at F Area was improved by cutting down the inner end of the kick plate to relieve binding on the rod.

Surges on No. 2 Beckman at D Area on March 12 and on No. 1 Beckman at F Area on March 24 resulted in scrams. Both instruments were overhauled and are operating satisfactorily at month end.

Tests on the north 107-B retention basin revealed a leakage rate of 850 gallons per minute. Close inspection of this basin has revealed several leaks and many minor cracks in the gunnito. Tapping tests also indicate the possibility of an undermined fill at several points under the floor. Repairs are in progress at month end.

Tube No. 3762-D, reported out of service last month, was satisfactorily replaced after honing the gun barrel smooth and removing the aluminum shavings in the channel. The tube was recharged with regular metal.

A total of 68 orifices and panellite gauges was changed to the next larger size at D Area during the month to relieve high exit water temperatures during start-up periods.

File Development

The 115 Building drying and regeneration cycles at 100-F Area have been modified to make better use of the drier capacity. It is anticipated that there will be a resultant reduction in steam and helium consumption. These changes involve an extension and adjustment of the cycles to reduce gas pressures and, consequently gas losses.

Auxiliary bleed lines were installed from the make-up system in 115-D to both the D and DR Piles. This makes it possible to maintain a positive pressure on either pile while circulating gas to the other, thereby avoiding the necessity of using large amounts of helium to purge the piles whenever the circulating system is put into service.

GAS PROCESSING BUILDING

During the extended outage of March 22 and 23, the gas tie lines between 115-D and the DR Pile were completed and cleaned. The DR Pile was purged with 60,000 cubic feet of helium, and normal gas circulation was maintained through the pile for ten hours using 97% helium. Circulation to the D Pile was resumed when the pile was started up. There was no indication of excessive moisture in the DR Pile and condensate collection in the dryers was normal during this period.

Adjustments to the dryer cycles at F Area (described under File Developments) have reduced the gas loss from an average of 3,000 cubic feet per day to an average of approximately 1,500 cubic feet per day.

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SPECIAL HAZARDS

All three piles experienced high effluent water readings during the month. At month end all areas are operating with one-half of the retention basin empty and compensating for high readings by diluting the effluent water at the 1904 Buildings.

The gamma dosage rate from the beam at the top far edge of the F Pile continued to increase. The reading at month end was 2800 mr/hr compared to 2280 mr/hr for February.

300 AREA - METAL FABRICATION

Production Statistics

Production for the month of March was as follows:

Billets Produced	39 Tons
Rods Machined	190 Tons
Bare Pieces Machined	131 Tons
Acceptable Pieces Canned	90 Tons

Melt Plant

The casting yields were as follows:

	<u>February</u>	<u>March</u>	<u>To Date</u> <u>1949</u>
Billet	71.9	65.8	67.2
Solid Metal	89.1	86.9	86.2

The lower casting yields for March resulted from a decrease in the amount of pickled TXB available for melting (see Chip Recovery). Only 25 percent of the TXB used this month was processed from pickled chips, as compared with 68 percent last month.

The casting of approximately 5,000 pounds of briquettes containing magnesium was completed in March. This work was started in October, 1948, and consisted of adding one briquette per crucible charge to prevent excessive amounts of magnesium from collecting on the inside of the melt plant furnaces or being carried into the vacuum system.

Several backfires occurred in the Stokes vacuum pump exhaust line on March 23. The finishing pump was found to have a broken valve spring. After the spring was replaced, no further backfires were experienced.

Machining

Machining yields were as follows:

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% Yield		
<u>February</u>	<u>March</u>	<u>To Date</u> <u>1949</u>
69.3	68.9	68.1

A close inspection of rods machined during the month indicated that those rolled at Vulcan from Hanford billets and at Simonds from Mallinckrodt billets were generally of good quality. Rods rolled at both Vulcan and Simonds from Electro-Met billets were of poorer quality, with a number of rods having voids, folds, and badly checked surfaces.

Chip Recovery

The Chip Recovery yield was as follows:

% Yield		
<u>February</u>	<u>March</u>	<u>To Date</u> <u>1949</u>
91.0	89.5	90.3

The entire Chip Recovery Process was operated eight shifts and the press was operated an additional seventeen shifts. A total of 66,716 pounds of TXB was produced.

Chip pickling was temporarily discontinued on March 3 when it was found that an excessive amount of uranium, in solution, was being lost via the rinse tanks. The necessary piping was installed to provide for the use of two static rinses (instead of flowing) and pumping the spent rinse water to Recovery. Chip pickling was resumed on March 18. A maximum throughput of 2,000 pounds was established, by analysis, as the frequency for changing the rinse water. Twenty-seven percent of the chips briquetted during the month were pickled.

The material burned in the Oxide Burner was as follows:

Weight Out - Lbs.		
<u>February</u>	<u>March</u>	<u>To Date</u> <u>1949</u>
18,605	10,760	45,247

On March 8 a minor explosion occurred in the duct work on the discharge side of the exhaust fan while the operator was attempting to light the propane burners. The duct and the discharge section of the fan housing were ruptured. The exhaust system was repaired and operation resumed on March 14.

Canning Operation

The canning yield was as follows:

% Yield		
<u>February</u>	<u>March</u>	<u>To Date</u> <u>1949</u>
92.2	90.6	90.9

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Canning rejects, by cause, were:

	% Total Canned - 4"		
	February	March	To Date 1949
Non Seating	0.8	0.8	1.0
Marred Surface	2.6	2.9	2.8
AlSi on Outside of Can	0.9	0.9	0.9
Frost Test	1.5	2.3	1.9
Bad Welds	0.6	0.6	0.7
Miscellaneous	1.4	1.9	1.8
	7.8	9.4	9.1

The drop in yield is attributed in part to the large scale movement of men in the area due to the planned reduction of force.

Fourteen slugs were canned in sleeve assemblies that had been preheated an additional thirty seconds in an AlSi bath. This is a continuation of Production Test No. 313-107-M, Supplement A, (Effect of Canning Conditions on Slug Yield and Quality). None of the pieces canned showed penetration within less than 0.020" of the outer can wall.

The following special request pieces were canned:

<u>Request No.</u>	<u>Contents</u>	<u>Number of Pieces</u>
55	Lithium Aluminum Alloy	478

In addition 4748 bismuth slugs and 608 lead slugs were canned.

Slug Recovery Operation

	% Recovered		Average Wt.-Lbs.	
	March	To Date 1949	March	To Date 1949
Z Slugs	91.7	86.3	3.914	3.911
X Slugs	6.6	11.1	3.857	3.858
Rejects	1.7	2.6	---	---
	100.0	100.0	---	---

A total of 100 canned gamma extruded slugs was recovered for use in transformation tests by induction heating.

Inspection and Testing

Autoclave rejects were as follows:

February	March	To Date 1949
.02/M	.06/M	.03/M

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Three autoclave failures occurred during March.

Forty-six canned pieces were checked for penetration; no penetration was found within 0.010" of the outer can wall but seven were found penetrated at 0.015".

The "As Received" quality of cans, caps, and sleeves was as follows:

	% Usable - 4"		To Date
	February	March	1949
Aluminum Cans	96.0	94.6	95.6
Aluminum Caps	93.9	94.7	93.6
Steel Sleeves	None Inspected	77.3	84.0

The initial shipment of 1980 aluminum cans, received in February from the Victor Manufacturing Company, was inspected and 97.3% met specifications. A second shipment of 5184 cans was received on March 23 and 95% was acceptable for use.

Material Handling

A total of 76.6 tons of rods was received from the Vulcan Crucible Steel Company and 110 tons were received from Simonds Saw and Steel Company.

Sixteen tons of MD-4 (graphite scrap) were shipped to the Vitro Manufacturing Company and 40.5 tons of billets were shipped to the Vulcan Crucible Steel Company.

305 Test Pile

The test pile was operated on a one-shift, five-day week schedule. A total of 128 tests was run on canned slugs, 64 on billet eggs, 336 on graphite, and the following on special work requests:

<u>Request No.</u>		<u>No. of Tests</u>
63	To determine the reactivity of special quartz tube for use in graphite experiments.	3
64	To determine the cross-section of magnesium.	4
65	To determine the reactivity of ash from fifty pounds of graphite.	9
66	To irradiate three indium foils to be used in counter tests.	1
67	To determine the induced activity of magnesium.	1
68	To irradiate samples of chipped paint.	6

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Request No.

No. of Tests

69	To obtain reactivity of a quartz dish prior to ashing graphite in it.	4
70	To determine the degree of "blackness" of ORNL-111.	5
71	To test the cross-section of a silver coated glass counter tube, two magnesium foil holders, and indium foil.	4
72	Indium beta self absorption test.	1
73	To test the reactivity of <u>two</u> lubricants (Molykote and Ucon) which are to be used in 105-H.	6
74	To test the cross-section of the components of a coaxial electric cable.	6
75	To determine reactivity of residue from graphite.	11

In addition, 14 tests were run on canned slugs in conformance with Production Test No. 314-60-M, (Fabrication of Slugs from Uranium Rolled at Different Finishing Temperatures).

Special Hazards

No unusual conditions developed during the month.

Development

A Meehanite mold was fabricated and used successfully for casting four billets in the Melt Plant. Evaluation of this mold will be continued to determine the feasibility of substituting molds of this type for graphite molds.

Thirty-one chamfered billets, fabricated in the Melt Plant in January, were returned as rods from the rolling mill and machined this month. It appears that some machining yield improvements, perhaps as much as 1.5%, can be realized from this type of billet. Plans are being made to establish it as standard.

- END -

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