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REC-3 1990

DATE June 15, 1949

SUBJECT P Division Monthly Report -

May, 1942

To File

FROM E. P. Leo

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BEFORE READING THIS DOCUMENT, SIGN AND DATE BELOW:

W. T. Katten	7-18-54
J. H. Katten	11-13-54 ✓
M. B. Katten	3-8-51
W. T. Katten	6/20/52

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MASTER

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HW-13561-A

#1 through #17 - Monthly Report
#18 - E. P. Lee - J. H. Warren
#19 - W. W. Windsheimer
#20 - P. E. Lowe
#21 - W. P. McCue
#22 - R. O. Mohann
#23 - A. B. Greninger
#24 - 300 File
#25 - 700 File

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Declassified

By Authority of RL-46-4

10/2/90

P DIVISION

11/7/90
11-26-70

MAY - 1949

June 15, 1949

I. GENERAL

The nominal operating level for both B and F Piles was 275 M.W. throughout the month except for outages listed under Area Activities. The D pile operated at 275 M.W. until May 23 when the nominal level was raised to 290 M.W. in the first step of the program covered in Production Test No. 105-260-P to evaluate the feasibility of operating piles at higher power levels.

A total of 44 tons of metal, at an average concentration of 205 MWD/ton, was discharged from the piles during the month.

Considerable difficulty was experienced during the month with stuck tubes containing Class IV (alpha-rolled, triple-dipped, randomly transformed) metal. A total of nine tubes with concentrations in the range of 320-370 MWD/ton was encountered. As a result of these difficulties with the Class IV material, future discharges of this type metal will be limited to concentrations in the range 300-320 MWD.

Approximately one ton of Class V (alpha-rolled, triple-dipped, completely transformed) metal was discharged at a concentration of 368 MWD/ton for test purposes. Inspection of this material indicated that all the slugs were in satisfactory condition.

All three piles were scheduled down on May 4 and May 25 to allow the Electrical Division to make a tie-in to the 230 KV lines for 100-H Area.

II. ORGANIZATION AND PERSONNEL

Number of Employees on Payroll - May, 1949

Beginning of Month	325
End of Month	322
Net Decrease	3

Two operators and one steno-typist terminated voluntarily.

R. O. Mohann was transferred from Chief Supervisor of the 300 Area to Chief Supervisor in 100-B.

W. W. Windsheimer was transferred from Chief Supervisor of 100-B Area to Chief Supervisor of the 300 Area.

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E. P. Lee visited the Mallinckrodt Chemical Company in St. Louis, Missouri, and the Simonds Saw and Steel Company in Lockport, N. Y., on May 2 and May 3 to inspect ventilation and rolling mill equipment.

III. AREA ACTIVITIES

<u>PILE SUMMARY</u>	<u>PILE B</u>	<u>PILE D</u>	<u>PILE F</u>
Time Operated (%)	91.1	88.9	87.0
Operating Efficiency (%)	90.1	87.9	85.8
*Power Level (M. W.)	275	290	275
*Inlet Water Temperature (°C)	14.0	13.8	13.6
*Outlet Water Temperature (Maximum °C., 10 tubes, 0.240" zone)	55.8	53.1	54.4
Number of Scrams	1	0	1
Number of Purges	3	2	1
Helium Consumption (cu. ft.)	52,953**	69,894	56,298**
Metal Discharged (tons)	17.34	9.91	16.53
Inhours Gained (this month)	21	8	24
*Inhours Poisoned	454	532	509
*Inhours in Rods	113	72	49

* Month end figures.

** Includes losses incident to unloading helium car.

PILE BUILDING

Outage Breakdown

<u>Date of Outage</u>	<u>Scheduled</u>		<u>Unscheduled</u>	<u>Length of Outage (Hours)</u>
	<u>Metal Discharged</u>	<u>Maintenance</u>		
5-3-49 to				
5-6-49	F	F		71.7
5-4-49		B		17.0
5-4-49	D	D		21.2
5-11-49	B			16.8
5-18-49	D			23.1
*5-21-49	B		B	16.2
*5-22-49			F	0.1
5-25-49	F			21.8
5-25-26	D			36.1
5-25-49		B		16.1
**5-27-49	D			3.3

* Unit scrammed due to failure of No. 1 Beckman.

** Unit down to discharge temporary poison.

OPERATING EXPERIENCE

Production tests having operational significance are reported below:

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105-81-P (Probe Tests on Top Central Tubes)
The tubes listed below successfully passed probes as indicated:

1.485"
4674-F 4586-B 4679-B
4561-B 4668-B

105-114-P (Van Stone Flange Corrosion Studies)
An inspection of Van Stone flanges which have been operating under the following conditions was found to be satisfactory:

- (a) Seven tubes with aluminum front face nozzles and four with aluminum rear face nozzles.
- (b) Four nozzles containing coated formed aluminum gaskets. There was evidence of gasket failure and Cranite gaskets were installed.
- (c) Seven rear and six front nozzles, which had formerly contained sacrificial Mg-Al alloy gaskets.

105-168-P (Replacement of Pile Helium Atmosphere with CO₂)
The CO₂ concentration in the F pile was maintained at 46% until May 10 when it was increased in increments of 3% until a concentration of 60% was reached on May 13. The CO₂ concentration at B and D piles was maintained at 40% 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 was reduced from 2.5 ppm to 0 ppm at F Area on May 18. A marked reduction in the rate of pressure drop build-up was observed. No change in effluent water activity was noted.

o The silicate addition at B Area was increased on May 18 from 1.5 to 2.5 ppm to provide control studies for the lowered feed at F Area. D Area silicate feed remained at 2.5 ppm.

105-260-P (Increase in Power Level)
The nominal level of the 105-D pile was increased to 290 M. W. on May 23 in accordance with this production test. No unusual or unexpected conditions have been observed at the higher level.

An unscheduled outage occurred at B Area on May 21 when a voltage regulating tube in the No. 1 Beckman failed. No. 17 Vertical Safety Rod winch failed with the rod in the unit and the time consumed in removing the rod with special equipment exceeded the time available for returning to nominal level. The down time was used for a regular charge-discharge.

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The use of Mark II segmented discharge equipment on two tubes at D Area on May 18 and on two tubes at B Area on May 25 proceeded without incident. All four tubes were discharged satisfactorily leaving one quarter of the old charge in the tube but were subsequently loaded with new metal. This program to familiarize the operating crews with the equipment will continue.

The following tubes, which contained Class IV metal, were discharged with difficulty and required special handling as noted:

<u>Tube No.</u>	<u>Date Discharged</u>	<u>Remarks</u>
1665-F	May 5	Required forces up to 3500%.
3195-F	May 5	Required forces up to 3500%.
1163-F	May 25	Required forces up to 3500%.
1184-F	May 25	Required forces up to 3500%.
3089-D	May 25	Required forces up to 5500%.
1459-D	May 25	Required forces up to 4000%.
1488-D	May 25	Required forces up to 1000%.
1659-D	May 25	Required forces up to 1000%.
1758-D	May 25	Required forces up to 5000%.

Mechanical Experience

All Horizontal and Vertical Safety Rods are in satisfactory operating condition at month end with the exception of No. 28 Vertical Safety Rod at D Area. During the start-up of D pile on May 26, this rod bound upon withdrawal under power and was raised mechanically. It is now tied out of service pending an investigation of the binding.

Occasional difficulty is still being encountered with Vertical Safety Rods #19, 33, and 38 at the F pile. These rods sometimes fail to enter the pile completely by as much as one foot.

Work of an unusual nature performed on Safety Rods during the month included:

1. A standard type rod guide which had been shortened 22 inches was installed in #14 Vertical Safety Rod position at D Area on May 18. Borescopic examination of the thimble revealed scratches on the rear side for about four feet into the thimble. Beyond this point the thimble is scratched on the front side almost to the bottom. The thimble was not replaced, as a pneumatic test indicated that it was satisfactory for further service.
2. On May 4 the rod guide, thimble, and step plug of #20 V.S.R. at F Area were removed, disclosing a kink in the thimble just below the rod guide. A traverse of the rod opening indicated $3\frac{1}{2}$ " movement toward the far side. The sharp discontinuity, which had caused kinking, was relieved by installing a step plug 15 inches shorter than normal. A new thimble was installed.

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* Soon after reassembly, the rod was found to bind under normal operation. This was corrected on May 25 by substitution of a new knuckle rod with the tip sections shortened to 25 $\frac{1}{2}$ ", in conformity with the remainder of the rod.

3. Binding of No. 14 Vertical Safety Rod at 100-F Area was relieved on May 25 by installing a new short rod guide and the knuckle rod from No. 20 position. The No. 14 thimble was rotated 90° clockwise to distribute the wear.

The rear far neoprene seal between rows 18-46 and a section of the far side top seal, which had become taut, were replaced during the shutdown of May 3-6 in 100-F Area.

The stainless steel chute liners at D and F Areas were re-anchored to the concrete on May 18 and May 4, respectively.

Process Tube No. 1674-B, which had been used in PT-105-245-P (Poison Effectiveness of Cadmium Coated Splines) was replaced on May 4, 1949. Tube No. 2695-F, which had been discharged with difficulty on April 5, was replaced on May 4.

An inspection of the front Van Stone flanges of Tubes Nos. 2451-B and 2496-B on May 11 revealed a slight rippling of the tube at the flange. The flange of 2451-B was replaced. On May 25 the front and rear flanges of 2451-B was replaced. On May 25 the front and rear flanges of 2451-B, 2496-B, 2552-B, and 2595-B were inspected. Restriction of the inside diameter up to 130 mils by rippling was evident on the front flanges of all tubes except 2552-B. The condition of the rear flanges was good. Further investigation is planned.

Pile Development

1. The successful elimination of the silicate addition to the process water (refer to PT-105-214-P, Supplement B, this report) will result in a savings of \$60,000 annually in chemical additions provided experience to date is confirmed by continued operation.
2. The adoption of an improved type of assault mask at 100-F Area during May resulted in better comfort, visibility, and freedom of movement for the wearer. Considerable savings are realized by improved personal efficiency of the worker while required to wear a mask.
3. The frequency of checking relief valves for air, water, and steam was revised from a six months to a twelve months schedule. This results in an \$800 per year saving for each area.
4. The bucket loading procedure for discharged metal has been revised to eliminate 25% of present transportation requirements. This will result in a reduction of one of the train crews formerly required for the 100 Areas-200 Area run. It is estimated that this will result in a saving of \$70,000 annually.

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GAS PROCESSING BUILDING

Sudden increases in the condensate recovery rate of #1 Drier at B Area on May 10 and on #2 Drier on May 25 were traced to leaking steam coils which were repaired.

SPECIAL HAZARDS

The gamma dosage rate from the beam at the top far edge of the F pile is still increasing and now shows a dosage rate of 3300 mr/hr at month end as compared to 3020 mr/hr last month.

300 AREA - METAL FABRICATION

Production Statistics

Production for the month of May was as follows:

Billets Produced	22 Tons
Rods Machined	99 Tons
Baro Pieces Machined	71 Tons
Acceptable Pieces Canned	55 Tons

Melt Plant

The casting yields were as follows:

	<u>April</u>	<u>May</u>	<u>To Date</u> <u>1949</u>
Billet	67.2	71.3	67.8
Solid Metal	88.1	83.2	86.0

The Melt Plant was operated on a one-shift five-day week schedule until May 23, after which the schedule was increased to a two-shift five-day week. The latter was done to expedite the casting of a backlog of approximately 80 tons of scrap.

Billet yield increased appreciably as a result of approximately 45 percent of the TXB charged being processed from pickled chips. The solid yield was adversely affected by the ignition of two charges prior to processing and the charging of a large amount of remelt.

On May 16 the Stokes pumps failed to provide a vacuum on "B" furnace. An investigation revealed that a large quantity of water had been pulled into the vacuum lines and Stokes pumps from a water leak in No. 2 coil of "B" furnace. The necessary repairs were made and operation of "A" furnace was resumed on May 19 and "B" furnace on May 20.

Beginning on May 19, all billets were cast with a 30° chamfer on the bottom ends as outlined in Document No. HW-13077 (Authorization for Process Change - 300 Area). It is expected that a reduction of 1.5% in solid scrap will

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result in the machining of rods rolled from these billets.

Four additional heats were run from charges containing slug recovery rejects to determine the possible causes of high silicon in billets. Since billet analysis has indicated that sufficient heats have been run for final analysis of the test by the Statistical Group, the production phase of this test has been completed.

Machining

Machining yields were as follows:

<u>% Yield</u>		<u>To Date</u>
<u>April</u>	<u>May</u>	<u>1949</u>
70.5	71.6	68.9

The machining yield continued at a favorable trend. Rods rolled at Simonds from Electro-Met billets showed a marked improvement in quality. A number of rods rolled at Vulcan had ridges or fins ranging from 0.010" to 0.015" in height extending the full length of the rods. This condition resulted in an abnormal roller turner tool mortality. Rod diameters varied within a range of 1.418" to 1.462" on all stock machined during the month.

Chip Recovery

The Chip Recovery yield was as follows:

<u>% Yield</u>		<u>To Date</u>
<u>April</u>	<u>May</u>	<u>1949</u>
92.6	89.4	90.5

The entire Chip Recovery process was operated four shifts, with the press operating an additional eight shifts. A total of 39,897 pounds of TXB was produced, of which approximately 73 percent was processed from pickled chips.

The material burned in the Oxide Burner was as follows:

<u>Weight Out - Pounds</u>		<u>To Date</u>
<u>April</u>	<u>May</u>	<u>1949</u>
13,123	27,754	86,124

The oxide burner was operated on a one-shift five-day week schedule until May 9, at which time the schedule was increased to a two-shift five-day week. The latter was done to expedite the burning of a backlog of approximately 48 tons of raw oxides.

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Oxides originating in the Melt Plant, and taken from storage for burning, contained high quantities of free metal. This fact has made it necessary to reburn large amounts of oxide to reduce the free metal below the allowable two percent.

Canning Operation

The canning yield was as follows:

% Yield		To Date
<u>April</u>	<u>May</u>	<u>1949</u>
90.5	90.9	90.8

Canning rejects by cause were:

	Percent		To Date
	<u>April</u>	<u>May</u>	<u>1949</u>
Non Seating	0.3	0.5	0.8
Marred Surface	2.5	2.2	2.7
AlSi on Outside of Can	1.2	1.0	0.9
Frost Test	3.2	3.7	2.4
Bad Welds	0.6	0.7	0.7
Miscellaneous	<u>1.7</u>	<u>1.0</u>	<u>1.7</u>
	9.5	9.1	9.2

Frost test rejects continue to be a problem with no conclusive evidence of the actual causes. Reductions in this type of reject, as well as others, have been achieved through emphasis on quality. The effect of can age on cleaning and wetting was investigated as a possible cause of frost test rejects. Results indicated that there was little or no difference in old and new cans taken from storage. In addition, the dimensional changes of slugs during alpha-beta transformation in the canning operation were reinvestigated to determine if differences in diameter expansion might be contributing to frost test rejects. Dimensional changes were found to be the same as they were before difficulty was encountered with the frost test rejects.

The following special request pieces were canned:

<u>Request No.</u>	<u>Contents</u>	<u>No. of Pieces</u>
13-5	Beryllium Nitride	12
65-8	Lithium Aluminum Alloy	113

In addition 84 papoose slugs, 1700 poison slugs, and 2545 lead slugs were canned.

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Slug Recovery

	<u>% Recovered</u>		<u>Average Wt.- Lbs.</u>	
	<u>May</u>	<u>To Date 1949</u>	<u>May</u>	<u>To Date 1949</u>
Z Slugs	88.7	87.2	3.910	3.911
X Slugs	9.3	10.5	3.860	3.858
Rejects	2.0	2.3	--	--
	100.0	100.0		

Inspection and Testing

Autoclave rejects were as follows:

	<u>April</u>	<u>May</u>	<u>To Date 1949</u>
	0.09/M	0.13/M	0.06/M

Four autoclave failures occurred in May. Two pieces were completely destroyed, one was ruptured at the base of the cap, and one had a slight swelling of the can wall about two inches above the base of the can.

Penetration within 0.010" of the outer can wall was found on the original test sample taken from "G" canning line on May 17 and 24, respectively. The three retest samples taken from both days' production on G line did not show penetration within 0.010" and the pieces involved were released for normal processing. A total of fourteen pieces tested during the month was penetrated 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>April</u>	<u>May</u>	<u>To Date 1949</u>
Aluminum Cans	92.1	92.3	94.6
Aluminum Caps	97.0	96.5	94.5
Steel Sleeves	92.5	92.9	87.5

Material Handling

A total of 167 tons of alpha rolled rods was received from Simonds Saw and Steel Company and 7.5 tons of solid scrap (UM and G) were shipped to Los Alamos.

305 Test Pile

The test pile was operated on a one-shift, five-day week schedule. A total of 81 tests was run on canned slugs, 63 on billet eggs, 482 on graphite, and the following on special work requests:

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<u>Request No.</u>		<u>No. of Tests</u>
80	To determine an accurate dih value for bars which are to be used in a special test.	6
81	To irradiate a slug to determine difference in flux between the inside and outside of the slug using uranium wire.	3
82	To calibrate the graphite stringer with boron to get a ratio of dih to absorption cross-section using a 1/v absorber.	12
83	To test daily the vacuum sweepings from the lay-up of "H" pile to guard against possible sabotage.	12
84	To determine reactivity of samples of lubricant and oil using a graphite stringer and slotted bar with "F" standards.	8
85	Irradiate a gold foil to make possible the study of the 2.7d activity and, in particular, to use the foil irradiated in a known flux to standardize a G. M. counting set up.	1
86	To determine whether a temperature indicating liquid, trade name "Templiaq", will withstand exposure to radiation in a pile.	1
87	To determine presence of boron in welding flux.	5

Special Hazards

No unusual conditions developed during the month.

Development

A study of the Chip Recovery press cycle was completed to evaluate the effect of a cooling coil installed in the oil reservoir of the hydraulic system. It was found that the daily production capacity of the press was increased from approximately 400 to 460 briquettes through the installation of the cooling coil.

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