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- Copies #1 thru #17 - Monthly Report
- #18 - EP Lee - JH Warren
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- #20 - WP McCue
- #21 - WP McCue
- #22 - RO Mehann
- #23 - RO Mehann
- #24 - AB Greninger
- #25 - PE Lowe
- #26 - 300 File
- #27 - 700 File

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Declassified

By Authority of RLO-CG-4

SE Sykes 11/7/90

By D. Clemons 11/26/90

PM Eckert 11-26-90

February 6, 1950

P DIVISION

JANUARY, 1950

This document consists of

11 pages

I. GENERAL

The B, D, F and H piles operated throughout the month except for outages listed under Area Activities. Power levels were as follows: B pile - 275 MW, D pile - 305 MW, F pile - 275 MW increased to 305 MW during the month, and H pile - 275 MW increased to 330 MW during the month. The piles operated with a "time operated" efficiency of 88.8%.

A total of 53.07 tons of metal at an average of 91.2% of the current goal concentration was discharged from the piles during the month.

A new record canning yield of 93.9% for 4" canned slugs was established during January.

II. ORGANIZATION AND PERSONNEL

Number of Employees on Payroll - January
 Beginning of Month - 340
 End of Month 340
 Net Increase -

E. J. Filip was promoted to Area Supervisor, effective January 1, 1950, replacing K. T. Perkins who assumed charge of the P Division Contact Engineer Group.

One clerk was hired to fill a vacancy in the 300 Area.

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PNL 11-90

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P Division

J. A. Cowan, Senior Supervisor, visited the Simonds Saw and Steel Company at Lockport, New York, on January 9 and 10 to observe the experimental rolling of billets preheated in a lead bath.

III. AREA ACTIVITIES

<u>FILE SUMMARY</u>	<u>PILE B</u>	<u>PILE D</u>	<u>PILE F</u>	<u>PILE H</u>
Time Operated (%)	37.3	94.3	80.0	93.8
Operating Efficiency (%)	86.1	92.7	78.9	93.2
*Power Level (MW)	275.	305	305	330
*Inlet Water Temperature (°C)	4.0	4.5	4.1	2.2
*Outlet Water Temperature (Maximum °C., 10 tubes, largest orifice zone)	46.6	47.7	53.1	44.3
Number of Scrams	4	1	0	3
Number of Purges	1	0	1	1
CO ₂ Consumption (cu. ft.)	55,080	61,608	21,983	41,810
Helium Consumption (cu. ft.)	21,655	81,363**	19,669	0
Metal Discharged (tons)	19.74	13.41	19.92	0
Inhours Gained (this month)	17	11	-5	38
*Inhours Poisoned	568	546	519	232
*Inhours in Rods	63	95	51	118
	<u>648</u>	<u>652</u>	<u>565</u>	<u>388</u>

* Month end figures.

** Includes 15,500 cu. ft. for DR Pilo.

FILE BUILDINGOutage Breakdown

<u>Date of Outage</u>	<u>Metal Discharged</u>	<u>Scheduled Maintenance</u>	<u>Unscheduled</u>	<u>Length of Outage (Hours)</u>
(1) 1-2-50				
(1) 1-3-50			B	0.2
1-4-50	D		B	0.2
1-5-50		H		20.8
(1) 1-6-50				18.5
* 1-10-50	F		B	0.1
(2) 1-11-50				101.9
* 1-12-50	B		H	0.9
(1) 1-16-50				32.0
1-17-50	D		B	0.2
1-19-50		B		21.5
(1) 1-19-50				20.0
(3) 1-22-50			D	0.2
* 1-24-50	B		H	9.7
* 1-25-50	F			42.0
1-26-50		H		47.7
				17.2

* Includes time to discharge temporary poison.

(1) Unit scrammed when panellit alarm could not be reset.

(2) Scram caused by defective #2 Beckman.

(3) Two successive scrams caused by loss of DC power to safety rod clutch circuit.

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P Division

Operating Experience

Production tests having operational significance are reported below:

105-31-P (Probe Tests of Top Central Tubes)
The tubes listed below successfully passed probes as indicated:

<u>1.480"</u>	<u>1.485"</u>	<u>1.490"</u>
4662-B	4570-B	4661-B
4625-B	4572-B	4686-B
	4575-B	4571-D
	4576-B	4576-D
	4577-B	4674-F

105-103-P (Corrosion Rates at Elevated Temperatures, Supplement "A")

Thirty-two tubes in F pile continued to operate throughout the month with reduced water flow in accordance with the provisions of this test. No unusual conditions were noted.

105-114-P (Van Stone Corrosion Studies)

Zinc gaskets and cap-supported sacrificial dummy pieces were installed in the front nozzles of five process tubes during the month.

105-168-P (Replacement of Pile Atmosphere with Carbon Dioxide)
The B pile CO₂ concentration was maintained at 80% until January 30, at which time replacement of the remaining helium in the pile atmosphere was begun. CO₂ concentration at month end was 83%.

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

105-243-P (Determination of Pile Reactivity Coefficients)
A coefficient test was run at the B pile on January 4, 1950, and at the H pile on January 31, 1950.

105-278-P (Effect of Increased Enrichment Level)
Inspection of two tubes of Group V material discharged at 120% of current goal and of two tubes discharged at 126% of current goal did not reveal any unusual distortion.

105-286-P (Special Irradiation of URCL 100-105)
Six samples, which had been irradiated previously, were successfully charged into D pile on January 17. No unusual difficulties were encountered.

P Division

105-288-P (H Pile Graphite Sampling)

Graphite sampling and tube channel measurements were successfully completed.

105-301-P (Increase in Power Level of F Pile)

In accordance with the provisions of this test, the nominal level of the F pile was increased from 275 MW to 290 MW on January 3 and to 305 on January 30. No unexpected changes in operating conditions were noted.

105-302-P (Power Level Increase of H Pile)

In accordance with the provisions of this test, the nominal level of the H pile was increased from 275 MW to 290 MW on January 10; to 305 MW on January 17; to 320 MW on January 24; and to 330 MW on January 31. No unexpected operating conditions were observed.

A total of 35.72 tons of Group V (alpha rolled, triple dipped, completely transformed) material was discharged during the month. Of this amount 31.83 tons had an average concentration of the current goal value and 3.39 tons were discharged at an average concentration of 116% of the current goal in accordance with the program of investigation of higher discharge concentrations.

During the month, the last of the Group III (alpha rolled, lead dipped) material was discharged from the piles.

During the outage of January 14, tube 1293-F, containing Group IV (alpha rolled, triple dipped, partially transformed) material was difficult to discharge. A severely warped slug stuck at the inner end of the rear gunbarrel and ruptured the tube, making necessary the replacement of the outlet ten feet of the process tube before discharge could be successfully completed. On January 25, tube 3184-F containing Group V material at a concentration of 115% of the current goal value was found to be stuck. Forces up to 6000 pounds failed to move the charge and it was necessary to remove the ribs from the downstream 24 feet of the tube in order to discharge the metal. Subsequent examination of the charge revealed a severely warped slug. Tube 0271-D, which contained Group IV material, required forces up to 2400 pounds for discharge on January 17.

Considerable difficulty was experienced with the panollit system at B pile during the month. Unexpected film accumulation in fringo tubes resulted in back pressure increases on these tubes. An immediate program of gauge replacement and recalibration was instituted, but on three occasions the pile was scrammed in accordance with operating procedure when trips occurred on gauges that had not been replaced. More frequent purges of the pile and completion of the gauge replacement program are expected to minimize this difficulty in the future.

P Division

On January 5, the AC power source for the Beckman controllers at H pile was isolated from other power circuits. Since that time no unexplained Beckman surges have been noted.

Mechanical Experience

All horizontal and vertical safety rods are in satisfactory operating condition at month end except #24-B, #20-D, and #33-D. These rods are all binding in the guides. Repairs are scheduled for February.

During the month, "A" rod at F pile, reported inoperative earlier (see HW-15550-A) was repaired by replacing the tip with a "cut-down" tip section. The rod operates satisfactorily at month end.

Routine inspections of the F pile downcomer have indicated progressive deterioration of the internal baffle structure. Work was begun in January to brace and stiffen the baffle members.

Repairs to the far side effluent line at H pile, which were begun in December, are approximately 25% complete at month end.

During the month, a number of slugs and dummy pieces were recovered from the discharge chutes at B pile and the chute liners were repaired.

Gas Processing Buildings

Operation of these buildings was normal during the month.

Special Hazards

The intensity of the booms at the top far edges of the B and F piles did not change significantly during the period.

The installation of auxiliary shielding at the T seams on the experimental level at H pile continued.

Project Status

Below is summarized the status of P Division projects which are currently active.

C-306 (Front Face Shielding Caps)

Thirty-nine of an order of 500 caps have been received. The balance of the order is expected in the near future, at which time a field evaluation of the design will be made and an order placed for the remainder of the required caps.

C-323 (Replacement of Vertical Rods and Guides)

This project is complete. A closing notice is expected early in February.

P Division

- C-330 (Improved Ventilation, Bldg. 313-314)
The Hershey bag filter installation is complete except for duct work which is being fabricated. Experiments with sand filters continue. Installation of a vacuum-type sweeper is awaiting receipt of attachments.
- C-339 (300 Area Rolling Mill)
Preparation of this project is in progress. The recommendations of the consulting engineers are due in March, 1950.
- C-347 (Nozzle Galvanizing and Replacement)
This project is approved and the outlet nozzles have been ordered. Bids are out for aluminum inlet nozzles and will be closed February 3, 1950.
- C-355 (Pile Clearance, Near Side)
Approval has been received for this project. No work has been started.
- M-711 (Experimental Algae Filter)
This project was closed out as of January 15, 1950. Test work will be initiated in the near future.
- M-713 (Development of Flexible Vertical Rod)
Design work on four alternate types of rod has been completed.
- M-715 (IHM Installation for Individual Tube Accounting)
Installation at H pile is complete. Further work will await trial runs on the H pile installation and receipt of materials on order.
- M-721 (Restraining Clamps, Pile Shielding)
Installation at D and F piles is complete. Installation at B pile is not contemplated in the immediate future.
- M-723 (Repairs to 107-B Basin)
Work is being delayed by extremely cold weather.
- M-725 (300 Area Burial Ground)
Excavation work is complete. Erection of the perimeter fence is in progress.

300 AREA - METAL FABRICATION

Production Statistics

Production for the month of January was as follows:

Billots Produced	19 Tons
Rods Machined	134 Tons
Bare Pieces Machined	102 Tons
Acceptable Pieces Canned	86 Tons

P Division

Molt Plant

The casting yields were as follows:

	<u>December</u>	<u>January</u>
Billet	68.2	66.6
Solid Metal	86.0	87.1

Although the solid metal yield increased appreciably during January, the billet yield continued to be adversely effected by stopper rod breakage and improper seating. It is planned to evaluate side-pouring crucibles as a possible remedy for this problem.

On January 13 the production rate was increased 20% by increasing the amount of uranium scrap charged per crucible from 500 to 600 pounds. See "Development Section" for additional details.

Machining

Machining yields were as follows:

<u>% Yield</u>	
<u>December</u>	<u>January</u>
76.3	76.0

The slight decrease in yield for January resulted from the machining of old rod stock which contained many rods having longitudinal cracks and folds, ragged ends, and excessive diameters. All rods machined from current shipments continued to be of good quality.

Chip Recovery

The chip recovery yield was as follows:

<u>Yield</u>	
<u>December</u>	<u>January</u>
91.7	87.4

The entire chip recovery process was operated four shifts and the press was operated an additional nine shifts. All chips were pickled and 29,642 pounds of TXB were produced.

A decrease in yield resulted from efforts to improve TXB quality through reducing the amount of fines in this material. This was accomplished by using a coarser screen on the chip washer. The difference in yield was reflected in increased oxide yield.

P Division

On January 9 work was started on Production Test No. 313-11-41 (Substitution of Calcium Nitrate for Calcium Chloride in the Chip Recovery Process).

Oxide Burning

The material burned was as follows:

<u>Weight Out - Pounds</u>	
<u>December</u>	<u>January</u>
26,956	18,299

Operation was continued as necessary to burn raw oxides as they accumulated from process.

Oxide on Hand at Month End (Metal Content)

To be burned	00.0 lbs.
To be analyzed	9,950.9
To be shipped	<u>41,323.6</u>
Total	51,279.5

Canning Operation

The canning yield was as follows:

<u>% Yield</u>	
<u>December</u>	<u>January</u>
92.7	93.9

Canning rejects, by cause, were:

	<u>Per Cent</u>	
	<u>December</u>	<u>January</u>
Non Seating	1.6	0.7
Marred Surface	2.2	2.0
Al-Si on Outside of Can	0.6	1.0
Frost Test	1.9	1.2
Bad Welds	0.5	0.3
Miscellaneous	<u>1.2</u>	<u>0.9</u>
	8.0	6.1

A record yield was established for the canning of 4" slugs during January. Non seating rejects were reduced appreciably through continued emphasis on the control of canning bath temperatures. A thorough study is being made of frost test rejects to isolate and eliminate possible causes. In addition the methods of crimping and operating techniques are being studied in an attempt to reduce Al-Si rejects to a minimum.

P Division

The following special request pieces were canned:

<u>Request No.</u>	<u>Content</u>	<u>No. of Pieces</u>
P-1C-A	Lithium Aluminum Alloy	524

In addition 56 papoose slugs, 50 receptacle slugs, and 3,743 bismuth slugs were canned.

Slug Recovery

	<u>% Recovered</u>	<u>Average Wt. - Lbs.</u>
	<u>January</u>	<u>January</u>
Z Slugs	82.4	3.903
X Slugs	14.6	3.859
Rejects	3.0	---
	100.0	

Inspection and Testing

Autoclave rejects were as follows:

<u>December</u>	<u>January</u>
.07/M	.06/M

There were three autoclave failures during January; two were found to be completely destroyed and one ruptured at the base of the cap.

None of the canned pieces tested during the month were penetrated within 0.015" of the outer can surface.

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

	<u>% Usable</u>	
	<u>December</u>	<u>January</u>
Aluminum Cans	87.0	94.4
Aluminum Caps	96.8	95.1
Steel Sleeves	*	95.2

* No new sleeves were inspected.

Material Handling

A total of 7½ tons of solid uranium scrap (UM & G) was shipped to Argonne National Laboratory. No other major shipments were made off plant or received during the month.

P Division

305 Test Pile

The test pile was operated 10 eight hour shifts. Twenty-two tests were run on canned slugs, 25 on billet eggs, and the following on special work requests:

<u>Request No.</u>		<u>No. of Tests</u>
115	To determine the precision of pile period measurements with a P. C. tube.	1
118	To measure absorption cross section of various glasses.	11
119	To measure absorption cross section of alloys containing aluminum, gadolinium, titanium, and vanadium.	22
121	To obtain tracks on Li photographic plates.	5
122	To measure relative neutron intensities in 305 pile.	1
123	To measure neutron absorption of SR-13 pieces.	10

During periods when the 305 test pile was not in operation, the personnel were assigned to other operations for training purposes.

Special Hazards

No unusual conditions developed during the month.

Development

On January 13, the weight of metal charged per crucible at the melt plant was increased from 500 to 600 pounds to reduce operating costs and increase casting capacity. This was accomplished by adapting a two inch extension to the top of each crucible. It is expected that the added capacity will be sufficient to maintain minimum backlogs on a one-shift operating schedule, with an annual savings of approximately \$35,000.

A test was run to determine if cut-off tolerances for slugs could be decreased and thereby reduce turning scrap in the facing operation. The nominal length of slugs after cut-off has been 4.125". Through this test it was found that this length could be reduced to 4.091" while maintaining a finished length of 4.045" ± 0.010" after facing. All cut-off lathes were set to the closer tolerance beginning January 16. The annual savings in scrap processing costs will be approximately \$25,000.

P Division

The usage of aluminum silicon in the canning baths has been extended to an average of two shifts. In some cases the tin content has been low enough to warrant further usage. This possibility is currently being evaluated.

Recovered flux has proven satisfactory for use in the bronze baths. All flux from the canning lines is being recovered through the EFC-6 process and about 50% is reclaimed for reuse. In addition, it is planned to use about 10,000 pounds of recovered flux held in storage for leaching. Results indicate that the annual material savings will be about \$13,000.

In an attempt to extend the life of elements in the bronze furnace, small vent openings have been cut near the top of the furnaces to allow chloride fumes to escape. Air lines have been installed in the bottoms of 3A and 4A furnaces to allow continuous purging at the rate of 10 liters per minute. Beneficial results have been noted and no temperature problems have been encountered. To date it appears that element life may be extended as much as four times that normally expected.

END

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