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76 pages.

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
FOR
JANUARY, 1959

HAN-71499-DEC

71499

Compiled By
OPERATION MANAGERS

February 20, 1959

HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON

Work performed under Contract No. W-31-109-Eng 52 between
the Atomic Energy Commission and General Electric Company

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By Authority of

C. W. K. 8-10-92

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TABLE OF CONTENTS

Distribution	A-2
Table of Contents	A-3
General Summary	A-4 through A-5
Staff	A-6
Number of Employees	A-7
Patent Summary	A-8
Production Operation	B-1 through B-4
Purex Operation	C-1 through C-6
Redox Operation	D-1 through D-6
Finished Products Operation	E-2 through E-7
Power and General Maintenance Operation	F-1 through F-3
Financial Operation	G-1 through G-5
Facilities Engineering Operation	H-2 through H-12
Research and Engineering Operation	J-3 through J-18
Employee Relations Operation	K-2 through K-12

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JANUARY, 1959

GENERAL SUMMARY

PRODUCTION

Production of plutonium from the separations plants during January was slightly less than the Official Forecast.

Both the production and shipments of UO_3 conformed to the operating and shipping schedules.

The output of unfabricated plutonium was slightly less than that scheduled while the production of shapes conformed to the Official Forecast. Shipment of shapes exceeded the commitment for January.

ENGINEERING

During start-up of Purex on normal product extraction, the plant capacity was limited (to CF = 1.44) by restricted flow through a replacement jumper. The plant was restarted January 13 at 3.0 CF after installing a screen in the jumper inlet nozzle to keep out polyethylene fragments.

Decontamination performance in both the Final Uranium and Final Plutonium cycles at Purex was poor at start-up, due to degraded organic in the 2D column feed stream. Only one plutonium batch exceeded gamma specifications. During this period the uranium product was out-of-specifications, and required rework along with the UO_3 Plant recycle material being processed. Both product streams and organic quality recovered together.

The recovery of Palm at Purex during the first part of January yielded 0.76 kilograms, or an overall of 92 per cent recovery realization. Use of an oxidizing flowsheet removed greater than 99 per cent from HA column.

Seventy tons of E-metal were dissolved, in two dissolvers at Redox, during January. Two step dissolution procedure has kept the residual heel to less than 0.5 per cent of the uranium charged.

A transmittal letter, providing a brief abstract of the rare gas recovery studies, was forwarded to the Atomic Energy Commission along with copies of summary reports which provided details on the study. The submittal of the above documents to the Commission constituted completion of the Phase I process study on rare gas recovery.

The conceptual design of a Zr-Nb recovery and packaging facility for installation in the Purex Sample Gallery was completed. Preliminary estimates indicate the Zr-Nb sources could be prepared for about one cent per curie.

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The scope design covering the modifications to the plutonium anion exchange unit at Purex for conversion to a manufacturing facility was completed. A summary report was issued to serve as a basis for project proposal preparation and detailed design for the project.

Specifications have been completed for the design, fabrication, and testing of a remotely-operated portable shear for jumper cutting. It is planned that this unit will be used in the Purex canyon to cut off valuable components from failed jumpers for decontamination and re-use, and to obtain shorter jumper sections for economy in burial.

Formal acceptance of the second crane facilities with exceptions was made by Purex Operation January 21, 1959. Preparation of the physical completion notice is in progress.

The decision was made to revise the scope of the casting furnaces for Project CGC-811 (Additional Fabrication Facilities, 234-5 Building) by substituting four batch furnaces in place of the continuous furnace outlined in Document HW-58365. This decision was based on the latest technology associated with casting and the critical mass limitation of 4.5 Kgs. inside the continuous type furnace.

GENERAL

On January 28, 1959, while removing a jumper from H Cell in the Redox building, the left hand auxiliary hoist and monorail broke loose from the 60-ton canyon crane and fell to the 202-S Canyon deck. The separation was caused by the shearing of the 5/8-inch bolts which clamp the retainer cleats together. It is apparent that the bolts became weak through wear to the point that they would not sustain a heavy load. At month-end the monorail and hoist assembly were being replaced with new units.

On January 8, 1959, a fission product contamination spread occurred over about 250 acres within the 200 West Area when a burial box containing cell jumpers collapsed during backfill operations. Details of this occurrence are covered in the investigation report of Radiation Incident No. CPD 59-1.

The Department achieved its fourth President's Safety Award on January 6, 1959 after completing approximately five and one-half million man hours without a disabling injury.

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STAFF

Vice President and General Manager, Atomic Products Division . . .	L. R. Fink
General Manager, Hanford Atomic Products Operation	W. E. Johnson
General Manager, Chemical Processing Department	W. K. MacCready
Manager, Production	J. H. Warren
Manager, Purex Operation	P. R. McMurray
Manager, Redox Operation	C. T. Groswith
Manager, Finished Products Operation	W. N. Mobley
Manager, Power & General Maintenance Operation	T. G. LaFollette
Manager, Financial Operation	K. G. Grimm
Manager, Facilities Engineering Operation	H. P. Shaw
Manager, Research and Engineering Operation	V. R. Cooper
Manager, Employee Relations Operation	D. S. Roberts

CHEMICAL PROCESSING DEPARTMENT
NUMBER OF EMPLOYEES
JANUARY 31, 1959

OPERATION	EXEMPT		OTHER		TOTAL	
	12-31-58	1-31-59	12-31-58	1-31-59	12-31-58	1-31-59
GENERAL MANAGER'S GROUP	10	10	1	1	11	11
PRODUCTION	6	6	3	3	9	9
PUREX	51	51	213	214	264	265
REDOX	55	51	225	223	280	274
FINISHED PRODUCTS	58	55	238	242	296	297
POWER AND GENERAL MAINTENANCE	39	40	250	254	289	294
FINANCIAL	20	19	40	39	60	58
FACILITIES ENGINEERING	68	69	23	22	91	91
RESEARCH AND ENGINEERING	62	62	25	25	87	87
EMPLOYEE RELATIONS	28	27	51	51	79	78
TOTAL	397	390	1069	1074	1466	1464

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CHEMICAL PROCESSING DEPARTMENTPATENT SUMMARY
FOR
MONTH OF JANUARY, 1959

All persons engaged in work that might reasonably be expected to result in inventions or discoveries advise that, to the best of their knowledge and belief, no inventions or discoveries were made in the course of their work during the period covered by this report except as listed below. Such persons further advise that, for the period therein covered by this report, notebook records, if any, kept in the course of their work have been examined for possible inventions or discoveries.

INVENTORTITLE

NONE

ACTING GENERAL MANAGER
CHEMICAL PROCESSING DEPARTMENT

CHEMICAL PROCESSING DEPARTMENT
PRODUCTION OPERATION

JANUARY, 1959

I. RESPONSIBILITY

There were no changes in the responsibility assigned to the Production Operation during January.

II. ACHIEVEMENT

A. Production Statistics

1. Purex Operation

	<u>January</u>	<u>December</u>
Tons uranium processed	376.50	602.74
Average production rate during operation (T/D)	19.6	21.4
Total waste loss (%)		
Uranium	0.12	0.05
Plutonium	0.29	0.16
Average cooling time (days)	104	102
Minimum cooling time (days)	81	90
On-line efficiency (%)	62	90

2. Redox Operation

	<u>January</u>	<u>December</u>
Tons uranium processed	68.1	69.26
Average production rate during operation (T/D)	6.5	5.7
Total waste loss (%)		
Uranium	0.24	0.23
Plutonium	0.51	0.38
Average cooling time (days)	208	219
Minimum cooling time (days)	156	161
On-line efficiency (%)	49.3	42

3. 234-5 Operation

	<u>January</u>	<u>December</u>
Batches input to Task I	175	231
Runs completed through Task III	183	258
Batches through Product Recovery	27	25
Reduction Yield (%)	96.98*	98.83
Waste disposal (units)	93.88	122.20

*Contains 1494.28 powder charged to misfired Button Y19-1-65.

4. UO₃ Operations

	<u>January</u>	<u>December</u>	<u>To Date</u>
UO ₃ loaded (tons)	456.6	608.9	
UO ₃ approved for shipment (tons)	398.8	597.7	31,325.98
UO ₃ shipped (tons)	447.67	644.63	31,049.46
UNH backlog (tons)	) 127-E	56-E	
	) 288	304	

5. Power

	<u>200 East</u>	<u>200 West</u>
Raw water pumped (gpm)	8,445	3,942
Filtered water pumped (gpm)	869	928
Maximum steam generated (lbs/hr)	272,000	155,000
Average steam generated (lbs/hr)	188,000	120,000
Total steam generated (M lbs)	139,875	89,282
Coal consumed, est. (tons)	9,124	6,361

6. Waste Storage

	<u>January</u>	<u>December</u>
Salt waste reserve storage capacity-Redox	3,879	3,933
Salt waste reserve storage capacity-Purex	33,698	34,075
Coating waste reserve storage capacity-Redox	30,881	31,006
Coating waste reserve storage capacity-Purex	46,322	46,699

B. Production Planning and Scheduling Operation

A new official forecast extending through FY 1964 was prepared and issued. Highlights of this forecast include:

1. Over-all reduction in uranium and plutonium processing through FY 1960, as compared to the previous official forecast.
2. Revision of the 234-5 program in accordance with the latest Albuquerque Schedule outlined in CXXX-1616.

C. Finished Products and Customer Liaison

The final report and summary of the Fission Products Market Survey was presented orally at HAPO on January 13, 1959, by representatives of Arthur D. Little, Inc. The report, which consists of two volumes, has been edited and is now being printed.

E. Reports and Documents

1. Prepared and Issued

HW-58728 RD Redox Plant Production Schedule, January, 1959
D. McDonald

HW-58729 RD Purex Plant Production Schedule, January, 1959
D. McDonald

HW-58730 RD UO₃ Plant Production Schedule, January, 1959
D. McDonald

HW-58731 RD 234-5 Plant Production Schedule, January, 1959
D. McDonald

HW-58805 Essential Materials Consumption-Purex, Chemical
Processing Department for December, 1958.
M. A. Thress

HW-58810 Essential Material Area Report to Cost and Pur-
chasing - Production Operation, Chemical Processing
Department for December, 1958, M. A. Thress

HW-58831 Chemical Processing Department - Waste Status Summary
for December 31, 1958, M. A. Thress

HW-58900 Production, Hanford Atomic Products Operation
Operation, January 26, 1959, R. E. Roberts

HW-59084 FD Forecast of Nuclear Materials Requirements FY 1959
(4th Quarter), Chemical Processing Department,
R. E. Roberts

2. Prepared for Signature and Issuance

HW-58712 Production, December, 1958, W. E. Johnson

CLVI-605 HAPO Production Forecast, W. E. Johnson

III. ORGANIZATION AND PERSONNELA. Safety

There were no plant injuries reported by Production Operation personnel during January, 1959.

B. Security

There were no security violations in the Production Operation during the month.

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C. Visits

W. K. MacCready, General Manager, and J. H. Warren, Manager, Production visited Oak Ridge, Tennessee, Washington, D. C. and Pittsfield, Massachusetts to discuss critical mass problems, waste disposal problems, and organizational problems, respectively, from January 28, 1959 to February 6, 1959.

J. H. Warren
Manager
Production Operation

CHEMICAL PROCESSING DEPARTMENT
PUREX OPERATION

January, 1959

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I. RESPONSIBILITY

There were no changes in the responsibilities of the Purex Operation during the month.

II. ACHIEVEMENT

A. Processing Experience

1. Production Statistics

a) Production - Percent of Monthly Commitment

Uranium	84 Percent
Plutonium	84 Percent

b) Production Rates

Processing rates during regular operation were at 2.7 CF except for a 24-hour period when rates were reduced to 1.97 CF because of instability in the HA column.

c) Operating Continuity

Uranium	62 Percent
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d) Waste Losses

Uranium	0.12 Percent
Plutonium	0.29 Percent

e) Product Re-treated in Silica Gel 105 Tons

2. Normal Processing

The startup of normal operations following the Palm recovery run was delayed about 48 hours by failure of the HSR jet jumper. The original jumper failed due to a slight leak which corroded the skirt of the connector head. The replacement jumper became plugged with polyethylene chips in the DOV soon after installation. The problem was resolved by inserting a screen in the inlet connector head.

The startup was normal; however, exceedingly high gamma activity was present in the uranium product (peaked at 290 GR) and the 2EW and 2EW losses were above normal. This difficulty was traced back

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to the presence of organic degradation products in the 2DF feed. Eight batches of uranium were segregated for rework within the building and ten batches were set aside for silica gel treatment. Increased organic washing restored the organic quality to normal and acceptable material was produced during the remainder of the month.

Rates were increased in the final uranium cycle to a maximum of 3.3 CF for the rework of high gamma product which had been combined with approximately forty tons of sump waste material from the UO₃ Plant. A total of fifty tons of uranium was reworked during the month.

The behavior of the HA column was very erratic for several days and showed signs of flooding under conditions previously considered normal. A temporary restriction of the HAW flow was also noted. Rates were reduced to 1.96 CF and the pulse frequency was lowered in order to restore stability. The erratic conditions did not materially affect waste losses or the decontamination performance of the column.

During the run period process changes were made to study the behavior of Palm in the HA and 2D columns. Nitrite was added to the No. 1 organic system (100 stream) to reduce the HAW Palm loss and was very effective until the column saturation was intentionally increased to the point where an appreciable plutonium and Palm loss occurred. Reduction of the saturation did not immediately reduce the Palm loss rate.

The dissolver caustic scrubbers were returned to service after a month of standby to allow completion of the new line for jetting the 216-A2 catch tank to the A-21 crib.

Radioiodine emission was under control except for the last few days of the period when the Purex limit was exceeded by a factor of two. The source was traced to the vessel vent system in general. Mercuric nitrate additions to the D cell tanks were resumed.

Self concentration in tanks 241-A-101, 102, and 103 continued at a rate of 4.0, 14.5, and 1.3 gallons per minute, respectively.

A second batch of waste was added to the 104-A underground storage tank to increase the temperature to a value between 70° and 100° C. Water was added to bring the total liquid level to 67 inches. This will serve a dual purpose of preheating the tank before actual use and to recheck on anomalous liquid level measurements which occurred during the August 1958 to December 1958 period.

On 1-25-59, failure of a plug in the UO₃ recovered nitric acid header in the sample gallery allowed acid to spray the area. Approximately 1,000 gallons drained to the E cell sump before the pump could be stopped. There was minor damage to mild steel equipment in the area.

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3. Special Processing

Prior to the start of normal processing a very successful Palm run was conducted with approximately 92 percent recovery. The flowsheet was identical to that used during the November run. However, the acid in the waste was recovered after killing the excess chromate in the F-7 tank with nitrite.

One batch of refluxed F8 waste was successfully reworked. Approximately 220 Palm units, 983 plutonium units and 683 uranium units were processed. The waste was an accumulation of losses from the November Palm run, sump waste and 2BW losses.

4. Radiation Experience

The total monthly radioiodine emission was 19.4 curies. The maximum emission in a seven-day period was 5.4 curies for the period ending January 28.

Eight Radiation Occurrences were charged to Purex during the month. Four were the result of loss of contamination control within a Radiation Zone which resulted in contamination being spread to areas not normally subject to contamination in the work being done.

Four cases of skin contamination were incurred during the month. The maximum levels encountered were 40,000 d/m plutonium and 600 c/m FP's. In all cases the contamination was readily reduced below detectable levels.

A routine radiation survey of the storage gallery revealed a radiation level of 4.5 r/hr at two inches from the floor adjacent to the canyon wall. The radiation level was reduced to 150 mr/hr at two inches with lead shielding and access to the area was restricted. The radiation is probably due to a void in the concrete although previous routine surveys of the area showed no radiation leakage.

Failure of the F11 left tube bundle last month resulted in contamination of the steam condensate piping in trap pit No. 2 to a maximum of 500 r/hr at two feet and 1.1 r/hr at 45 feet through a one-half inch thick manhole cover. This latter reading dropped to 400 mr/hr after one month of steam purging.

A leak in the overground coating waste transfer line at 241-CR tank farm resulted in contamination of the ground to 1.5 r/hr at 15 feet. The line was replaced at a maximum exposure of 4 r/hr.

C. Mechanical Experience

The piping systems for rerouting the 216-A2 tank jet transfer from the 216-A4 crib to the 216-A21 crib were completed. In conjunction with this work, the XD tank overflow and vent piping in the 293-A building was rerouted from the A-21 line to the SX-3 sump tank. Rerouting of wastes to A-21 crib was necessary after the A4 crib became plugged early in December.

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Extensive repairs and modifications were performed on the 291-A main damper following remote removal of the unit from the main wind tunnel. Repairs became necessary after the damper became stuck in a partially open position.

A new Wilfley centrifugal pump was installed in the P-13-2 position in the 203-A area, replacing the Pacific pump which had frequent mechanical seal failures. Purex has six other Wilfley pumps in service, all performing with a minimum of mechanical or operating difficulty.

Installation of a safety device, to preclude the possibility of collision between the two remote cranes, was completed during the month. The device has multiple limit switch arrangements to apply the crane brakes automatically when the cranes are within eight feet of each other.

A special radiation measuring device including a lead-shielded chamber, Beckman amplifier and recorder, was installed on the new remote crane as a means of detecting abnormally high radiation during charging operations.

Three bellows seal failures on DOV valves used on nitric acid service were experienced during the month. One failure involved a new DOV which was in service only a few hours. Examination of two new DOV's removed from spare parts revealed that the bellows were abnormally stretched and would be subject to early failure in service. Investigation is underway to determine the source of this problem in order to take corrective action.

D. Analytical Performance

The successful Palm recovery run focused attention on the limitations of methods for the evaluation of the final Palm product samples. Further clarification of the X-ray, fluorimeter, and plutonium methods will be required. The usefulness of the 256 channel analyzer was again demonstrated.

Another problem associated with the Palm run was the unusually high radiation levels associated with routine samples. Considerable ingenuity was shown in handling the situation without any incident of personnel over-exposure or radiation occurrences.

A revised referee program to improve the measurement of analytical precision on critical samples was introduced this month. Also a new revised cribbed sample schedule was accepted to improve the coverage on these samples for proper environmental exposure control.

A special analytical service, utilizing the 256 channel analyzer, was provided to the Chemical Effluents Technology Operation.

E. Improvement Performance

1. Process Tests and Revisions

During most of the run period nitrite was added to the G5 tank to

improve control of Palm losses in the HAW stream. The results were favorable until the saturation in the HA column was built up to the point that plutonium and Palm losses occurred. Palm losses appeared to lag behind changes in column saturation and were not corrected until the saturation was brought down to the low side of operating limits.

Sulfuric acid was introduced to the 2DS stream in an effort to reduce Palm losses in the 2DU. Results were negative. Sulfamic acid was then tried but was also unsuccessful.

2. Equipment Changes

The alarm system from the 241-A tank farm to the 202-A dispatcher's office was revised. The new system will signal the dispatcher's office whenever the process air compressors automatically change from one to the other in case of overheating or complete failure.

F. Inventions and Discoveries

No inventions or discoveries were reported by Purex personnel during January 1959.

G. Events Influencing Costs

The failed F5 nitric acid fractionator, costing about \$186,000 new, was decontaminated and repaired at a cost of \$1500.

Organic consumption was approximately 20 gal/ton, as compared to about 12 gal/ton in the previous several months. The increased consumption is attributed to the increased washing in R cell, along with inadequate decanting of the wash solution. This represents an increased cost of approximately \$10/ton.

III. ORGANIZATION AND PERSONNEL

A. Safety

There were no disabling or near-serious accidents during the month. Eight medical treatment injuries were reported.

B. Security

One open file violation was reported during January.

C. Personnel

G. P. Coryell - Supervisor - Process Operation, transferred to IPD on January 2, 1959. He was replaced by J. D. McIntosh, who transferred from Finished Products Operation.

G. C. Devalon, Specialist - Process Operation, transferred to Finished Products Operation on January 26, 1959.

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101

Three employees completed the "Understanding People" course.

J. M. Blackburn attended the Plant Engineering and Maintenance Conference in Cleveland, Ohio. The trip included visits to the Hotpoint Plant in Chicago and the General Electric Company Production Engine Department at Evendale, Ohio.

The following persons visited Purex during January, 1959.

Brigadier General R.H. Harrison - USAF-SWP Division

Frank T. Lewis - Manager, Personnel Development-Manufacturing Services, General Electric Company

Dr. Donald L. Katz - President, A.I.ChE and Professor at University of Michigan.

S. J. Levine - Manager, Idaho Test Station for General Electric Company.

Manager
Purex Operation

PR McMurray:EAF:gt

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CHEMICAL PROCESSING DEPARTMENT
REDOX OPERATION

JANUARY, 1959

I. RESPONSIBILITY

There were no changes in the scope of responsibility of the Redox Operation this month.

II. ACHIEVEMENT

A. Processing Operation

1. Production Rates and Operating Continuity

E-Metal processing was conducted as scheduled during the month and the production commitment was exceeded by 24 percent while operating at 49 percent of the total hours scheduled for building operation. However, to meet this production it was necessary to continue the metal dissolution operation on a sustained basis, including weekends, when the building is normally scheduled for standby. During the week of 1-12-59, 60 percent nitric acid flushes were processed through the 233-S Building and parts of the 202-S Canyon Building as an exploratory and precautionary step to evaluate and ascertain product hold-up points in critical pieces of equipment. No significant quantities of plutonium were recovered which could point to excessive hold-up of product in problem areas.

Production rates were maintained at 70 percent of nominal during operating periods except during the latter part of the month when only one precycle column was being operated at a time. During the last 48 hours of precycle operation flooding of the columns was experienced and the rate was subsequently reduced to 40 percent of nominal. Column flushing prior to the February production run is expected to correct this condition.

Except for two batches of UNH, which required silica gel treatment, the gamma ratio on both product streams remained well within shipping specifications. Waste losses for the E-Metal processing averaged 0.24 percent and 0.51 percent for uranium and plutonium respectively.

The plutonium production for the month was slightly higher than normal in iron content and although it was shipped to Z Plant, some blending with other low content iron plutonium will be necessary to meet button purity specifications. The higher iron content is evidently due to corrosion in the 233-S Concentration Building equipment and by past experience the L-3 concentrator is the most likely source. Replacement of the bottom section of the lower loop in the L-3 concentrator is scheduled for the early part of February.

Iodine 131 emission to the 291-S stack remained under good control throughout the month. Total emission for the month was 0.142 curies.

2. Equipment Experience

Jumper changes were started in the H Cell this month which will allow the transfer of condensate from the H-6 ruthenium scrubber condenser to

the D-13 waste receiver tank. When completed, this will reduce appreciably the amount of radiation activity sent to the cribs. Currently the H-6 condensate is transferred to the cribs via the D-2 crib sampler tank.

B. Maintenance Operation

On January 28, 1959, while removing a jumper from H Cell, the left hand auxiliary hoist and monorail broke loose from the 60 ton canyon crane and fell to the 202-S Canyon deck. The separation was caused by the shearing of the 5/8-inch bolts which clamp the retainer cleats together. The monorail is mounted by six pairs of retainer cleats. One of each pair is welded to the five-foot crane beam and the other to the monorail. Each pair of retainer cleats is fastened together with two 5/8-inch bolts. It is apparent that the bolts became weak through wear to the point that they would not sustain a heavy load. At month-end the monorail and hoist assembly were being replaced with new units. At this writing it appears that the work should be completed by February 9, 1959.

There were no major canyon equipment replacements made during the month. However, jumper changes were started in H-Cell which will allow the transfer of the E-6 condensate to the D-13 waste receiver tank. Two jumpers were installed before the work was interrupted by the auxiliary hoist failure noted above.

C. Waste Handling and Decontamination Operation

1. Waste Handling

Redox Coating Waste Received (S Farm)	15,649 gallons
Redox Salt Waste Received (SX Farm)	96,075 "
Total Gallons Boil-Off Salt Waste	123,223 "
Waste Received at TX (From 221-U)	32,313 "

The 113-SX tank bottom remained static during the month. Radiation readings taken inside the five horizontal laterals, which were drilled ten feet below the tank bottom during December gave no indication of a leak in the tank bottom. The addition of water to the tank to verify the presence (or absence) of a leak has been delayed pending more favorable weather conditions.

The salt waste stream from the Redox Plant was diverted from the 115-SX to the 111-SX tank during the month. This is the second filling for the 111-SX tank and was made possible by pumping the non-boiling waste from the 111-SX tank to U Farm for permanent storage.

The waste pump from the 111-SX tank was moved to tank 112-SX this month without incident. The transfer was made in preparation for pumping 112-SX waste to the TX tank farm for permanent storage.

2. Equipment Decontamination and Repair

a. Regulated Steam Pit

Thirty-nine vehicles and ten pieces of heavy equipment were

decontaminated during the month. The increased activity resulted from the burial ground incident which occurred on January 8, 1959, and which is reported in detail in Radiation Incident CPD 59-1. A total of 160 man-hours was charged to this Operation.

b. Railroad Equipment

Three locomotives, three UO₃ flat cars, and the burial string were decontaminated during the month. The increased activity in this area was also due to Radiation Incident CPD 59-1. A total of 118 man-hours was charged to this Operation.

c. 221-U Canyon

The decontamination cycle on the Redox A-2 dissolver, which was removed because of a leaking coil on September 1, 1958, was completed this month. However, because of excessive radiation readings from undissolved material remaining inside the unit, repairs have not been completed. Mechanical methods for removing the undissolved material are now being investigated.

One pump pit jumper for the SX Tank Farm was decontaminated and repaired without incident.

The Purex F-6 concentrator tube bundle was being put through the final decontamination cycle at month-end. Initial decontamination efforts were effective in reducing the radiation readings from 150 mr at 20 feet to 900 mr at surface.

d. 224-T Building

Decontamination work in F and G Cells in the 224-T Building, as requested by the Power and General Maintenance Operation, is now approximately 20 percent complete. This work is being done as manpower becomes available from higher priority decontamination and repair assignments.

D. Analytical Control Operation

Analytical control work in the 222-S Laboratory was confined primarily to routine operation. However, considerable analytical support was provided the Process Chemistry Group, Research and Engineering Operation, in their current work involving the processing of the third batch of Palm from the Purex process. This included the loan of a Technologist to assist in the processing.

E. Radiation Monitoring Operation

Eight radiation occurrences were reported during the month. Most significant was a fission product contamination spread over approximately 250 acres within the 200 West Area on January 8, 1959. The incident occurred when a burial box containing Redox cell jumpers collapsed during backfilling operations at the burial grounds. Ten people received low level skin

and personal clothing contamination and 13 government owned vehicles and two railroad diesel engines were also contaminated. All cases of personnel skin contamination were promptly reduced to non-detectable, and all equipment was subsequently returned to service. Details of the incident are covered in the investigation report of Radiation Incident No. CPD 59-1. The remaining seven cases involved low-level skin contamination, high fission product air contamination above the normal respiratory requirements, and low-level contamination outside of regulated zones. In all cases corrective action was prompt and effective.

On January 2, 1959, highly contaminated and obsolete jumpers stored in H-Cell of the 202-S Canyon Building were loaded into a burial box liner for disposal. This work released particulate RU-106 to the canyon deck which resulted in re-contamination of the crane and a significant increase in the fission product concentration of the canyon air. Due to the particulate size or apparent flocculent nature of the contaminant, the canyon air remained abnormally high until the canyon deck was water flushed via the roof sprays. A significant increase in the fission product activity of the air entering the sand filter was also noted during this period. While no significant increase in activity was observed in the sand filter, the outlet air showed a moderate increase. All activity was reduced to normal following the canyon wash-down and several decontamination assaults on the 60 ton canyon crane. The contamination status of the crane is now better than before the H-Cell jumper removal work was performed.

Work on the 202-S Building 60-ton canyon crane involved personnel exposures similar to previous months. Dose rates ranging from 350 to 1500 mrad/hour were encountered during decontamination and relamping of the craneway lights was performed in rates ranging from 800 to 4000 mrad/hour.

F. Improvement Experience

1. Process Tests and Revisions

Information related to this item is covered in the Research and Engineering portion of the Department report.

2. Inventions or Discoveries

There were no inventions or discoveries of a patentable nature reported in the Redox Operation during the month of January, 1959.

G. Events Influencing Costs

The Redox Plant was shut down for the New Year's Holiday and remained down for four days including the week-end. Premium pay for employees celebrating the holiday on January 2, 1959 was thus eliminated.

A review of the Redox pump performance during CY 1958 shows that seven pump replacements were required as compared to 20 for CY 1957, representing a savings of approximately \$78,000. This is primarily due to the installation of the glass bearing open head pump installed in 1957.

position and a process change in the D-14 position.

Spare parts inventory reductions during January amounted to \$31,000. This was accomplished primarily through the redesigning of condenser pot tube bundles and gauges with a corresponding reduction in the spare parts needed.

H. Plant Development and Expansion

1. Preparatory Engineering

Plant Modifications for Processing Non-Production Reactor Fuels

A revised project proposal, requesting \$1,450,000 of the total \$6,300,000 planned for the project, was approved by the HAPG General Manager and the proposal submitted to the HOO-AEC for approval on January 27, 1959.

Power Fuels Business

Three PRTR dummy fuel elements have been fabricated and are ready for testing in a dissolver. Revised plans call for testing the elements in a dissolver now being decontaminated and repaired at the 221-U Decontamination and Equipment Repair Facility. This will eliminate the necessity of dissolving the eight-foot elements at Redox, as was originally planned, and allow a close visual inspection for evaluation of this method of dissolver charging.

Redox Inert Gas System Improvements

The filters for the sample gallery loop have both been tied into the system and placed in operation. Fabrication and installation of a new stainless steel loop for the sample gallery has been started. Arrival of the silica gel drying tower has been delayed until February 20, 1959, per information from the vendor. The oil filter to be used in conjunction with drying tower has arrived on site.

2. Design and Construction Liaison

CG-686 - In-Line Monitoring Instruments - Redox

The Redox steam condensate gamma monitor installation is complete except for tie-ins and installation of the monitoring instrument which is now being calibrated. Design of the LAFS gamma absorptometer jumper has been delayed pending evaluation of final tests on the prototype jumper.

CG-764 - Test Wells - 216-BC Crib Area

The contractor has been unable to remove the screen from the last well (No. 53). Work has been suspended by the AEC pending decisions on a new course of action.

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HW-59079

CG-783 - Additional Fire Protection - 222-S Building

The contractor, National Automatic Sprinkler Company, has moved equipment to the job site and started installation of the sprinkler system.

MA-10 - 113-SX Waste Tank Leak Detection System

The final measurements on the horizontal laterals beneath the tank bottom revealed considerable directional deviations. Negotiations have been started for correcting this deficiency.

I. Reports Issued

No secret reports were issued by Redox Operation personnel during the month of January, 1959.

III. ORGANIZATION AND PERSONNEL

A. Safety

There were no disabling injuries, serious accidents or incidents, in the Redox Operating during January 1959. Eight medical treatment injuries were reported during the month.

B. Security

There were no security violations in the Redox Operation during the month of January, 1959.

C. Personnel Activities

Mr. S. G. Fraenkel, Director of Research and Engineering for the Standard Railway Equipment Manufacturing Company of Chicago, visited HAPO on January 20, 1959 to discuss shipping of irradiated fuel elements. His company proposes to offer transportation services for radioactive materials to reactor operators. Basic design assumptions of the proposed shipping casks and possible operating complications were reviewed. Specific Hanford requirements and preferences were discussed.

G. E. Loud, Supervisor, Redox Radiation Monitoring Operation, accepted a position in the Aircraft Nuclear Propulsion Department, Cincinnati, Ohio, and was transferred to that location on January 30, 1959.

J. D. Ryan, Contact Engineer, Redox Maintenance Operation, transferred to IPD on January 1, 1959.

J. E. Lee, Maintenance Foreman, Redox Waste Handling and Decontamination Operation, transferred to IPD on January 1, 1959.

D. E. Barlan, Utility Operation in the Redox Waste Handling and Decontamination Operation, retired on January 30, 1959.

CT Groswith:HWM:mh

Chas. B. Duxworth
Manager
Redox Operation

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CHEMICAL PROCESSING DEPARTMENT
FINISHED PRODUCTS OPERATION
MONTHLY REPORT

JANUARY 1959

I RESPONSIBILITY

There were no changes during the month in the responsibilities assigned to the Finished Products Operation.

II ACHIEVEMENTS

A. Processing Operation

All shipping schedules for unfabricated plutonium were met during the month, however production was 2% under schedule. The Recuplex operation produced 90% of schedule in spite of a prolonged outage during the early part of the month. Uranium Oxide production and shipping schedules were met without difficulty.

The production of unfabricated plutonium was somewhat low during January due to a lack of feed for an eight-day period at mid-month. This feed shortage was due to longer-than-expected outages of Purex and Recuplex. Recycle, both liquid and metals, was significantly higher than normal during the month. The primary cause of this was high iron content in the portion of the feed from the Redox plant. There were very few mechanical difficulties involved with the equipment used for plutonium metal production.

The startup of the Recuplex Operation was delayed until January 14 due to numerous equipment difficulties resulting from the prolonged shutdown. Performance following the startup was very satisfactory, 42 Kgs of material being processed during the latter half of the month from 16 slag and crucible runs plus 89 metal dissolver runs. The columns operated at 72.4% efficiency at average rates of 1633 liters/day. Waste loss from the columns was 0.59%, and from slag and crucible dissolvers 0.03%.

The Uranium Reduction plant operated relatively trouble-free throughout the month. 486,207 pounds of 100% nitric acid were delivered to Purex during the month from the recovery system. All system tie-ins have been completed to insure complete segregation of E metal, the processing of which will be started at mid-February.

A major problem facing the processing operation at month-end is in regard to the 234-5 Building vacuum header. The by-pass header being installed should be ready for activation early in February. Plans are being formulated to start cleanout activities on the old header as soon as possible. Criticality considerations covering this job are being given extensive and serious study at month-end.

B. Fabrication Operations

Requirements for the basic commitments for 65 model assemblies were met for January. Delivery requirements were 8% ahead of schedule at month-end.

Fabrication activities progressed smoothly and according to schedule during most of the month. A 36-hour partial curtailment in machining production was experienced due to lack of feed caused by equipment breakdown on the resistance furnaces. Some tooling problems hampered the 6507 model production. These problems have been corrected and normal production resumed. Rejection rates due principally to casting quality, were above normal for the period.

Machining mechanical performance was exceptionally good during January and only the above mentioned tooling difficulties marred an otherwise excellent month.

A second Task VII coating unit was converted to an induction furnace to be used for the recovery of metal for recycling to the main production stream. Some casting production is expected from this unit starting the first week of February.

Preliminary acceptance of the Gorton lathes has allowed fabrication operations to start equipment checkout, and to start the training of personnel on the production of aluminum shapes. Progress has been satisfactory to date.

C. Maintenance Operation

The equipment in the area of plutonium metal preparation functioned quite well during the period with the exception that a high rate of failure to heating elements on the Hood 9A fluorinator was experienced. These failures were attributed to poorly fabricated elements by the vendor rather than to operating conditions.

All equipment used in plutonium metal fabrication functioned well except that the Task IV furnaces experienced a high rate of heating element failure.

Considerable difficulty was experienced in the startup of the Recuplex equipment following the prolonged shutdown due to the contamination incident which occurred last month. Principal difficulties involved numerous plugged and leaking lines and valves. Performance following the corrections of these difficulties has been good.

Project CG-745 (RMC Fabrication Line) has required considerable maintenance assistance in the startup and calibration of equipment. Valuable experience is being obtained by maintenance personnel which will undoubtedly facilitate future maintenance of this equipment.

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D. Control Operations

Analytical work proceeded routinely. A total of 4659 determinations were made on 786 samples received during the month.

Schedules for the inspection of 65 model assemblies were met. Reject rates for the 6506 and 6507 parts were 10.3% and 19.7% respectively. Causes for these rejects were random except for pits in the 6507 part, there being six rejects for this reason.

The Dow Chemical Company at Rocky Flats reported the rejection of one 6506 part due to chipped threads. This is the first such case since the start of production of the 65 model. Two waivers of specifications were also noted from them. The necessity for a general tightening of controls had been noted in December and corrective action has been taken.

There were eight radiation occurrences and nineteen skin contamination cases documented in January, a significant drop from December. Stack emission averaged 10.4 mc/day, down from 24.7 mc/day averaged for December.

E. Improvement Experience

1. Process Tests and Revisions

Information relating to this item will be covered in the Research and Engineering portion of the Department report. Other information concerning Weapon Data will be covered in a separate report to be written at a later date.

2. Inventions or Discoveries

No inventions or discoveries of a patentable nature were reported during the month.

F. Events Influencing Cost

Nothing significant to report.

G. Plant Development and Expansion

1. Projects - Study, Scoping or Approval Phase

The 216 WR Crib Replacement Project for the Uranium Reduction Operation was returned to the Facilities Engineering Operation for further study. Company approval of the proposal should be achieved in early February.

The following project proposals are awaiting AEC approval and release of construction funds: CG-789, Additional Fire Protection 234-5, and CG-723, Conversion of Recuplex to a Manufacturing facility.

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G. Plant Development and Expansion (Cont'd)

1. Projects - Study, Scoping or Approval Phase (Cont'd)

An engineering study is being conducted in preparation for a project proposal for reduction of radiation exposure in the Button Lines - 234-5.

Project CGC-813, Recovery of Pu From Waste, will be submitted for approvals after further criticality study considerations.

2. Projects - Construction

A total of six projects are in the construction phase for the Finished Products Operation. They are: RMC Fabrication Line - CG-745; RMC Button Line - CG-734; Miscellaneous Improvements, UO₃ - CG-767; Cribs and Test Wells, 234-5 - CAC-798; Reduction of Exposure, RMA Line - CGC-800; Vacuum System Improvements, 234-5 - CGC-826.

Construction funds have been released for projects CG-725, Liquid Waste Handling Facilities, UO₃; and CGC-811, Additional Fabrication Equipment, 234-5. Detailed design work is underway on both projects.

3. Projects - Completed

There were no capital expenditure projects completed during the period.

III ORGANIZATION AND PERSONNEL

A. Organization Changes

A partial realignment of personnel in preparation for the formal inception of the new Finished Products organization resulted in the following assignments:

L. M. Knights, Manager, Uranium Reduction, was assigned to the position of Manager, Control (includes Analytical Control, Final Inspection, and Radiation Monitoring).

L. A. Berry, formerly Manager of Control, was placed on Special Assignment reporting directly to the Manager, Finished Products.

The following employees were transferred out of the Finished Products Operation:

W. A. Crossman, Supervisor, Product Recovery, was transferred to IPD.

P. J. Wiater, Supervisor, Processing, was transferred to the Redox Operation.

J. D. McIntosh, Supervisor, Processing, was transferred to the Purex Operation.

R. B. Guenther, Analyst, Processing, was transferred to the Research and Engineering Operation.

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A. Organization Changes (Cont'd)

J. E. Mahaffey, Contact Engineer, Provisional, Maintenance Operation, terminated his employment at Hanford on a Leave of Absence to seek employment at a GE plant in an eastern location.

J. R. Jacobson, a Chemist on the rotational program, was employed in that capacity on a permanent basis in the Control Operation.

B. Safety Experience

No disabling injuries or serious accidents occurred during January. Seven medical treatment injuries were experienced as compared to ten in December. The frequency rate decreased from 2.18 to 1.27.

A review of critical mass control was conducted in January and as a result batch limits have been reviewed, procedures have been modified, and additional postings have been accomplished to enhance the safety aspects of this control.

C. Radiation Experience

All significant information relative to radiation experience in the Finished Products Operation is carried in this report under Control Operation (Item II - F).

F. Security Experience

There were no security violations experienced during the month.

E. Personnel Activities

The annual Information Meetings of the Finished Products Operation were conducted this year by L. I. Brecke, Acting Manager. Seven separate sessions were held in order to cover all shifts in both buildings. Two hundred twenty seven employees (exempt and non-exempt) attended. The discussion covered the past and the future regarding, Safety, Radiation Control, Production, Costs, Employment and New Business. The presentation was such that it was unclassified. The information was well received and numerous appreciative comments have been received.

A training program has been inaugurated at the Uranium Reduction plant for maintenance personnel to provide a better understanding of the basic problems of radiation detection and measurement as well as to inform them on other parts of the radiation protection program. This program is being given in eight one-hour lectures.

The 200-West Area firemen are attending a program on radiation monitoring procedures at the 234-5 Building.

One exempt employee from the Control Operation attended a three-day training session in the "256 Channel Analyzer".

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E. Personnel Activities

"Effective Writing" is being attended by twenty of our people. Also one employee is attending "Interviewing". Two others are attending "Understanding People".

F. Miscellaneous

W. N. Mobley, Manager, Finished Products Operation, was in Washington, D. C., from January 5, 1959, through January 16, 1959, acting as a consultant on power reactors for the Atomic Energy Commission.

W. N. Mobley, Manager, Finished Products Operation, represented HAFO in Schenectady on January 30, 1959, on a task force which discussed Radiation Protection.

L. I. Brecke, Acting Manager
Finished Products Operation

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HW-59079

CHEMICAL PROCESSING DEPARTMENT
POWER AND GENERAL MAINTENANCE OPERATION

JANUARY 1959

I. RESPONSIBILITY

Responsibilities of the Power and General Maintenance Operation remained unchanged during the period covered by this report.

II. ACHIEVEMENT

A. Operating Continuity

Steam, water, and emergency electrical services were made available to the production facilities in sufficient quantities to sustain continuity of operation without interruption for the entire month.

B. Inspection, Maintenance, and Replacement

Fabrication of the prototypal dual pass Silver Reactor for Purex, including lagging and sheathing, has been completed. Work has been started on a model 3 Purex Silver Reactor.

Mock-up and hydrostatic testing was completed on an E-B2 off-gas steam heater for Purex which was made off-site. It was discovered in mock-up that all dimensions were out of tolerance by 1/4" in reference to the locating dowel pad, and this was corrected by moving the dowel pad to compensate for the error or damage. Hydrostatic testing disclosed a high pressure leak and FEO was notified. FEO has indicated that no further testing or repair is to be done until they have cleared the matter through the vendor inspection group and legal to determine vendor responsibility.

Assembly, test, and run-in were completed on a Purex IDI pump which has been placed in standby, and a #2 pulse generator has been prepared for service except for test run-in.

Fabrication of the 9E hood and conveyor system was completed as part of Project CGC-800, "Reduction of Personnel Exposure, RMA Line."

Four "control damper sections" were fabricated and installed as replacements in the hood exhaust ducts in room 227, Building 234-5. This was carried out under high contamination conditions and without incident.

A carbon steel burial capsule was completed to provide for disposal of a Redox H-4 Oxidizer steam coil.

All assigned work on the Cesium Recovery System has been completed as of January 15. The second feed tank, the neutralizer, and the condenser were finished during January, and further work on the Hastelloy B crystalizer has been cancelled because the vendor could not supply a crack-free piece of one-half inch tubing required for the coil.

A total of 14 replacement jumpers were made in January - 11 for Purex, 1 for Redox, and 2 for 241-SX Tank Farm.

Seven electric motors, varying from 2 to 15 HP, were re-wound and repaired.

An automatic pipe cutting machine making use of the Heliarc cutting process has been received. This is an adaptation of the "Mechanical Draftsman" made by Steffan Engineering Company and use of the Heliarc process required the establishment by Financial Operation of arrangements to pay a license fee on all gas used in the process. Employees are now being trained on the machine and considerably better operating efficiency is anticipated.

Fabrication of an "air lift circulator" for use at 241-A Tank Farm was completed. This circulator has a central column 44 feet long with a laminated steel top flange 13" thick to provide radiation shielding.

Contamination of an area extending from the 200 West Industrial Burial Garden to the T Plant occurred on January 8 during a routine burial of defective cell jumpers. The weather was overcast with occasional gusts of wind up to twenty miles per hour. The incident did not occur until after the wooden whaler box was pulled into the trench and covered with dirt by the crane and dozers. As the box was nearly covered a contamination spread was noticed when a routine radiation check of personnel on the job showed that radioactive particles had become air-borne. This incident apparently occurred when the lid of the box gave way after dirt had purposely been dropped on it by the crane. Breaking of the box lid has been customary past practice so that no "voids" are left in the burial garden, preventing future "cave-ins." Three General Maintenance employees received skin and nasal contamination, but were later cleaned up and released. In order to remove and stabilize the contaminated areas it was necessary to wash down the black top roads and blade, plow and bull-doze certain areas. It was also necessary to change both the wet and dry filters in the heating and ventilation equipment of 271, 222 and 224-T Buildings.

Replacement of the railroad gate at the west entrance to the U Plant was necessary after it was damaged by a plant train. An unused gate at the T Facility was installed in place of the damaged unit until a new "cyclone fence" type gate can be obtained.

Installation was completed of a remote crash alarm system between the 200 East Patrol Headquarters and the 2101-M Building. When this system is actuated by pushing a button at Patrol Headquarters it rings an alarm in the 2101-M Building and also shuts down the heating and air conditioning systems in this building. During plant practice evacuations it was found that the personnel in the 2101-M Building were unable to hear the signal from the Power House.

A new burning pit was excavated in the trash disposal ground in the 200 East Area. This trench is 75 feet long and 15 feet wide and replaces a smaller trench which had become nearly full of trash accumulations. An additional trench will be excavated to provide for disposal of non-combustible materials. A general clean up of this area was also accomplished by removal to the Richland Excess Yard of all scrap and salvage. All other material such as concrete blocks and material having no value were buried. The entire burning pit and surrounding edges were bladed.

Work completed for the AEC during the month was the excavation of two

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spoil pits for the disposal of contaminated drilling at wells No. 299W15-94 and No. 299W15-95. This work was under contract No. A.T. (45-1) - 1406.

Fabrication and installation of the 234-5 Building 26" Vacuum System is 97 per cent complete. Three de-mister units, which were received from off-site vendors, remain to be installed. One unit required modification before installation.

Conversion of the 234-5 Task VII coating hood to a casting hood has been completed. The coating unit was replaced with an induction furnace lifting mechanism, and thermocouple for temperature control.

The inspection of all 400 HP electric motors on the raw water pumps was completed. This inspection included pulling the end bells and visually inspecting and gauging worn parts, clearances, etc. All work necessary to put the units in a good state of repair was done.

As a result of rains in late December and January, the export water supply reflected a turbidity content of 480 PPM as compared to a norm of 8-10 PPM. Corrective action has been taken and the situation is gradually clearing. The count was down to 17 PPM at month end.

Services rendered other departments included balancing work on the ventilation system in the Irradiation Processing Department's 105-C Building to prevent the back-flow of contaminated gases.

Ventilation acceptance tests were started on the RMC line at the Finished Products Operation; however, it was necessary to discontinue the tests until recommended changes to the damper control systems could be effected. Extreme caution is being exercised as the system is highly contaminated and flow reversals are possible.

The new exhaust fan installation in the silo at 224-UA Building was tested for flow directions. This new installation resulted from recommendations by the Power Operation Ventilation Balance personnel and serves as a means of containing air-borne uranium powder.

The semi-annual inventory for all special materials was completed on January 2, 1959. All sub-holders and the control custodian were inventoried by Inventory Accounting, Financial Operation. In addition, the regular quarterly inventory was submitted to the control custodian by all sub-holders. The only shortage was 3.02 grams of scrap gold wire lost in moving by the control custodian.

III. ORGANIZATION AND PERSONNEL

A. Safety and Security

No disabling injuries were incurred by the Operation.

One security violation, involving an open file, was experienced during January.

T. B. LaSalle, Manager
Power and General Maintenance Operation

CHEMICAL PROCESSING DEPARTMENT
FINANCIAL OPERATION

JANUARY, 1959

I. RESPONSIBILITY

There were no changes in the responsibilities assigned to the Financial Operation during the month.

II. ACHIEVEMENT

A. Product Cost

A statistical study of maintenance costs, equipment and spare parts usage, and plant investment was prepared at the request of W. N. Mobley for use in relation to his assignment as a consultant to the AEC Committee on Homogeneous Reactors.

In early January, a schedule of the impending FY 1960 and 1961 budget effort was received from Contract Accounting. Approximately a month prior to the receipt of this notification, all Level 3 managers were notified of the imminence of the budget effort and were sent schedules for submission of information to Product Cost. Prior to the end of the month, manpower submissions were received from all components together with narrative justifications. These schedules were consolidated and submitted to CPD management for review.

The method of cost reporting and setting of a billing price for Palm were established through conferences with Purex management and interested CPD engineering personnel. Concurrence on the methods used was secured from the local Commission.

A review of operating costs billed from other departments revealed the following erroneous charges. Arrangements for credits have been completed, which will result in reducing CPD costs by \$1,800.

1. Laundry billing error	\$1 425
2. Computing service overcharge	375

Audit and reconciliation of the Precious Metals and Special Materials inventory has been completed, and the inventory report was prepared and issued. Losses of materials have been negligible; however, there has been sizeable decline in market value of platinum, and the possibility of a write-down of inventory value is under consideration.

B. Personnel Accounting

All major tax reports have been mailed to the Schenectady office well in advance of due dates. The only remaining major tax report to be completed concerns State of Washington Unemployment Tax and this will be completed and forwarded within the next few days. Other reports of

prime importance, namely, Year End Reconciliation of Pension Accounts, are awaiting receipt of the necessary listings from Schenectady.

Since CPD has on its payroll two nonexempt employees who were elected City Councilmen, CPD finds itself one of the HAPO components concerned with their request for additional "E" time when absent from work because of Council-connected duties. Authorization was received, within the last week, from F. K. McCune approving an additional five days of "E" time for the year 1959.

Statistics - Salary Payments

	<u>Gross Payroll</u>		<u>Overtime Payments</u>	
	<u>January</u>	<u>December</u>	<u>January</u>	<u>December</u>
Nonexempt	\$ 699 047*	\$592 835**	\$13 684*	\$15 752**
Exempt	<u>330 870</u>	<u>337 546</u>	<u>2 894</u>	<u>2 038</u>
Total	<u>\$1 029 917</u>	<u>\$930 371</u>	<u>\$16 578</u>	<u>\$17 790</u>

* Payments to nonexempt employees cover a five-week period.

** Payments to nonexempt employees cover a four-week period.

C. General Accounting

A check was received January 12, 1959, from the State Department covering our claim of \$29.76 for transportation tax on V. R. Cooper's trip to Geneva, Switzerland.

The December General Ledger Trial Balance and reports of Travel and Living Expense were delivered to Contract Accounting on schedule.

The final closing report of 1958 contract fee money, representing \$905 unexpended funds, was issued one day early to Contract Accounting.

All cash advances pertaining to 1958 business were cleared by January 15, 1959.

During January, CPD Finance prepared 319 voucher checks totaling \$348,587.78. General Books issued 22 of these checks totaling \$3,022.37. No checks for contamination of personal effects were issued.

Continuity of Service Accrual rate was increased from 10% to 11%, primarily to offset the costs of the Savings and Security Program. General Ledger account 2183, "Savings and Security Program Costs Accrued", was established to record the accrual and costs of the Savings and Security Program. Deduction from Employees' Pay sub-account 2243, "Savings and Security Program", was also established.

Workmen's Accident Compensation Accrual was discontinued as it is anticipated the present balance of \$18,980 will adequately cover CY 1959 expenses.

As of December 31, 1958, expenditures and commitments of \$10,519,388 and \$958,477, respectively, had been incurred against active CPD projects with \$14,213,637 authorized funds.

No new projects were authorized by the AEC during January. CG-725, Liquid Waste Handling Facilities - UO₃ Plant, was increased by the AEC to \$34,400 (including \$400 Transferred Capital Property) and CGC-811, Additional Plutonium Fabrication Facilities - 234-5 Building, was increased by the AEC to \$1,600,000.

During January, five Appropriation Requests were approved for a total of \$72,174. These consisted of the following:

Radiation Alarms	CPD General	\$49 500
Critically Safe Centrifuge	FEO	14 000
Aural Alpha Beta Gamma Monitor	Purex	4 600
Ultrasonic Pickling Equipment (supplemental funds)	FPO	3 568
Multi-Point Strip Recorder (supplemental funds)	FEO	<u>506</u>
Total		<u>\$72 174</u>

D. Auditing

A formal audit report was issued covering the findings and recommendations relating to an audit of Payroll and Timekeeping Practices.

An audit memo was prepared and issued to Level 3 managers requesting administrative action to improve performance in preparation of time cards, utilization of vehicles and personnel and adherence to scheduled quitting time.

An analysis was made of the Department's procurement transactions relating to prescription safety glasses; findings were presented to management for consideration.

Audit programs were prepared and field work was started on audits of Employee Insurance Plan and General Accounting activities relating to cash and travel advances.

Audit observations were made of the Physical Inventory of Precious Metals.

Meetings were held with Contract Accounting personnel in an effort to strengthen procedures relating to compliance with AEC Manual Chapter 1700 - Pricing Policy.

E. Procedures

A special meeting with Specialists - Procedures, IPD and FPD, was held in order to discuss the progress being made on the integrated financial system, and demonstrate CPD's progress in the integration of Cost Accounting. The project coding structure was explained and examined for possible integration with the Property Accounting unitization function.

A complete procedural study of the Material Control Operation was begun during the month. This study will cover the Spare Parts Operation of R&UO and its relationship with FEO Material Control Operation and the Material Control Operation of the production plants.

A special meeting was held with Purex personnel using recorder charts and arrangements were made to reduce retention schedule of these charts to six months and to permit on-site destruction. This will eliminate permanent storage space formerly required in Records Center.

F. Measurements

CY 1959 cost and production goals for CPD, Purex, Redox, and Finished Products were prepared, reviewed with, and approved by, managers concerned and then issued.

Cost and production analysis reports for Purex, Redox, and Finished Products, comparing actual costs and production with forecast, were prepared and issued to interested Level 3 managers.

The CPD Productivity Report for the fourth quarter CY 1958 and CY 1958 total was prepared and issued.

III. ORGANIZATION AND PERSONNEL

A. Safety and Security

A safety and security meeting for all Financial Operation personnel was held on January 22, 1959.

No medical treatment, disabling injuries, or security violations were experienced during the month.

B. Personnel Activities

B. M. Dobbs, Manager - Product Cost, attended the Product Cost Accounting Seminar held in Forest Hills, New York, from January 26 through January 30, 1959. Mr. Dobbs also visited several G.E. plants in order to review product cost programs and techniques.

C. Reports Issued

HW-58662	CPD Operating Report - December	MM McDonald
HW-58812	Essential Material Inventory and Consumption Report - December	GE Dyreng
HW-58823	Unit Cost Information - December	BM Dobbs
HW-58882	Redox Cost and Production Analysis - December	GH Temple
HW-58883	Purex Cost and Production Analysis - December	GH Temple
HW-58884	Finished Products Cost and Production Analysis - December	GH Temple

C. Reports Issued cont.

HW-59051	Off-site Transfer Voucher	KG Grimm
HW-59060	Off-site Transfer Voucher	KG Grimm
CLVI-590	CPD Cost and Production Analysis - December	KG Grimm
TS - RD	Product Cost Report - December	BM Dobbs

Manager - Finance

HW-59079
February 6, 1959

CHEMICAL PROCESSING DEPARTMENT
FACILITIES ENGINEERING OPERATION

January, 1959

I. RESPONSIBILITY

There were no significant changes in responsibilities assigned to the Facilities Engineering Operation during the month.

II. ACHIEVEMENTS

PUREX OPERATION

A. Research and Development

Rare Gas Processing

A transmittal letter, providing a brief abstract of the rare gas recovery studies, was forwarded to the Atomic Energy Commission along with copies of summary reports which provided details on the study. The submittal of the above documents to the Commission constituted completion of the Phase I process study on rare gas recovery. Further Case III studies may be requested by the Commission at a later date on purification of a "light" xenon product by thermal diffusion means.

Zirconium-Niobium Recovery

The conceptual design of a Zr-Nb recovery and packaging facility for installation in the Purex Sample Gallery was completed. The envisioned facility would consist of a 3' 6" x 5' 11", "hot cell" located adjacent and connected to the F-15 sampler for recovery from the LWW stream. All operations, filtration, calcination, and capsulation would be performed within the "hot cell" with a manipulator being provided for the mechanical operations. A precipitate in the LWW stream would be collected on the filtering surfaces within the source tube itself, dried and calcined in place, and the source tube sealed. Although this concept was based upon recovery of Zr-Nb sources of about 7000 curies per tube, it would be equally applicable to the recovery of other fission products in conjunction with other selective precipitations within the canyon equipment. In such a case, the location of the "hot cell" would be chosen to best satisfy the process. Preliminary estimates indicate the Zr-Nb sources could be prepared in this manner for about one cent per curie.

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Titanium Tube Bundles for Acid Concentrators

A preliminary process study was completed on the application of titanium for reboilers of Purex waste concentrators. The following program was suggested for arriving at an optimum reboiler design involving minimum usage of titanium:

1. Several heat transfer equipment firms should be contacted informally to determine their interest and qualifications for the design of a titanium reboiler.
2. The HAPD development program on titanium tube to stainless tube sheet joints should be accelerated. Substitution of titanium tubes in the present stainless cannisters would probably represent the maximum incentive case for titanium in this service.
3. Decontamination and inspection of failed 304-L cannisters should be accelerated. Minor design changes to the stainless cannisters might extend cannister life and obviate the need for the use of titanium.

Magnetic Flowmeter for Jumper Service

A magnetic flowmeter installed in a jumper on the 2AF stream was placed in service the latter part of this month. It will be necessary to make adjustments and tests at the next process shutdown before the operation can be properly evaluated.

pH Meter Application

A pH meter has been operating satisfactorily in the 271-T Building lab for one month under electrical interconnection conditions simulating a process jumper installation. A jumper design has been completed for making a prototype installation in tank E-3. It is expected that fabrication and installation will be started in February.

B. Plant Engineering

Conversion of Anion Exchange Facility

The scope design covering the modifications to the plutonium anion exchange unit for conversion to a manufacturing facility was completed. A summary report was issued to serve as a basis for project proposal preparation and detailed design for the project.

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Portable Sampler

Design and drawings for the 216-A portable effluent sampler have been completed. This portable sampler unit will permit sampling of effluent flows to swamps, ponds, or sewers.

Stainless Steel Bellows

Design modifications were completed for future use of stainless steel bellows, in place of Teflon bellows, in the seal pot vent headers of the F-5 fractionator and the J-8 and K-4 concentrators. Stainless steel bellows have been used on the other concentrators because of the effect of radiation on Teflon. The recent failure of the Teflon bellows on the F-5 fractionator indicated the need for change-over at the other vessel locations.

Jumper Cutter

Specifications have been completed for the design, fabrication, and testing of a remotely-operated portable shear for jumper cutting. It is planned that this unit will be used in the Purex canyon to cut off valuable components from failed jumpers for decontamination and re-use, and to obtain shorter jumper sections for economy in burial.

C. Project Activities

CA-513-E - Second Remote Crane Facility

Formal acceptance of the second crane facilities with exceptions was made by Purex Operation January 21, 1959. Preparation of the physical completion notice is in progress.

REDOX OPERATION

A. Research and Development

Two-Jet Sampler

Tests have continued in the 321 Building on the two-jet sampler which has been mocked-up to represent the IAFS sampler for the in-line absorptiometer. The performance with simulated IAFS solution is satisfactory with an upper jet flow rate of approximately 0.1 liters per minute. Measurements are yet to be made on the amount of fog carry-over into the vent.

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Waste Tank Leakage Detection

Measurements were made of gamma radiation level in the lateral test holes under the 113-SX tank. At all five points it was less than 0.1 mr/hour. Steps are being taken to provide greater sensitivity in the instrument for additional experimental testing.

B. Plant Engineering

Inert Gas Vessel, 202-S Building

Comment copies of the new design for the inert gas vessel have been received from CEO for review. Recommendations were requested and received from the Carboline Company regarding a protective lining for this vessel. Composition of the recommended material is being investigated to determine whether it is a potential contaminant to the Redox process.

Redox F-1 Vessel

Spare parts review and drawing changes were completed on F-1 vessel during the month. The Redox Operation has requested design modification to allow the coils to be removed from the top portion of the vessel. A work order has been issued to CEO for the design change.

FINISHED PRODUCTS OPERATION - Z PLANT

A. Research and Development

Chemical Processing and Reduction

A functional specification was prepared during the month to form the basis for the design of a centrifuge which could replace the vacuum drum filter.

A perspective drawing showing the overall arrangement of the chemical processing equipment, the maintenance crane, and the general working area has been completed. This drawing was made to show a complete picture of the hoodless approach and how it integrates the working area, the maintenance hood, the overhead crane, and the vacuum cleaning system. Another drawing which shows the actual sequence of changing out a piece of equipment in stepwise pictorial views has been made to supplement the above perspective drawing.

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Weapons

A review of the critical mass problems associated with casting units was made with Research and Engineering. The following decisions were made:

1. The volume of the pouring crucible (slab type) shall not exceed the volume associated with a solid mass of 9 Kg of alpha plutonium.
2. The working volume of the pouring crucible shall not exceed 4.5 Kg; only in the event that an error might occur in operation would the 9 Kg volume be occupied.
3. The maximum mass of material in button pans in Hood HC-18 BS shall be 2.5 Kg of alpha plutonium on a spacing of 13" - 14"; at present this spacing is 20". It may be possible to increase the number of storage stations in this hood from 20 to 25.
4. Spacing of plutonium parts shall be based on 20" center to center distances for 4.5 Kg masses and 13" - 14" center to center distance for 2.5 Kg masses.

The decision was made to revise the scope of the casting furnaces for Project CGC-811 by substituting four batch furnaces in place of the continuous furnace outlined in Document HW-58365. This decision was based on the latest technology associated with casting and the critical mass limitation of 4.5 Kg inside the continuous type furnace.

Z Plant Radiation Study

The remote gamma and neutron recorder has been removed from Hood 9A and taken to 300 Area for redesigning. When returned the instrument will be capable of being easily moved from one hood location to another for examination of hood radiations with varying process conditions and area location.

An example of radiation variances which warrant further examination is the difference in rate of fall-off between neutron and gamma radiation in the process area around Hood 9A. Readings taken 6 feet from the floor near the hood and near the room wall 6 feet back showed the ratio of neutron/gamma to increase with distance. Ratios are given on page 7.

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Radiation to the Front and Back of Hood 9A Taken
6 Feet from Floor at Middle Plane of Hood

<u>North or Front Side</u>			<u>South or Back Side</u>			
<u>Gamma</u>	<u>Neutron</u>	<u>Ratio,</u>	<u>Gamma</u>	<u>Neutron</u>	<u>Ratio,</u>	
<u>Mr/</u>	<u>Mrem/</u>	<u>Neutron</u>	<u>Mr/</u>	<u>Mrem/</u>	<u>Neutron</u>	
<u>Hour</u>	<u>Hour</u>	<u>To Gamma</u>	<u>Hour</u>	<u>Hour</u>	<u>To Gamma</u>	
At Hood						
Wall	22		25			
1' From						
Hood Wall	16	23	1.4	17	22	1.3
6' From						
Hood Wall	5	10	2.0	6	11	1.8
Near Room						
Wall						

Ratios of neutron to gamma of 2 were observed near the walls of the process room surrounding the hood. This ratio approaches unity as distance to the radiation source is decreased.

B. Process Technology

Vibration Analysis - Gorton Lathes - 234-5 Building

The vibration analyzer was used on two Gorton lathes which are being installed at 234-5 Building. Initial runs of these lathes showed evidence of excessive vibration. Tests which were conducted using the analyzer indicated that the magnitude of the vibration showed definite peaks at approximately 400 and 800 RPM of the lathe spindle head. This is indicative of a resonant condition. Additional bracing was added to the hood supports, and the amplitude of the vibration was reduced from a maximum of 3 mils to 0.12 mils. This amount of vibration is below the tolerable limit.

C. Project Activities

CG-734 - RMC Button Line - 234-5 Building

Hood 9-B has been moved from its temporary location to the new location on the RMC Line and tied into the HC-1 conveyor. Preparation work for the installation of the remainder of the HC-1 conveyor and process hoods is now complete.

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CGC-811, Rev. 1 & 2 - Additional Plutonium Fabrication Facilities - 234-5

Revision 2 of this project proposal, which presented the proposed methods of work performance was forwarded to HOO-AEC on January 5, 1959. AEC Directive HW-475, Modification 1, dated January 8, 1959, authorized funds in the amount of \$1,600,000 to perform the proposed work and approved work methods.

FINISHED PRODUCTS OPERATION - UO₃ PLANTA. Research and DevelopmentNPR Processing - UO₃ Plant

A study was completed and a budget report issued covering the needed changes in the UO₃ Plant segregated processing of NPR uranium content with E-Metal and depleted natural material from the present HAPO reactors.

B. Process TechnologyPneumatic Solids Transfer Valve

A summary report was prepared covering the installation and testing of the prototype pneumatic solids transfer valve in the UO₃ Plant and the operation and economies effected by virtue of later installation made on the calciner.

C. Project ActivitiesCG-767 - Miscellaneous Improvements - UO₃ Plant

Design work on the "B" Cell Decontamination Facility and sulphuric acid system is complete. Design work has started on the powder unloading system.

The UNH loop header for "E" metal is complete except for some remaining insulation work.

GENERAL ACTIVITIESA. Research and DevelopmentJet-Type Process Pump

Developments in the power fuels program have shown the need for a better process pump to handle the boiling, and extremely corrosive, dissolver solution. In searching for such a unit, the possibility of using a

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modified jet pump was proposed. Some problems exist, but solutions have been proposed and a development program started. If it proves successful, the pump will also be adaptable to canyon service in Redox and Purex. It will have no process lubricated bearings or seals, so all parts exposed to process solutions can be selected for corrosion resistance instead of bearing properties. Chemical Equipment Development group of HLO are doing preliminary test work on the proposal at the present time.

Waste Storage

Dr. Frank Neumann, Seismologist from the University of Washington, submitted a preliminary seismological report of the Hanford Area in compliance with Consultant Agreement CA-204. The report is documented GEH-24175, "Preliminary Seismological Report," by Frank Neumann, December 29, 1958. The report defines the broader aspects of the earthquake risk problem at Hanford and the present state of knowledge concerning various types of earthquake phenomena and earthquake engineering problems. The report also summarizes the specific items on which direct statements are desired. Dr. Neumann has also summarized the regions of incomplete data and technical knowledge.

Instrument for Nuclear Incident Alarm

The design and application of nuclear incident alarms has been reviewed in various Operations in CPD and HLO. The basic criteria and design have been determined for an instrument which would serve as interim steps in the broad program.

Appropriation Request for \$49,500 was approved on January 29, 1959. This Request will provide for a plug-in type instrument to be located in sensitive locations in the 200 Area facilities.

This instrument would provide a local alarm in the event of a nuclear incident. Fabrication of a prototype instrument has been started, and a review of vendor's products is being made to determine if a commercially available instrument would be satisfactory.

Experimental Test Plates

Five test plates were welded of Hastelloy F, Hastelloy #25, and Carpenter 20 Cb materials to study the weld-cracking characteristics of these materials and to develop acceptable procedures for use with both the metal-arc (coated electrode) and tungsten-arc processes.

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B. Plant Engineering

Management Practices - General Maintenance

Internal procedures and forms have been set up to aid in the planning, scheduling and time accounting of maintenance functions. Assistance in orienting the planning and scheduling personnel and foremen in basic concepts of pre-planning, analytical estimating and methods analysis has been provided. Improved feedback reports on building and grounds assignments were obtained by integrating maintenance and financial needs.

C. Project Activities

Project Cost Information as of January 18, 1959:

Total Authorized Funds - Active Projects	\$15,718,000
Total Cost-To-Date	10,876,000
Commitments and Open Work Releases	1,121,000
Unencumbered Balance	3,721,000

Costs charged to above projects December 21, 1958 to January 18, 1959.	418,000
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III. ORGANIZATION AND PERSONNEL

A. Personnel

F. E. Porter, Engineering Designer, transferred from the Locomotive and Car Equipment Department, Erie, Pennsylvania, to FEO Drafting, effective January 12, 1959.

B. Safety

The regular monthly safety meetings have been held by all Operations. No unfavorable trends have been noted in safety performance.

C. Inventions

None

D. Reports Issued

HW-58258 - Radiography Facility - Design Basis, Project CGC-811,
R. A. Ciccarelli, January 6, 1959.

HW-58461 - Scope Design for Conversion of Purex Anion Exchange
Prototype to a Manufacturing Facility," (Unclassified) by
L. D. Gustafson, January 23, 1959.

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HW-59079

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Reports Issued (Continued)

- HW-58563 - Installation of Pneumatic Solids Transfer Valves in the UO₃ Plant, by J. M. Gerhart, January 21, 1959.
- HW-58586 - Purex Gas Purification Studies - Transmittal of Summary Reports, by W. K. MacCready, January 9, 1959.
- HW-59013 - Budget Study Report, FY-1961 Plant Acquisition and Construction Budget, NER Reprocessing Requirements - UO₃ Plant, by L. D. Gustafson, January 27, 1959.
- HW-58897 - Twenty-six inch Vacuum System Improvements - 234-5 Building, by R. C. Tabasinske, January 14, 1959.
- HW-58437 RD - Assumptions for Preparation of Plant Acquisition and Construction Budget for FY 1961 - CPD, by D. R. Gustavson, December 8, 1958.
- HW-58619 - Project Proposal (CGC-811) Revision 2, Additional Plutonium Fabrication Facilities, 234-5 Building, by D. R. Gustavson, December 29, 1958.

E. Trips

D. B. Hagen was chairman of a round-table discussion on the subject "Maintenance in Nuclear Plants" at the Plant Maintenance and Engineering Conference held in Cleveland, Ohio on January 27, 1959. Mr. Hagen also discussed industrial engineering problems with personnel in the Aircraft Gas Turbine plant in Evendale, Ohio, and the Hotpoint Appliance plant in Chicago.

D. E. Braden visited Northwest Copper Works, Portland, Oregon, and United Products Company, Tacoma, Washington, on December 30, 1958 and January 19, 1959, respectively, for the purpose of inspecting RMC Button Line equipment.

On January 19, G. P. Kesel visited the United Products Company of Tacoma, Washington, to witness acceptance tests on Hood 13-MD being procured on Project CG-734.

P. S. Kingsley visited the Boeing Aircraft Company, Seattle, Washington on January 13, 1959 to arrange transfer of excess titanium to HAPO.

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Visitors

Mr. F. P. Robinson, G.E. Apparatus Sales Department, Pasco. visited HAPO January 21 and 22 for the purpose of inspecting the ACA motor at U-Plant.

R. C. Hildebrandt, District Structural Engineer, and L. C. Miller, Field Engineer, of Portland Cement Association, visited HAPO to discuss structural analysis of waste storage tanks.

Lee Flynn, Allan Gunderson and A. C. Welch were HAPO visitors at intervals during the period from January 7 to 24 to supervise the installation and start-up of the Gorton lathes in the 234-5 Building.

Manager
Facilities Engineering Operation

HP Shaw:FC:mh

CHEMICAL PROCESSING DEPARTMENT
RESEARCH AND ENGINEERING OPERATION

JANUARY, 1959

PUREX PROCESS TECHNOLOGY

Feed Preparation

Irradiated uranium with cooling times of 91 to 145 days was dissolved to form solvent extraction feed. Radioiodine control was excellent (0.6 curies per day, average) although no mercuric nitrate was added to the head end vessels for iodine suppression. Operation of the ammonia scrubbers was restarted when the bypass around the plugged A-4 Crib routed the effluent to Crib A-21. Except for an air leak in the C-Cell equipment all scrubbers are functioning properly, and detailed evaluation tests are planned.

Solvent Extraction

After a neptunium recovery run was completed, normal production processing was conducted at capacity factors ranging from 1.44 to 3.0 for the remaining 62 percent of the month. Typical performance data for normal plant processing are summarized below:

<u>Cycle</u>	<u>Log Decontamination Factor, dF</u>		<u>Instantaneous Loss, Percent</u>	<u>Recycle, Percent</u>	
	<u>Plutonium</u>	<u>Uranium</u>	<u>Plutonium</u>	<u>Plutonium</u>	<u>Uranium</u>
First	4.5	4.6	0.04	-	-
Final	3.1	2.3	0.003	0.75	5.0
Ion Exchange	>0.6	-	-	0.45	-
Overall	>8.2	6.9	0.043	1.20	5.0

Shortly after plant start-up the processing rate was reduced from CF = 3.0 to CF = 1.44 because of insufficient HSR flow through a replacement jumper. Inspection of the jumper showed the restriction was caused by polyethylene fragments, presumably from the HA Column scrub plates, in the diaphragm-operated valve. Installation of a screen in the jumper inlet nozzle prevented a recurrence of the plugging problem when the plant was restarted at CF = 3.0 on January 13.

Higher-than-normal intercycle stream gamma activities prevailed shortly after start-up, but these declined rapidly; however, poor decontamination performance in both the Final Uranium and Final Plutonium Cycles was experienced at start-up. An investigation determined that the poor performance was due to degraded organic in the 2DF, which produced poor quality solvent in the No. 2 Solvent System. (The organic was inadvertently jetted into the ICU Concentrator prior to start-up.) The poor organic

quality reduced decontamination 100-fold in the 2D Column and four-fold in the 2A Column. As plant operation continued with a high 20S rate, the quality of the organic rapidly improved, and the uranium product gamma ratio dropped from 290 to less than 2.0 within five days. Because the plutonium was recycled to head end via L-Cell Package prior to being routed into the plutonium ion exchange unit, only one plutonium batch exceeded gamma specification.

In addition to a stepwise pulse frequency reduction of 14 cycles per minute, HA Column flooding forced a ten-hour processing rate reduction from CF = 2.7 to CF = 1.9. Despite the reduced pulse frequency and the unstable condition of the column, the HA Column decontamination remained relatively normal. After the column regained stability, the processing rate was increased stepwise to CF = 2.7; however, the pulse frequency was maintained at the lower value.

Uranium product, which was too high in gamma activity for silica gel treatment, was combined with uranium rework solution from the UO₃ Plant and reprocessed at four tons per day through the Final Uranium Cycle by increasing its rate above the plant processing rate. Batch addition of rework to the 2DF Tank produced abnormal 2DW uranium and 2DU neptunium losses; consequently, continuous addition of rework was used to stabilize these losses.

Concurrent with the high gamma ratio of the uranium product, the plutonium content of the uranium exceeded the ten parts per billion specification. However, as the organic quality improved, the plutonium concentration decreased to within specifications, but leveled off at twice the previous normal concentration.

Generally all plutonium and uranium waste losses have been excellent; however, during the time of poor organic quality the 2EW uranium loss increased 100-fold above normal and the 2EW plutonium loss increased three-fold. The uranium loss tapered off more slowly than the plutonium loss, but finally reached normal value. Neither the HA Column instability nor operation at lower pulse frequencies increased the HAW plutonium loss appreciably. When the uranium saturation in the HA Column was gradually increased during a neptunium study, the HAW loss temporarily increased to 0.6 percent.

Other items of interest include the following:

- (a) A ten percent reduction in 2AS flow did not affect the 2A Column decontamination performance.
- (b) A tendency for erratic ICW uranium losses was eliminated by a five cycle per minute increase in the IC Column pulse frequency.
- (c) A batch of hydrolized waste was reprocessed with no adverse effects on the process.
- (d) The uranium product gamma activity reached the lowest value since two-cycle operation.

Neptunium Recovery

The neptunium recovery operation, conducted during the first part of January, successfully recovered 0.76 kilograms of neptunium-237 from that accumulated in the 3WB System. Use of an oxidizing flowsheet produced greater than 99 percent recovery in the HA Column. Although initial high-acid concentration in the IBX Column produced temporary high neptunium losses to the IBU, this condition was rapidly corrected. An over-all neptunium recovery of 95 percent was realized during the run. Gamma activities of the intercycle streams were approximately the same as those experienced during the November recovery run, but the gamma activity of the final product solution shipped from the Purex Plant was lower by a factor of six. Product analysis was as follows:

Neptunium	- 15 grams per liter
Plutonium in Neptunium	- 0.4 percent
Uranium in Neptunium	- 1.2 percent
Iron in Neptunium	- 0.15 - 0.5 percent
Gamma Activity	- 7.6×10^4 μ c/gal.

To promote accumulation of neptunium in the 3WB System during the January processing run period, nitrous acid was added to the IOO; concurrently, sodium nitrite was eliminated from the HAF. When 0.003 M nitrous acid in the IOO gave indications of producing a partitioning failure in the IBX Column, the sulfamic acid concentration in the IBX was increased from 0.06 to 0.10 M, and the nitrous acid concentration was reduced to 0.001 M. The HAW neptunium losses remained below the analytical detection limit until the uranium saturation was increased to determine its effect on neptunium recovery. When the HAW plutonium losses rose to 0.6 percent, the HAW neptunium loss increased to over 100 percent of the neptunium in the HAF. The neptunium lost via the HAW was segregated for rework when the HA Column operation returns to normal.

Attempts to reduce neptunium lost to the 2DU (up to 30 percent of the HAF neptunium) by the following methods proved unsuccessful: (a) addition of 0.0025 M and 0.0050 M sulfuric acid to the 2DS, and (b) addition of 0.0050 M sulfamic acid to the 2DS.

Plutonium Concentration

When the resin in the plutonium ion exchange unit was replaced during the last shutdown period, 30 - 50 mesh Permutit SK resin was added to the system. At the time the resin was changed, the mesh of the XSW screen was increased from 24 x 110 to 14 x 88 to assist the removal of resin fines from the system. The low XAW plutonium recycle, up to ten-fold lower than previous recycle, has been attributed to the excellent pushing characteristics of the present resin.

Solvent Treatment

Although the gamma activity of both solvents increased temporarily near the start of the neptunium recovery run, continued plant operation with from 70 to 90 percent of the washed organic recycled to the feed tank returned the

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HW-59079 [REL]

solvents to normal prior to the completion of the run. Prior to plant start-up, a test of recycling IOO containing 0.003 M nitrous acid indicated the nitrous acid had no deleterious effects on the solvent; consequently, this concentration of acid was used in the IOO at plant start-up. The amount of nitrous acid was later reduced to 0.001 M to prevent a plutonium partitioning failure in the IBX Column.

During the period of high gamma activity in the Final Uranium Cycle, the 20F gamma activity increased fifty-fold, but a three-fold increase in the 20S rate rapidly returned the 200 stream to near normal conditions.

Waste Treatment and Acid Recovery

Nitric acid was recovered from the neptunium recovery run wastes after sodium nitrite was added to prevent excessive concentrator corrosion by the sodium dichromate in the HAW. As a result of the concentration, the waste volume sent to underground storage was four-fold less than the waste from the November neptunium run.

Erratic operation of the waste concentrator caused by rate adjustments and variable HAW acidity produced a higher-than-normal IWW flow (6 flows vs 5 for flowsheet). Waste volumes sent to the 241-A Tank Farm during the month averaged 59, 554, 9 and 249 gallons per ton of uranium for neutralized IWW, solvent washes, centrifuge cleanouts, and cell drainage, respectively. The coating waste solution sent to the 241-C Tank Farm was 230 gallons per ton of uranium dissolved. Over-all plutonium and uranium losses for the month were 0.29 and 0.12 percent, respectively. Coating waste losses for plutonium and uranium accounted for 30 and 33 percent of the over-all losses, respectively.

IWW equivalent to the waste from 75 tons of uranium processing was transferred into TK-241-A-104 to increase the temperature of the tank above 70°C, the temperature at which the tank has been warming for the past five months. Self-concentration in 241-A-101, 102, and 103 continues at 3.9, 14.5, and 1.3 gallons per minute, respectively, with a normal 139°C in TK-101 being the maximum tank temperature recorded during the month.

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HW-59079

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REDOX TECHNOLOGY OPERATION

Dissolution

Failure of the coil in the original C-2 dissolver at the end of December limited dissolution to the A and B dissolvers throughout January. Approximately 70 tons of E-Metal, cooled in excess of 160 days, were dissolved at an average rate of 1.16 tons per day per dissolver. The instantaneous dissolution rates averaged 1.3 and 1.2 tons per day, respectively, for the down-draft, A, and up-draft, B, dissolvers. Successive samples of occasional second cuts, during prolonged periods of digestion, revealed the heel remaining after the normal two-step dissolution procedure to be less than 0.5 percent of the uranium charged.

Solvent Extraction

The HA Column was operated for approximately 4 hours with the HAX acidified to 0.22 M HNO_3 to determine the extent of neptunium and fission product extraction. Preliminary laboratory analyses and the HCP gamma monitor indicated that refluxing of both neptunium and fission products occurred to some extent, probably due to the acid deficiency, -0.27 M HNO_3 , of the HAFS. Approximately three hours after the HAX was acidified the HCP activity, as indicated by the in-line gamma monitor, started to increase and was still rising, having doubled its original value one and one-half hours later at the end of the test. The HCP activity dropped sharply within ten minutes and returned to normal in less than thirty minutes after the use of neutral HAX was resumed. Additional tests with neutral or slightly acidic HAFS and acidified HAX will be made during February.

A tubular flow-cell of linear polyethylene was tested in the HCP gamma monitor for a three-week period early in January to compare it with the molded fluorothene cells which had suffered rather rapid build-up in back-ground activity in the HCP monitor. After two weeks of service the back-ground activity began to increase steadily, despite relatively low solution activity. Within thirty hours the back-ground activity increased six-fold to a level seven times that of the solution being measured. A new cell employing teflon tubing performed satisfactorily during the testing of acidified HAX but has not been in service long enough to determine its relative freedom from build-up of back-ground activity.

Extensive flushing of the extraction columns, overflow lines, associated vessels and the vent header with 60 percent nitric acid recovered approximately 160 grams of plutonium or about 0.1 percent of the amount of plutonium processed since the preceding, and much less extensive acid flush.

Plutonium Ozonation

Detail design is nearing completion on a prototype continuous ozonator intended to improve ruthenium removal from the plutonium stream. The one-piece unit will perform the following functions: 1) strip hexone from the 2BP stream; 2) condense the hexone and associated steam; 3) contact the stripped 2BP with

TOP SECRET

ozone in four successive stages, employing parallel vapor flow; 4) provide circulation in the E-2 tank which constitutes the fifth stage of the contacting system. Laboratory investigations indicate that liquid phase catalysts, which can be removed in the final extraction cycle, may greatly improve the efficiency of the unit with respect to both rate and ultimate amount of decontamination.

Product Concentration

A flush of the L-2 stripping tower and the L-3 product concentrator with 40 percent nitric acid removed only 310 grams of plutonium, about 0.5 percent of the plutonium processed since the preceding flush approximately six weeks earlier. Further periodic flushing will be required before a correlation can be established between plutonium build-up and either through-put or 3BP acidity.

Waste Storage

Neutralized extraction wastes were routed to the 111-SX during the month marking the first use of tankage reclaimed by means of pumping facilities provided by Project CG-717. The presence of a 100,000-gallon heel, at a temperature of 180 F, precluded the necessity of taking special precautions to eliminate the possibility of thermal shock at the start of re-filling the tank.

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FINISHED PRODUCTS TECHNOLOGY OPERATION

URANIUM CONVERSION OPERATION

Process Performance

All UO_3 produced met product specifications. At month end, however, the gamma radioactivity was slightly in excess of that of aged natural uranium.

Nine hundred seventy three (973) pounds of nitric acid per ton of uranium processed (92.3% of theoretical) were recovered at an average concentration of 48%.

The average operating rate of the calciners was 7.8 tons uranium per unit for each day on the line. The overall calciner operating efficiency was 96.8%.

The filter bags of a primary unit (X-28-2) were changed after 13 operating days when it became impossible to maintain the differential pressure within established limits. The reason for the short service life (average life has been 55 days) is not apparent, but might have been due to a period of operation at high differential pressure while the blow rings were inoperable.

The stored concentrated floor drainage was shipped to Purex for reprocessing. Filtration through a filter aid appeared to be satisfactory.

Process Improvement

The nitric acid absorber (TA-3) instrumentation was further modified to eliminate the need for operator judgement. Satisfactory control has been achieved during steady operation and at shut-down. It is indicated that further improvement is required for start-up.

The trim of the steam control valves for the 100% UNH concentrators was increased to $1\frac{1}{2}$ inches from $1\frac{1}{4}$ inches. This increased the rate to approximately 20 tons per day for each concentrator.

Shear pin failure occurred on the J calciner agitator assembly during the month. Replacement pins were $\frac{5}{8}$ inch diameter with no relieved section. The sheared pins had a half-inch diameter relieved section. Four $\frac{5}{8}$ inch diameter pins, which had been installed previously, were removed for inspection. No deformation or other evidence of fatigue was detected. All calciners are now equipped with the $\frac{5}{8}$ inch diameter shear pins.

Four feed points were found to be cracked and were replaced. One feed point, which had previously cracked and was repaired by welding, failed completely after 502 hours of operation. No agitator damage resulted.

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all calciner cells are now equipped with facilities for panel board controlled steam and air purging of the feed lines and feed points during shut-down.

The Allen-Sherman-Hoff rotary valve was removed from test in mill feed service after it was indicated that further work was required to eliminate the high impulse loading of the mill. The valve appeared to be satisfactory in all other respects. A screw feed to the mill has been installed and is currently under test.

METAL FINISHING OPERATION

Recuplex

Twenty (20) runs, consisting of crucibles, fragments, powders, and clean-outs, were processed through the Slag and Crucible Hood. Slurry losses to crib averaged 0.03% of the recovered plutonium.

The continuous plutonium dissolver pot failed by weld corrosion after seven weeks of continuous service. The pot was replaced with a new unit.

Alpha plutonium briquettes that could not be dissolved safely or remelted into ingots were burned to the oxide. No difficulty was experienced in dissolution and recovery of the high temperature oxide produced.

The SE Hood processed 1633 liters per day at an operating efficiency of 72% for an average instantaneous rate of 2255 liters per day. Waste losses to crib averaged 0.0088 g/L (0.59% of the feed plutonium). The solvent extraction recovery system was shut down during the first half of the month for replacement of hood panels and the plutonium concentrator.

Task I - II

One hundred seventy-five (175) runs were processed with an average filtrate recycle of 1.56%.

Except for one week during the month, operation of the Hood 9A continuous equipment was good. Air leaks into hydrofluorination system for a period of about one week resulted in poor oxide-to-tetrafluoride conversion and Task III reduction yields were adversely affected. Repairs to a leaking bellows and rotary valve corrected this condition.

A series of twenty-two (22) consecutive nitrate runs from Redox, which contained above normal amounts of Fe, Cr, and Ni, resulted in ten button rejects. The data are being reviewed in order to establish new nitrate feed specifications that will meet the purity standards required by current fabrication.

Process Chemistry OperationNEPTUNIUM PROCESSINGPurification

During January, the neptunium received from Purex was processed through the 222-S Building anion exchange facility. The only flowsheet variation of significance (compared with the flowsheet reported last month) was the use of hydrazine in place of semi-carbazide during the resin loading. This change resulted in noticeably less gassing. The operation, carried out in two batches, yielded a product solution containing 20 g/l neptunium, 0.1 weight percent plutonium and 1.8 weight percent iron. Overall decontamination factors were 87 for plutonium, 7 for gross beta, 10 for gross gamma, and 8 for UX.

Oxalate Precipitation and Calcination

The neptunium oxalate precipitation and calcination equipment was shaken down with a small-scale (40 gram) run. The feed solution, containing 45 g/l neptunium and four molar nitric acid, was made 0.16 molar in semi-carbazide and allowed to stand at room temperature for one hour. The resulting solution was then added slowly, with stirring, to enough one molar oxalic acid to precipitate the neptunium as the di-oxalate and give a mother liquor containing 0.08 molar oxalic acid and 3.2 molar nitric acid. After standing for two days, the precipitate was filtered and washed with 0.5 liter of 4 molar nitric acid. Analysis of the filtrate showed a neptunium loss of only 0.07 percent and virtually no plutonium decontamination across the precipitation. Calcination of the air-dried oxalate for one hour at 550 C gave a material with a "crystal density" (measured by liquid displacement) of about 9.4 g/cc.

ANALYTICAL ASSISTANCEPlutonium Assay of Dissolver Solution

Evaluation of the ion exchange-coulometric method for the assay of various types of dissolver solutions was continued. Very favorable results were obtained when the method was tested on a synthetic Darex type solution. Twenty-two runs on the synthetic gave an average recovery of 99.7 percent and a standard deviation for an individual result of plus or minus 0.2 percent. In view of the composition of the synthetic solution, which contained 1.1 molar stainless steel, it may be concluded that the method is not materially affected by the presence of relatively large amounts of iron, chromium, and nickel.

Beta Activity of UO₃ Powder

In conjunction with specification studies carried out by the Finished Products Technology Operation, current production UO₃ powder was analyzed

Beta Activity of UO₃ Powder (Continued)

for beta-emitting nuclides. The following typical breakdown of beta emitting components was obtained:

<u>Beta Emitter</u>	<u>% of Total Beta Activity</u>
Ruthenium-103,106	9.4
Strontium-89,90	0.02
Thorium-Protactinium-234	90.4
Cerium-Praseodymium-144	0.21
Zirconium-Niobium-95	0.10
Total	100.1

As is shown by the data, over 90 percent of the beta activity is due to uranium daughters (Th-Pa-234). Consequently, the limiting factor from the standpoint of beta radiation is the uranium daughter activity, rather than any one particular fission product.

Alpha Scintillation Counting of Liquid Samples

Work was initiated to adapt the alpha scintillation counting system to the alpha counting of liquid samples. Efforts to date have been centered on the establishment of a suitable sample preparation procedure and the improvement of the counting resolving time to accommodate high counting-rate samples. The sample preparation procedure which was tentatively selected consists of mounting one milliliter of sample in a conventional counting dish and covering with a one mil thickness of mylar plastic to form a contamination-free mount.

QUALITY CONTROL AND STANDARDS

During the month the Quality Control program for the Chemical Processing Department Analytical Laboratories was maintained as usual. The Analytical Control Quality Report - October - December, 1958, HW-58896, was issued. Analytical corrections for accountability source data continue to be issued to the SS Accountability Operation on a monthly basis. Two additional corrections are now being applied, a correction for the percent americium-curium found in the H-7 (dissolver solution) composite and a correction for the impurities found by spectrographic analysis in the L-6, L-9 (product) plutonium nitrate load-outs.

The Standards Laboratory continued the production of calibrated glassware and standard solutions. One hundred (100) millicuries of plutonium as a nitrate solution were shipped to USAEC, New York Office on January 2, 1959. Ten grams of plutonium metal containing less

QUALITY CONTROL AND STANDARDS (Continued)

than 350 parts of metallic impurities were prepared and shipped to C. D. Rodden, USAEC, New Brunswick, New Jersey, on January 5, 1959.

The Standards Laboratory prepared an RCR (concentrated supernatant) standard for the 234-5 Analytical Control Operation Quality Control program. Approximately five grams of NpO_2 were repurified and are now available for X-ray and radioassay calibrations work. Two hundred grams of plutonium as the nitrate were prepared for standards work by anion exchange purification techniques. A second 200 grams of plutonium as the nitrate will be available for standards preparation during February. U_3O_8 standards were prepared and are now available for the 234-5 laboratory as film calibration standards.

234-5 DEVELOPMENT OPERATIONContinuous Chlorination

Continuous chlorination in the small glass reactor proceeded for twenty shifts this month. Rates have been gradually increased to about 70 grams per hour, as plutonium, without yet reaching a limit. A total of 4100 grams of plutonium has been processed from oxide to chloride during January.

Operating conditions have usually been as follows:

Powder bed depth: $3/8" \pm 1/8"$.
Residence time in 24" furnace: 45 ± 15 minutes.
Phosgene flow: 3 ± 0.5 times stiochiometric requirements.
Vibration time: 1 - 4 seconds/minute.
Temperature: 500 ± 25 centigrade.

Lowering the temperature 50 C slows the chlorination rate. Raising the temperature 50 C has increased the chlorination rate. Increasing the phosgene flow also increases the rate. These observations were made at times when chlorination of powder flowing through the tube was barely or hardly complete.

Characteristics of Plutonium Trichloride Powder

Current powder from the continuous chlorinator in Hood 30 has shown mild caking, but the lumps break up rather easily. Laboratory analyses of the powder show a composition corresponding to $\text{PuCl}_{2.7}$, as indicated by Pu and Cl analyses.

The best estimate of phosgene remaining in freshly-produced but cooled plutonium trichloride powder is 0.02 moles COCl_2 /mole PuCl_3 . One small sample showed that this ratio may reach 0.05. After standing overnight, the mole ratio was down to 0.004, possibly due to phosgene reaction with remaining traces of plutonium dioxide.

Corrosion Studies

Development and Corrosion Chemistry, HLO, reports that corrosion of Hastelloy B and Hastelloy C in the chlorination off-gas system is about 10 mils per month at the point where condensate forms. Corrosion of these alloys at 500 C in the chlorinator proper has been previously reported at 1 - 2 mils per month.

Corrosion of 304L stainless steel is low at humidities of dew point 5 C or less. The estimated rate of 1 - 2 mils per month may be reduced on closer examination. At dew point -20 C, the steel exposed for two months appeared as bright as before exposure.

Temporarily humid (estimate -10 to 0 C dew point) conditions in dry Hood 30 shows that escaped phosgene is selective in the metals it attacks at these conditions. Identities of these metals or alloys are not yet identified.

Off-Gas Studies

The data in the table below were obtained by analyzing off-gases sampled during the chlorination of cerium oxide. Values are expressed in mole percents.

<u>Temp. C</u>	<u>COCl₂</u>	<u>CO</u>	<u>Cl₂</u>	<u>HCl</u>	<u>CO₂</u>
435	27.7	25.0	21.7	0	26.1
440	< 1	8.2	10.1	8.2	73.4
448	22.2	23.5	28.3	---	26.0
538	16.9	32.6	22.5	5.6	22.5
450	46.5	18.5	20.5	3.0	---

Phosgene flow rates were approximately 25 - 30 ml/min. during sampling for the first four points. This represents an overall phosgene excess of approximately 200 percent as calculated after chlorination was discontinued. When the last sample listed above was taken, phosgene flow was about 50 ml/min.

The composition of off-gases is dependent upon the rate of chlorination and is, therefore, affected by the composition of the bed as well as the temperature and the phosgene flow rate. The bed varies with chlorination time from an initial composition of approximately 100 percent oxide to a final composition approaching 100 percent trichloride. Thus, samples taken at different times during chlorination may vary widely in analysis, although temperature and phosgene flow rate are unchanged. This type of variation makes reproducibility of analyses impossible with the present equipment.

The presence of oxygen in amounts up to five percent has not been explained.

The unpredictable appearance of hydrogen chloride in concentrations up to 10 percent is also unexplained. Studies are being planned to determine whether the hydrogen chloride is actually a chlorination by-product or is formed in the analytical apparatus by the hydrolysis of phosgene.

It has been established that the solid materials which deposit on process surfaces are formed only when oxide is present. They appear to be largely chlorides of iron, aluminum, and nickel. Chlorination of oxides of these three metals with phosgene produced very similar deposits. These solids form only on surfaces which are cooler than 325 C. When heated in the presence of air, the solids become refractory and are very difficult to remove.

Plutonium(III) Chloride Reduction (Batch)

Reductions were made with plutonium(III) chloride from the small continuous chlorinator. Good reductions resulted in every case. Bulk densities of

the powders used varied from 2.0 - 2.9 g/cc. Little, if any, differences in reduction characteristics were noted.

Work on the feasibility of adding the calcium and iodine to the reduction vessel on top of the plutonium(III) chloride was continued. The best yield obtained was 75 percent. A new reduction vessel is being fabricated so that the problem may be studied under more ideal conditions.

A successful reduction was made (200-gram scale) when all of the iodine and 2/3 of the calcium were placed above the trichloride and the remainder of the calcium below.

An RS-4 crucible with a copper coating was used for a 700-gram reduction. The coating held up very well. It did not crack on the bottom like the nickel coat usually does. Further tests will be made with this coating.

One thousand forty-four (1044) grams of plutonium skulls were melted together with calcium and calcium chloride, and the temperature raised to 1050 C. A button weighing 992 grams was obtained.

Semi-Continuous Reduction

Fifty (50) grams of plutonium as the trichloride were dropped with calcium into a crucible at 800 C. A 30-gram plutonium button was recovered. A purified argon atmosphere was used. Further tests will be conducted as time allows.

Recovery of Plutonium From Chloride Slag and Crucible

After chloride slag and crucible material is dissolved in nitric acid and boiled down with nitric acid until the boiling point reaches 160 C, the plutonium in solution is in the plus six valence state. Reduction of the plutonium to plutonium(IV) is necessary to obtain low waste losses across the ammonium hydroxide precipitation step. With low nickel content slags, this may be accomplished by making the solution 0.2 percent hydrogen peroxide. However, when nickel-coated crucibles are used, the waste losses increase greatly (ca 0.2 to 3+ percent) and pH adjustment becomes difficult. Addition of hydroxylamine sulfate as a reducing agent with the hydrogen peroxide reduces the waste losses to about 2 mg/liter, compared to 38 mg/liter with peroxide alone. Further experimentation with reducing agents is under way.

One Crucible Scale Chloride Slag Dissolver

The large-scale slag and crucible dissolver apparatus has been installed and tested with a half-scale dissolution. Sparge tubes of titanium are used to test the corrosion of this metal under actual operating conditions. The apparatus is built so stirring apparatus can be used instead of sparging for solution agitation.

ORGANIZATION AND PERSONNEL

Personnel

On January 1, 1959 R. E. Tomlinson resumed his duties as Manager, Advance Process Development Operation after serving as Acting Manager, Production Operation since April, 1958.

On January 1, 1959 R. G. Geier transferred to the Redox Technology Operation.

On January 12, 1959 H. Q. Snyder transferred to the Processing Operation, Finished Products Operation.

On January 12, 1959 R. B. Guenther transferred from the Uranium Reduction Operation, Finished Products Operation to the Finished Products Technology Operation.

Trips

V. R. Cooper attended a meeting on the criteria for declassification of separations technology information in Washington, D.C. on January 19 and 20, 1959.

R. E. Tomlinson attended a conference on removal of long-lived nuclides at the Brookhaven National Laboratories, Upton, New York; Mr. B. Manowitz, on January 8 and 9, 1959.

R. E. Tomlinson testified at Congressional hearings; Mr. J. T. Ramey, and consultation on production plans; Mr. F. P. Baronowski, Atomic Energy Commission Offices, Washington, D.C., January 26 through 30, 1959.

W. G. Browne lectured to Inland Empire Pre-Science Fair at the Gonzaga University, Spokane, Washington, Dr. Hurd on January 10, 1959.

R. E. Smith visited the Mouat Industries, Columbus, Montana, Mr. Mouat on January 7 and 8, 1959 to inspect the ore processing facilities.

Visitors

S. J. Fraenkel of the Standard Railway Equipment Mfg. Co., Chicago, Illinois visited R. E. Tomlinson on January 20, 1959 to discuss a proposed design for shipping cask for irradiated fuel elements.

Visitors (Continued)

Marshall Cook and Richard Hoff of the University of California, E.O. Lawrence Radiation Laboratory, Livermore, California visited E. R. Irish and W. H. Swift on January 20, 1959 to discuss Palm recovery specifications and fabrication.

Donald L. Katz of the University of Michigan, Ann Arbor, Michigan visited W. H. Swift on January 21, 1959 to observe crane operation.

Inventions

None

V. D. Cooper

Manager
Research and Engineering

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HW-59079

EMPLOYEE RELATIONS OPERATION
MONTHLY REPORT - JANUARY 1959

I. RESPONSIBILITY

There were no changes in responsibility during the month of January.

II. ACHIEVEMENT

FIRE PROTECTION OPERATION

There were five fire responses during the month; a transformer in a counting machine overheated, a ballast in florescent light fixture burned out, a tire on low boy trailer was ignited, caused by a flat tire and a rekindle from controlled burning ignited a pile of trash. Fire Protection personnel washed oil and gas from roadway caused by an auto wreck.

During the month 315 fire extinguishers were inspected, three installed, three delivered to new location, 12 seals broken and not reported, 36 serviced, and 250 weighed. Twenty-four gas masks were inspected and six serviced. Eighteen hand lines were inspected. Sprinkler systems in 272-W, 272-E, and 277 W were inspected. A daily check was made on No. 4B dry system in 2101 M. Moisture was drained from 272-E system.

Various services were performed for other operations. Buildings and roadways for Purex and Redox were washed to remove contamination. This lasted for four days and involved 184 man hours and 116 tanker loads of water. A pipe line west of 234-5 was charge. Several piles of poles and scrap lumber at 200 North Area were control burned. Box #16 at 200 East was taken out of service while work was done on the sprinkler system. Two Chemox masks were dismantled, cleaned and disinfected.

Classes were held each Friday during the month in Civil Defense Work.

Forty-one alarm boxes were tested during the month.

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UNION RELATIONS OPERATION

Of thirteen grievances received during the month of January, eight were satisfactorily answered at Step I.

Meetings have been held with William Lubersky, who will represent the Company in an arbitration hearing of the Wonacott Case. Pertinent data and information is being compiled for his use during the hearing which has tentatively been scheduled for March 5, 1959.

A meeting was held with representatives of the Industrial Firemen's group who had protested the Company's method of selecting officer candidates for the Fire Department. Specifically, they objected to the frequency of written examinations and advised the Company in writing that in the future the Firemen would refuse to take them; however, after further discussion, they retreated from that position and the Company is investigating the possibility of giving such examinations at less frequent intervals.

An interesting nonbargaining unit grievance was processed in which a number of Laboratory Assistants (female) objected to the Company's practice of granting a half day off before Christmas to some employees and not to others. The relief sought, of course, was to have same consideration extended to all employees. The Company explained that it was not possible to grant this privilege to every employee but the Company would restudy and evaluate the problem before the next Christmas holiday.

At the request of the HAMTC an investigator for the Wage-Hour Division of the Department of Labor visited HAPO during the month. The Union had asked for a review of the Company's practices insofar as overtime payments are concerned. Specific attention was given to those situations where employees work alone and where relief for lunch periods could constitute a problem in spite of the Company's best efforts to be completely fair and legal in its administration. The investigator had made no report at month end.

UNION RELATIONS OPERATION

	<u>January</u>	<u>December</u>
Bargaining Unit Employees in CPD	821	815
Bargaining Unit Employees Utilizing Check-off	540	539
Percentage of Total Bargaining Unit Employees Utilizing Check-off	65.8	66.1

Following is the grievance statistics summary for the month of January, 1959.

	<u>Unit</u>	<u>Nonunit</u>
Grievances received year to date	13	0
Grievances pending at Step II on 12-31-58	15	1
Grievances received during the month	13	0
Satisfactorily answered at Step I	8	0
Settled at Step I through expiration of 90 day time limit	2	0
Processed at Step II	9	1
Pending at Step II on 1-31-59	9	0
Pending at arbitration		
Active	4	0
Inactive	8	0

HEALTH AND SAFETY OPERATION

<u>Chemical Processing Department</u>	<u>January - 1959</u>	<u>December - 1958</u>
Disabling Injuries	0	0
Serious Accidents	1	1
Medical Treatment Injuries	45	51
Technical Overexposure Incidents	0	0
Radiation Occurrences	24	26-2/3
Fires	1	1
Security Violations	4	0

Comments on Statistics

A fire loss of \$10.00 was caused by rekindle following area general controlled burning.

Serious Accident CPD 59-1 was caused by failure of a malleable steel plug in a nitric acid line in 202-A Building; property damage amounted to \$1075.00.

Programs

The department achieved its fourth Presidents Safety Award on January 6, 1959, after completing approximately five and one-half million man hours without a disabling injury.

Plans were completed to develop and publish a manual of CPD Radiation Protection Standards as a joint project with the three Radiation Monitoring managers.

Safety rules for the Chemical Processing Department, 222, 271, and 2704 Buildings, for 1959 were prepared and issued for posting.

Manuals and bandages were purchased for use in a CPD on-the-job First Aid training program.

A safety meeting device, Safety and Security Criss Cross, was fabricated and made available for use in the department.

Training and Education

The CPD supervisors Safety Training Program Conference Leaders meeting was conducted. A film, Knowing Is Not Enough, was purchased in support of the program.

At the request of HOO-AEC an instructor was provided for a 20 hour Industrial First Aid training program for AEC Security personnel.

Advice and Counsel

Redox - Approved types of hose clamps for high pressure air lines; HAP0 standard piping identification for breathing mask air piping systems; approved construction materials for false ceiling in 202-S offices.

Purex - Fluorescent lamp tubes and fixtures requiring safety clips; approved construction materials in conference room false ceiling; checked pump pits for oxygen efficiency.

Finished Products - 234-5 plutonium incinerator facility.

P & GM - Design of hot start plugs for transportation and evacuation buses; controlled burning procedure review; Roto chopper for weed elimination; experimental use of hydrogen-heliarc cutting of stainless steel; safe requirements for shoring open pit at 241-A Tank Farm; fill holes and improve pedestrian walkways at 200-West shuttle unloading area inside the area at 200-West badgehouse; safe practices during routine welding operations.

Facilities Engineering - Inspection of 241-SX Caisson and required safety equipment for entering pit and checking laterals; development of a facility for processing spent fuel elements; 234-5 plutonium incinerator facility; emergency evacuation of construction personnel and duty of Project Engineering on the job.

Employee Relations - Fire Protection Operation - conversion of passenger bus to disaster rescue bus; evacuation procedure revision.

AEC - Information furnished upon request to HOO-Process Engineering and Manufacturing Division, on the use and manufacture of toxic materials, for the calendar years 1957 and 1958.

Relations & Utilities - Alerted Transportation supervisor on congestion at 200-East Main gate at shift change; safety meeting assistance to Electrical Distribution and Stores.

Inspection, Investigation and Audit

Informal investigation - Redox employee fall at the 200-West shuttle unloading zone inside area at the main badgehouse.

Informal investigation - Redox hose clamp failure in high pressure aid service, resulting in injury to supervisor.

CPD Serious Accident 59-1 - Purex UO₃ recovered nitric acid line, malleable steel plug failure.

Five safety suggestions requiring considerable time and effort were investigated and answered.

Inspection - Tank Farm, pump, and compressor buildings, 241-SX and 241-A

The Power Operation audit was issued.

Reports Issued

CPD Annual Industrial Summary of Fire and other Property Damage Experience

Form AEC-13 Monthly Summary-Accident, Occupational Disease, and Fire Experience

Form ERE-17 Quarterly Report of Injuries

Form AEC-92 Supervisors Report of Accident (CPD Serious Accident 59-1)

Monthly Health, Safety and Security Performance

Accident Prevention Council Meeting Minutes

Monthly Narrative Report to AEC

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PERSONNEL DEVELOPMENT AND PLACEMENT

<u>A. Employment</u>	<u>Exempt</u>	<u>Non-Exempt</u>	<u>Total</u>
<u>Additions</u>	1	11	12
New Hires	0	0	0
Reactivates	0	2	2
Re-Hires	0	3	3
Re-Engages	0	1	1
Transfers from other components	1	5	6
<u>Removals</u>	10	4	14
ROF	1	0	1
Retirement	0	1	1
Leave of Absence	1	0	1
Deceased	0	1	1
Transfers to other components	8	0	8
Resigned	0	2	2
<u>Requisitions (Non-Exempt)</u>			
Number on hand at beginning of month		9	
Number received during month		3	
Number filled		11	
Number on hand at close of month		1	
<u>Request for Transfer (Exempt)</u>			
Number on hand at beginning of month	9		
Number received during month	1		
Number transferred	1		
Number closed out	2		
Number on hand at close of month	7		
<u>Applications for Employment (Exempt)</u>			
Applications received during the month	2		
Hired	0		
Closed out	2		
Applications on hand at close of month	2		
Open Requisitions	3		

Service Pins

A total of 19 pins were issued as follows:

15 yrs. service	1 Male	0 Female
10 yrs. service	8 Male	2 Female
5 yrs. service	8 Male	0 Female

[REDACTED]

Status - Personnel Development Program for Non-Exempt Employees

Month

Number of appraisals scheduled	105
Number of appraisals delinquent 1-31-59	64

Correspondence

During January a total of seven inquiries regarding CPD people were answered. They consisted of:

- 1 letter regarding record of employment
- 3 letters regarding inquiry of credit
- 3 letters regarding housing loans

Military Service Records

Records show that CPD has a total of 114 employees who are subject to military training through Selective Service or Armed Forces Reserve action.

	<u>Exempt</u>	<u>Non-Exempt</u>
Ready Reserve	9	12
Standby Reserve	16	5
Deferments Requested		0
Deferments Granted		2
Deferment Requests Pending		3

B. Personnel Training and Development

Participation in Training Courses

Exempt	57
Non-Exempt	30
G.E. Supervisory Selection Program - No. Completed	2
G.E. Supervisory Selection Program - No. Revaluated	1

A survey is presently being conducted on the current need for CPD decontamination - contamination control seminar type training.

Arrangements were made to start PBM-I. The first session will begin in February as soon as the Study Guides are received from Schenectady.

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HW-59079

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C. Office Services

Duplicating

Copies Produced 181,063

Mail

Total Pieces of Mail Handled 54,485
Registered Deliveries 348

Addressograph

Pieces of Written Material Produced 17,601

A study of light automotive vehicle requirements has been completed. As a result of this study some vehicles have been reassigned in order to obtain better utilization.

COMMUNICATION

In order to better explain the reasons behind the increase in Social Security deductions, as well as other modifications made to the Social Security law last year, all Department employees were provided with a booklet describing Social Security law amendments. This booklet was distributed with paychecks during the month.

A letter to employees' homes during the month discussed the fourth President's Award, the Department employment situation, and a look at our business prospects for 1959 as well as the next three to five years. A booklet on home safety was enclosed with the letter.

Management interviews, preliminary to the preparation of a Communication Workshop for supervisors and foremen, were started during the month. Present plans call for interviews with some 15 Level 3 and 4 managers and with approximately 20 supervisors in order to determine how the Workshop can best serve the needs of Department supervision.

In addition to the normal items of information and safety promotion, Department mass communication media discussed a number of HAPO and Company organizational changes, considerable first-of-the-month financial information, and the fourth President's Safety Award.

Editorial counsel and assistance in clearance procedures were provided five authors of technical papers and speeches, and three authors of signed articles.

Work with Press Relations during the month included preparation and approval of material for two news releases (the Redox burial incident, and the Redox Crane incident) and the selection of four or five subjects for possible national publicity.

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EMPLOYEE COMPENSATION OPERATION

Job descriptions prepared in accordance with the format developed for the "HAPO Nonexempt Compensation Study" have been received for the six selected "benchmark" jobs in CPD. Copies have been distributed to all HAPO Employee Compensation Operations for study and evaluation. Twenty one descriptions have been received from other HAPO components with 15 remaining to be completed.

Six nonexempt jobs were reviewed during the month. Four were semi-technical, one was clerical and one secretarial in nature. New classifications were established for two of the semi-technical jobs. No other changes resulted from the remaining five reviews.

SUGGESTION PLAN

	<u>December</u>	<u>January</u>
Suggestions Received	42	132
Acknowledgments to Suggestions	43	132
Suggestions Pending Acknowledgment	0	0
Suggestions Referred to Operations for Investigation	43	132
Suggestions Pending Referral to Operations	0	0
Suggestions Completed and Closed	70	32
Adopted Suggestions Approved by Board	49	14
Adopted Suggestions Pending Approval by Board	15	10
Total Net Tangible Savings	\$19,715.36	0
Cash Awards Paid During Month	\$ 2,550.00	0
Total Number of Suggestions Outstanding to Operations at End of the Month	94	171

AVERAGE AGE OF OPEN SUGGESTIONS

<u>Participation in Benefit Plans</u>	<u>December</u>	<u>January</u>
Insurance Plan	99.8	99.8
Pension Plan	99.5	99.6
Stock Bonus Plan	58.8	53.5
Good Neighbor Fund	64.0	63.5
Savings & Security Program	96.9	96.9

One employee retired on Normal Retirement during January, namely: D. F. Barlen, Utility Operator, Redox Operation.

III. ORGANIZATION AND PERSONNEL

A. Meetings

Members of the Employee Relations Operation attended approximately 75 meetings during the month. In addition to Safety, Security, Round Table, and Information meetings, these included:

Meetings with counterparts in other departments

Industrial Relations Council Meetings

Pre-grievance and Step II grievance sessions

Meetings concerning Standards Program for Maintenance

AEC representatives on transportation of off-site fuel elements.

Arbitration hearings

B. Personnel Activities

Fire Protection Operation held 123 inside classes and 30 outside classes, in which 4,850 feet of hose were used. The percentage of time spent in training was 16.1, amounting to 1037.5 hours.

The Specialist, Technical Personnel Placement, visited the Atomic Power Equipment Department at San Jose, California and the Vallecitos Laboratory. Also, the ninth annual conference of the Western College Placement Association at Los Angeles, California was attended.

C. Safety and Security

There was one medical treatment injury in Employee Relations Operation.

D. S. Roberts, Manager
Employee Relations

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