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HW--14596-A

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DATE October 6, 1949SUBJECT P Division Monthly Report -September, 1949To FileFROM E. P. LeeCOPY No. [redacted]

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PNL 11-90

October 6, 1949

P DIVISION

SEPTEMBER, 1949

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 60.22 tons of metal, at an average concentration of 396 MWD/ton, was discharged from the piles during the month.

The 105-H Building was accepted from the Construction Division on September 28 with certain exceptions noted under the Operating Experience section of this report. At month end P Division operating personnel are making preparations for activation of the H pile.

On September 28 the operation of the 300 Area oxide burning process was reduced from a two shift to a one shift five day operation. This change in schedule was possible as a result of working off the backlog of uranium oxide.

The shipment of 200 tons of canned slugs to Building 105-DR for storage was completed on September 9 and the shipment of 250 tons of canned slugs to Building 105-H for the initial loading charge was completed on September 26.

II. ORGANIZATION AND PERSONNEL

Number of Employees on Payroll - September, 1949

Beginning of Month	317
End of Month	320
Net Increase	3

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By Authority of RLO-CG-4

AE Sykes 11/7/90

By J. Greninger 11/26/90

PM Eck 11-26-90

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One operator and one steno-typist terminated voluntarily. One operator returned from leave of absence and one operator was rehired to fill a vacancy in the 300 Area. In addition, one steno-typist was transferred from the Construction forces and one was hired to fill vacancies in the 100 Areas.

Two Shift Supervisors, B. E. Dalton and J. D. Darby, were removed from the rolls of the 300 Area, effective September 1. T. M. Hall, Shift Supervisor, returned from leave of absence. W. N. Koop and C. E. Jones were added to the P Division rolls as Supervisors in Training; these men were transferred from the Technical and Health Instrument Divisions, respectively.

Twenty-five operators and three supervisors were transferred to 100-H Area from the other 100 Areas. This completes the transfer of operating personnel in preparation for the start-up of H pile.

III. AREA ACTIVITIES

PILE SUMMARY	PILE B	PILE D	PILE F
Time Operated (%)	91.6	85.6	91.5
Operating Efficiency (%)	89.7	83.4	89.9
*Power Level (MW)	275	305	275
*Inlet Water Temperature (°C)	18.0	18.4	18.1
*Outlet Water Temperature (Maximum °C., 10 tubes, 0.240" Zone)	54.8	52.5	55.2
Number of Scrums	1	1	1
Number of Purges	1	1	0
Helium Consumption (cu. ft.)	19503	65427**	23348
Metal Discharged (tons)	17.52	26.31	16.39
Inhours Gained (this month)	5	1	6
*Inhours Poisoned	511	525	539
*Inhours in Rods	65	71	55

* Month end figures.

** Includes consumption of 15,000 cu. ft. at DR pile.

FILE BUILDING

Outage Breakdown

Date of Outage	Metal Discharged	Scheduled Maintenance	Unscheduled	Length of Outage (hours)
9-1-49	B			21.8
9-8-49		F		36.5
9-10-49			B	19.3*
9-10-49			D	.7*
9-10-49			F	.6*

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Outage Breakdown (Con't.)

<u>Date of Outage</u>	<u>Scheduled</u>		<u>Unscheduled</u>	<u>Length Outage (hours)</u>
	<u>Metal Discharged</u>	<u>Maintenance</u>		
9-14-49	D			46.1**
9-21-49	B			21.5
9-27-49	F			24.4
9-28-49	D			56.9

* Unit scrambled due to Critical Y power condition.
100-B could not be restarted because duration of
condition exceeded recovery time.

** Includes outage to discharge temporary poison.

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:

<u>1.485"</u>	<u>1.490"</u>
4670-D	4665-B
	4666-B
	4677-D
	4681-B
	4682-B

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

During the September 27 outage at F pile,
smaller orifices were installed in tubes
2670-F, 3564-F, 3674-F, and 2851-F. At
month end, the reduced flow was not affect-
ing operation of the pile at nominal level.

105-114-P (Van Stone Corrosion Studies)

During the September 8 outage at F pile, ex-
amination of three tubes fitted with stainless
steel front nozzles and sacrificial magnesium
upstream dummies revealed the tubes to be free
of corrosion products and the Van Stone flanges
to be in good condition,

Three tubes fitted with galvanized upstream
nozzles revealed no appreciable Van Stone
pitting or corrosion products.

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Four rear and three front Van Stone flanges protected by sacrificial magnesium gaskets were inspected and all were found to be in good condition.

105-168-P (Replacement of Pile Helium Atmosphere with CO₂)
The CO₂ concentration was maintained at 60% in B and F piles and 40% in D pile throughout the month.

105-214-P (Silica Feed Reduction - Supplement B)
No sodium silicate was added to the process water at the piles during the month. Pressure drop film formation and decomposition appears to have reached an equilibrium value in the central tubes of B and F piles. In the D pile, however, a purge was necessary at the end of the month because of a sudden unexplained increase in film formation rate.

During the purge of the 105-D pile (9-28-49) a screen on the solids injection system split, permitting large particles of solids to enter the process water system. This resulted in severe plugging of the screens on C and D riser and the subsequent charging of these screens necessitated approximately 15½ hours of additional outage time. After startup, there was evidence of cone screen plugging on five tubes and the unit was shut down for an additional 2.3 hours to change these screens.

The orifices in the inlet end of the process tubes were changed to the next larger size on 13 tubes in B pile, 43 tubes in D pile and 21 tubes in F pile during the month to relieve high exit water temperature conditions following startup.

During the month, segmental discharge of four tubes was attempted. Two tubes at B pile were discharged without incident. The tape would not enter one tube at D pile and it could not be discharged; the other tube was processed without incident.

A total of 55.12 tons of Group V (alpha rolled, triple dipped, completely transformed) material was discharged during the month at an average concentration of 406 MWD/ton without incident.

Four process tubes were replaced during the month (channels 0574-B, 3469-D, 1659-D and 1758-D) and the tube was removed from channel 4280-F for corrosion studies.

The 105-H area was accepted from the Construction Division on September 28, 1949 with certain exceptions. The work required to complete the unaccepted items will be performed by the Manufacturing Division Mechanical Divisions personnel on work order

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authorization from the Construction Division. Included in the work yet to be completed are these major items:

1. Balance building ventilation system.
2. Make unit flow test.
3. Complete installation and testing of gas analysis instrumentation.
4. Replace inlet and outlet caps.
5. Complete installation of B test hole insert.
6. Change all cross header screens and identify headers and tubes.
7. Complete installation and testing of pannolit gauges.

Mechanical Experience

At month end all horizontal and vertical safety rods are in satisfactory operating condition with the exception of #32-F which is tied out due to excessive binding.

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

1. No. 31-B rod was replaced with a stainless steel rod and guide.
2. Replacement of electrical leads on #16-B and #17-B rods continued during the month.
3. The pneumatic testing of all vertical safety rod thimbles was completed during the month. Thimbles #18-F and #31-F were replaced and #26-F remains to be replaced. No. 23-F, reported leaking (see HW-14338-A), was retested and found to be satisfactory.
4. The tip of #5-D rod was replaced on September 15 after a water leak was observed in the tip.

The air inlet duct to the rear face of D pile was found to be blocked with water during the September 15 outage. The duct was pumped dry and the drain cleaned. At month end, the condition of the duct appears satisfactory.

On September 3, a partial failure of the horizontal rod hydraulic shim pump drive system occurred at B pile. Investigation revealed that excessive leakage of oil at #9 drive motor had resulted in the transfer of considerable oil from the shim pump sumps to the accumulator pump sumps via the drain line. The shim pump sumps were refilled and the motor is scheduled for overhaul to prevent recurrence of the condition. The emergency accumulator system was not affected by this trouble.

The inspection of the front ends of 35 tubes in D pile revealed corrosion product deposition in several tubes but no evidence of pitting in any except 1794-D. This tube was pitted at the

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Van Stone flange and also in the tube downstream of the flange. Further evaluation of this problem is being made by the Technical Divisions.

The tie-in of the 107-DR effluent line at 1904-D was completed during the month.

Pile Area Development

A removable shield was developed at F pile during the month for use while cutting vertical safety rod thimbles. Personnel exposure during thimble replacement was reduced 50% by use of this device.

A revision of the Control Room RXC (Beckman) circuits was made in all piles during the month. The revision provides a separate fuse for the heater and electrometer circuits and is expected to minimize scrams caused by fuse failure in the heater circuit.

Process Control Activities

During the month, forty-one procedure revisions and twelve log sheet revisions were processed in preparation for the activation of the H pile. In addition the group undertook new responsibilities in connection with project and cost engineering, began a training program for two new supervisors, and continued the routine production accounting and scheduling work, suggestion processing and development investigation.

Gas Processing Building

Operations in these buildings were normal during the month. Sixteen thousand pounds of liquid CO₂ were unloaded into storage at 110-H on September 22.

Special Hazards

Slight decreases in the intensity of the beam at the top far edges of D and F piles were reported during the month.

300 AREA - METAL FABRICATION

Production Statistics

Production for the month of September was as follows:

Billets produced	20 Tons
Rods Machined	72 Tons
Bare Pieces Machined	53 Tons
Acceptable Pieces Canned	69 Tons

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Melt Plant

The casting yields were as follows:

	<u>August</u>	<u>September</u>	<u>To Date</u> <u>1949</u>
Billet	66.0	68.8	68.1
Solid Metal	84.6	84.4	85.6

An increase in billet yield was obtained by processing current rather than stock pile material, using approximately 55% TXB, 31% UM, and 14% remelt per furnace charge. In addition, about 90% of the TXB charged was processed from pickled chips.

The new Cochran Bly saw was used satisfactorily for billet cropping throughout the month.

Machining

Machining yields were as follows:

	<u>% Yield</u>		<u>To Date</u> <u>1949</u>
	<u>August</u>	<u>September</u>	
	71.3	72.6	69.9

The higher yield this month resulted from a reduction in turning scrap. Rod diameters ranged from 1.408" to 1.460", with an average of approximately 1.425". The amount of solid scrap on some of the lots machined was high because a number of rods were elliptical and had deep surface grooves and voids.

A total of 21 thermocouple slugs was machined on September 14. These slugs are to be used for 100 Area test purposes.

Chip Recovery

The Chip Recovery yield was as follows:

	<u>% Yield</u>		<u>To Date</u> <u>1949</u>
	<u>August</u>	<u>September</u>	
	90.5	92.1	90.6

The entire Chip Recovery process was operated four shifts, with the press being operated eight additional shifts. A total of 20,257 pounds of TXB was produced, of which 92.7 percent was processed from pickled chips.

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Oxide Burning

The material burned was as follows:

Weight Out - Pounds		
<u>August</u>	<u>September</u>	<u>To Date</u> <u>1949</u>
41,831	95,776	280,920

Oxide burning was continued on a two-shift five-day week schedule until September 26, at which time operation was decreased to a one-shift five-day week. The backlog of oxides for burning had been sufficiently reduced, as a result of using the outgassing furnace for roasting, to warrant this change in scheduling.

Canning Operation

The canning yield was as follows:

% Yield		
<u>August</u>	<u>September</u>	<u>To Date</u> <u>1949</u>
91.6	91.1	91.2

Canning rejects, by cause, were:

	% Yield		
	<u>August</u>	<u>September</u>	<u>To Date</u> <u>1949</u>
Non seating	0.8	1.7	0.9
Marred Surface	2.5	2.8	2.6
Al-Si on Outside of Can	1.6	0.7	1.1
Frost Test	1.5	1.4	2.0
Bad Welds	0.7	0.6	0.7
Miscellaneous	1.3	1.7	1.5
	8.4	8.9	8.8

The canning yield was slightly lower this month than in August. Defective thermocouples in the canning baths on two occasions resulted in an abnormal number of pieces being rejected for non-seating. A mechanical failure of an electric hoist caused 108 pieces to be spilled in a degreaser and rejected for marred surface. Al-Si rejects were reduced appreciably through improved crimping techniques.

All pieces canned on August 1 and 2 which have been held for investigation (see Document HW-14338-A) were re-etched and those having caps containing excessive copper, as indicated

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by off color, were rejected. Only seven pieces were rejected and the remainder was released as acceptable.

A total of 686 slugs was canned by the lead dip process in conformance with Production Test No. 313-109-M, (Heat Treating Uranium by Electrical Induction). One hundred sixteen slugs fabricated from depleted uranium were canned by the lead dip process under Production Test No. 313-110-M, (Lead Dip Canning of U-238).

The following special request pieces were canned:

<u>Request No.</u>	<u>Contents</u>	<u>No. of Pieces</u>
P-10-A	Lithium Aluminum Alloy	312
ORNL	Alpha Rolled Uranium (Pb Dip Canned)	80

In addition 3070 lead slugs and 42 uranium receptacle slugs were canned.

Slug Recovery

	<u>% Recovered</u>		<u>Average Wt. - Lbs.</u>	
	<u>September</u>	<u>To Date 1949</u>	<u>September</u>	<u>To Date 1949</u>
Z Slugs	95.3	88.8	3.906	3.911
X Slugs	4.3	9.2	3.862	3.858
Rejects	<u>0.4</u>	<u>2.0</u>	---	---
	100.0	100.0		

Inspection and Testing

Autoclave rejects were as follows:

<u>August</u>	<u>September</u>	<u>To Date 1949</u>
0.08/M	0.08/M	.06/M

Three complete autoclave failures occurred in September.

No penetration was found within 0.010" of the outer can wall on any of the pieces tested during the month. Only one test sample showed penetration at 0.015".

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

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	<u>% Usable</u>		<u>To Date 1949</u>
	<u>August</u>	<u>September</u>	
Aluminum Cans	94.9	93.8	94.6
Aluminum Caps	86.4	90.5	93.5
Steel Sleeves	*	84.4	86.4

* No new sleeves were inspected.

A total of 3480 aluminum cans received from Scoville Manufacturing Company was inspected and 97.7% were acceptable.

Material Handling

An additional 21,402 canned slugs were transferred to 100-DK for storage and 128,502 canned slugs were shipped to 100-H for initial loading.

One hundred thirty-five tons of rods were received from Simonds Saw and Steel Company and 21 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. Ninety-four tests were run on canned slugs, 29 on billet eggs, 384 on graphite bars, and the following on special work requests:

<u>Request No.</u>		<u>No. of Tests</u>
97 & 98	To test the effectiveness of boric acid type P column to be used as a temporary P column in the 105 piles.	15
99	To make boron calibration of 305 pile.	4
100	To determine purity of SR-65 pieces.	24
101	To calibrate instrument.	1
102	To calibrate instrument.	1
103	To test P-10-A slugs.	12
104	Standardize instruments for obtaining data on PT-225-105.	1
105	Sort P-10-A slugs to be used in the 105 ° piles.	96

Special Hazards

No unusual conditions developed during the month.

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Development

Test runs were completed this month to determine the feasibility of using the outgassing furnace to burn oxides. Results indicated that this furnace was more efficient and has about twice the capacity of the existing propane burner. It was converted for the routine burning of oxides on September 6. An estimated manpower savings of about \$3,000.00 will result from the use of the electric furnace to reduce the current backlog of oxides, and an annual manpower savings thereafter of about \$3500.00 based on present production rates.

A pneumatic cylinder and foot switch were installed on one Lodge and Shipley lathe to actuate the starting and stopping mechanism. The results have been very satisfactory and show a time savings of 11½ for facing canned slugs. It is planned to make this installation on the two remaining lathes, which require manual operation of the clutch and brake.

A suggestion to degrease billet eggs prior to testing was adopted. The evaluation of this suggestion indicated that almost all of the retests on billet eggs resulted from contamination that could be readily removed by degreasing. Based on actual testing experience for the first six months of the year, it is estimated that about \$870.00 can be saved annually by degreasing billet eggs and thus eliminating the cost of retesting in most cases. In addition to the above savings it is expected that more accurate T.D.S. values will be obtained.

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