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HW-59434

DEL

DISTRIBUTION

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14, 15, 16	Atomic Energy Commission, Hanford Operations Office Attention: J. E. Travis, Manager
17, 18	Atomic Energy Commission, Washington 25, D. C. Attention: E. J. Bloch, Director, Division of Production
19	Atomic Energy Commission, Washington 25, D. C. Attention: F. P. Baranowski, Chemical Processing Branch
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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

FEBRUARY, 1959

GENERAL SUMMARY

PRODUCTION

The production of plutonium from the separations plants during February exceeded the monthly commitment; however, year-to-date production is slightly below the Official Forecast.

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

The output of unfabricated plutonium exceeded the schedule while the production of shapes was slightly less than the Official Forecast. Shipments of buttons exceeded the commitment, both for the month and on a year-to-date basis. Shape shipments for CY 1959 conformed to the Forecast.

ENGINEERING

About 0.85 kilograms of palm were accumulated in the Purex 3WB system during the first part of February. The first run of a new and simplified processing scheme for palm recovery resulted in only 0.13 kilograms removal. Eighty per cent of the original accumulation was recycled via 2BW.

E-metal charging limits for Redox dissolvers were recalculated to reflect findings of recent ORNL criticality experiments. Charge size was reduced from 3.0 tons to 1.75 tons per dissolver.

A twelve-hour acid-flowsheet run in the Redox HA column was made in February and preliminary findings indicated an appreciable reflux of palm. A document (HW-59526), describing laboratory work to develop a palm recovery flowsheet for Redox, was prepared.

Abnormal corrosion of the plutonium system by low-rate, E-metal processing is indicated at Redox. Metallic impurities of the concentrated product stream vary approximately inversely to rate of plutonium throughput. A new concentrator of titanium is being procured to meet this problem.

The flowsheet for E-metal processing was modified to reduce the high sodium impurity which subsequently appeared in the UO_3 product. The calcination of enriched uranium nitrate was started February 12, 1959.

Neutron counters were installed at key processing locations in Recuplex and are being calibrated. These instruments were placed to improve process and critical mass control.

The design of the 6-inch continuous centrifuge for Finished Products Operation was reviewed with the Bird Machine Company and verbal agreement was reached with them to design and construct the centrifuge.

A preliminary cask acceptance criteria for power fuels reprocessing was completed and forwarded to the AEC, together with comments on the proposed AEC licensing agreement with prospective power reactor operators.

The prototype circulator was installed in the Purex self-boiling waste storage tank 241-A-101 on February 11, 1959.

GENERAL

The personnel budget for FY 1960 and FY 1961 was submitted to, and approved by, the HAPO General Manager.

The Walker Arbitration case was heard in Portland but no decision has been received.

The Industrial Firemen have filed suit against the Company claiming retroactive overtime pay (approximately twenty minutes per day). Information is being developed for the Company's defense.

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SECRET

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	P. R. McMurray
Manager, Redox	C. T. Groswith
Manager, Finished Products	W. N. Mobley
Manager, Power and General Maintenance	T. G. LaFollette
Manager, Finance	K. G. Grimm
Manager, Facilities Engineering	H. P. Shaw
Manager, Research and Engineering	V. R. Cooper
Manager, Employee Relations	D. S. Roberts

CHEMICAL PROCESSING DEPARTMENT
NUMBER OF EMPLOYEES
FEBRUARY 28, 1959

<u>OPERATION</u>	<u>EXEMPT</u>		<u>OTHER</u>		<u>TOTAL</u>	
	<u>1-31-59</u>	<u>2-28-59</u>	<u>1-31-59</u>	<u>2-28-59</u>	<u>1-31-59</u>	<u>2-28-59</u>
GENERAL MANAGER'S GROUP	10	10	1	1	11	11
PRODUCTION	6	6	3	3	9	9
PUREX	51	47	214	212	265	259
REDOX	51	50	223	221	274	271
FINISHED PRODUCTS	55	58	242	241	297	299
POWER AND GENERAL MAINTENANCE	40	39	254	249	294	288
FINANCIAL	19	19	39	38	58	57
FACILITIES ENGINEERING	69	68	22	21	91	89
RESEARCH AND ENGINEERING	62	61	25	24	87	85
EMPLOYEE RELATIONS	<u>27</u>	<u>26</u>	<u>51</u>	<u>51</u>	<u>78</u>	<u>77</u>
TOTAL	390	384	1074	1061	1464	1445

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CHEMICAL PROCESSING DEPARTMENTPATENT SUMMARY
FOR
MONTH OF FEBRUARY, 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.

INVENTOR

R. S. Rosenfels, Research
and Engineering

TITLE

Non-Cracking Setter Plates
for Firing Calcium Fluoride
Crucibles

GENERAL MANAGER
CHEMICAL PROCESSING DEPARTMENT

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CHEMICAL PROCESSING DEPARTMENT
PRODUCTION OPERATION

FEBRUARY, 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>February</u>	<u>January</u>
Tons uranium processed	291.18	376.5
Average production rate during operation (T/D)	22.3	19.6
Total waste loss (%)		
Uranium	0.06	0.12
Plutonium	0.19	0.29
Average cooling time (days)	105	104
Minimum cooling time (days)	91	81
On-line efficiency (%)	46	62

2. Redox Operation

	<u>February</u>	<u>January</u>
Tons uranium processed	52.45	73.2
Average production rate during operation (T/D)	8.0	6.5
Total waste loss (%)		
Uranium	0.36	0.24
Plutonium	0.55	0.51
Average cooling time (days)	278	208
Minimum cooling time (days)	160	156
On-line efficiency (%)	40.1	49.3

3. 234-5 Operation

	<u>February</u>	<u>January</u>
Batches input to Task I	178	175
Runs completed through Task III	185	183
Batches through Product Recovery	47	27
Reduction Yield (%)	98.5	96.98
Waste disposal (units) (1)	687.66	446.35

(1) Erroneously reported in December, 1958 and January, 1959.
Corrected figures are 369.68 and 446.35, respectively.

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4. UO₃ Operations

	<u>February</u>	<u>January</u>	<u>To Date</u>
UO ₃ loaded (tons)	62.3-E		
	394.2	456.6	
UO ₃ approved for shipment (tons)	48.35-E		48.35-E
	403.36	398.8	31 729.34
UO ₃ shipped (tons)	448.89	447.67	31 498.35
UNE backlog (tons)	111-E	127-E	
	191	288	

5. Power

	<u>200 East</u>	<u>200 West</u>
Raw water pumped (gpm)	7 691	3 752
Filtered water pumped (gpm)	801	921
Maximum steam generated (lbs/hr)	258 000	158 000
Average steam generated (lbs/hr)	150 655	114 412
Total steam generated (M lbs)	101 240	76 885
Coal consumed, est. (tons)	6 375	5 022

6. Waste Storage

	<u>February</u>	<u>January</u>
Salt waste reserve storage capacity-Redox	3 826	3 879
Salt waste reserve storage capacity-Purex	33 407	33 698
Coating waste reserve storage capacity-Redox	30 828	30 881
Coating waste reserve storage capacity-Purex	46 058	46 349

C. Finished Products and Customer Liaison

The Fission Products Market Survey was completed by Arthur D. Little, Inc., and the final report of the study is now being printed for scheduled distribution next month.

E. Reports and Documents

1. Prepared and Issued

HW-59102 RD	Redox Plant Production Schedule, February, 1959 D. McDonald
HW-59103 RD	Purex Plant Production Schedule, February, 1959 D. McDonald
HW-59104 RD	UO ₃ Plant Production Schedule, February, 1959 D. McDonald
HW-59105 RD	234-5 Plant Production Schedule, February, 1959 D. McDonald

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HW-59146 Essential Materials Consumption - Purex, Chemical Processing Department for January, 1959
M. A. Thress

HW-59182 Scheduled Shutdown, UO₃ and Purex Plants
J. H. Warren

HW-59205 Essential Material Area Report to Cost and Purchasing - Production Operation, Chemical Processing Department for January, 1959, M. A. Thress

HW-59204 Chemical Processing Department - Waste Status Summary for January, 1959, M. A. Thress

2. Prepared for Signature and Issuance

HW-59078 Production, January, 1959, W. E. Johnson

III. ORGANIZATION AND PERSONNEL

A. Safety

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

B. Security

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

NR Chapman
Acting Manager
Production

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CHEMICAL PROCESSING DEPARTMENT
PUREX OPERATION

February, 1959

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	94 Percent
Plutonium	104 Percent

b) Production Rates

Processing rates during regular operation were maintained at a nominal 2.7 CF.

c) Operating Continuity

Uranium	46 Percent
---------	------------

d) Waste Losses

Uranium	0.06 Percent
Plutonium	0.19 Percent

e) The silica gel facilities were in standby during the period.

2. Normal Processing

Recovery and decontamination performance of the solvent extraction batteries was excellent during the month, and both products met specifications. Six uranium batches exceeded the 2.0 gamma ratio specification but were successfully blended with high quality material.

At the start of the month the HAW plutonium and Palm losses were high, 0.03 percent and 100 percent, respectively, due to a planned increase in saturation of the HA column. When the saturation was reduced, the plutonium losses declined immediately but the Palm losses persisted until the saturation was reduced below the normal value. This caused the gamma levels of the intercycle stream to increase two-fold and put the uranium product slightly above specifications. The column

saturation was not increased because of the pattern of Palm losses and the impending shutdown.

Improved scheduling enabled the dissolver cycle times to be lengthened to 6 - 7 hours. This factor, along with scheduling cuts, permitted more efficient nitric acid recovery in the backup facility with a potential essential material saving of \$5.00 per ton.

During January 1959 the A-21 crib began receiving dissolver scrubber effluent and 291-A stack flushings. After one month in this new service the 6" vitrified clay tile line to the crib failed and it was necessary to replace it with a new stainless steel line.

Measurements of pH, sludge levels, and radiation profiles were completed in Tanks 241-A-101, 102, and 103. Self-concentration continued at normal rates.

A replaceable prototype air lift circulator was installed in the 241-A-101 waste storage tank. After ten days of operation the temperature dropped from 120°C to 116°C on the lower element of the temperature profile. No difficulties were encountered during installation, which gives assurance that replacements can be made in case the existing circulators should fail.

3. Special Processing

a) Palm Run

A new oxidizing Palm recovery flowsheet, utilizing only the Final Plutonium Cycle columns, was given its initial trial. Although the recovery was limited to 20 percent and the run period was much longer than anticipated, the overall run was considered a success. Processing knowledge was greatly enhanced as the theoretical flowsheet was tested and revised during the trial run.

The original gravity flow routing of the 2BP from L2 to J5 was found to be limited. This condition was corrected by utilizing the 2BP sampler jet for routing the flow to J5.

During the initial phases of the run, the 2B column was in a continual flood. This condition was found to be due to the 2AX organic flow being 165 percent of flowsheet because of instrumentation failure.

The initial acidity of the 2BX, 1 M, was found to be too high, thus causing 2BW losses to be almost 100 percent. After lowering the acidity to 0.5 M the recovery was approximately 90 percent. Further decreases in acidity are contemplated for the next run.

During the Palm run, the H₄ concentrator was used to reduce the volume of the 2AW stream and miscellaneous tank flushes for back-cycling to the 3WB stream during the next normal run. A very

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slight amount of this material overflowed into J1, which contained feed for the Palm run, causing the activity of the Palm stream to jump up by five-fold. As a result the decontamination of the final product was difficult and never approximated that accomplished in previous Palm runs. It is expected that the experience gained during the test will lead to a more economical and reliable process flowsheet for subsequent runs. It is expected that at least 70 percent of the Palm not successfully packaged will be recovered during the rework of wastes.

b) Other Special Processing

The combined rework of high gamma uranium product produced in January and the UO₃ Plant sump wastes was completed. Also the previously mentioned batch of IWW waste containing the HAW Palm losses was successfully reworked with approximately 70 percent recovery.

During the shutdown flushes were made of the R Cell tanks to reduce gamma activity levels and remove any residual plutonium from the system. The activity levels were reduced by ten-fold and approximately 175 units of plutonium were recovered.

Initial studies of fission product recovery from IWW wastes were made, utilizing the Head End Centrifuge G-42 for the separation of activity-bearing solids. For details refer to HW-58722.

4. Radiation Experience

The total radio-iodine emission for the month was 14.1 curies. The maximum emission was 13.1 curies for a seven-day period ending 2-4-59, as a result of processing an unknown quantity of green metal.

Four Radiation Occurrences were incurred during the month as compared to eight for the previous month. One was the result of an employee suffering a medical treatment injury caused by a contaminated object. Flooding of the A-6 steam condensate crib contaminated the adjacent area to 500 mrad/hr. A portion of the six inch vitreous line used for routing waste from 216-A2 to the A-21 crib collapsed and was replaced with stainless steel line. The maximum radiation levels were 2 r/hr. for this work.

Replacement of valves and sampling jet in the F16 sampler pit involved radiation fields up to 100 rads/hr. Flooding of the sampler pit reduced average levels to about 1.5 r/hr.

C. Mechanical Experience

The failure and subsequent replacement of the F6 (west) tube bundle during February was the fifth during the fiscal year and the seventh since plant startup. The failed tube bundle was originally used in the H-4 concentrator but was moved to F-6 in October 1958. The failure occurred after forty months of combined service.

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The rupture of a four inch stainless steel steam line (in the concrete wall) supplying the F11 east tube bundle is the second failure of this type. The previous failure, also on the F11 concentrator, occurred in March 1957. Facilities Engineering Operation has conducted successful experiments at the shop with remotely installable plastic tube liners. Inasmuch as only two of the original four steam lines supplying the F11 concentrator are now serviceable, FEO has been requested to assist in developing a method for effecting prompt repairs to failed lines.

Pipe fabrications and hot piping tie-ins for installation of two new Magnaflow pumps were completed in N Cell hood during the building shutdown.

Scheduled overhaul and repairs were performed on the K2 and H3 PIV units which provide variable speed power control to the respective pulser units located in the canyon. Considerable wear on the link belt drive chains and pitting of the roller bearings was noted during the overhaul. The H3 unit, which showed the greater wear, had been in service since startup without an overhaul. The K2 unit was completely overhauled on May 27, 1957, at which time similar bearing damage was noted. FEO is presently making a lubrication study on the PIV units.

D. Analytical Performance

The laboratory provided analytical support for the Palm program and the recovery of zirconium and niobium from the waste streams. Problems such as increased sampling frequency, high radiation levels of the Fission Product samples, and uncertainty of the sample phases (organic or aqueous) were successfully overcome.

E. Improvement Performance

1. Process Tests and Revisions

A new Palm recovery flowsheet was tested which offers a number of economic and reliability advantages over the previous one.

F. Inventions and Discoveries

Nothing to report.

G. Events Influencing Costs

The switching of the Final Plutonium Cycle from the #2 Organic System to the #1 System will result in the saving of an estimated 700 units of product per year. Previously all the 2BW plutonium losses were sent to underground storage via the organic carbonate wash solution.

The PF7 canyon pump, valued at \$7000, which failed on 6-27-58, was decontaminated and repaired at a cost of \$2450.

The decontamination and repair of the failed F2 off-gas steam heater cost \$2300. This equipment has a replacement value of \$30,000.

III. ORGANIZATION AND PERSONNEL

A. Safety

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

B. Security

There were no security violations during February.

C. Personnel

D. W. Diehl, Contact Engineer, transferred to the Vallecitos Laboratory, APED.

K. L. Fowler, Supervisor - Product and Material Handling, transferred to IPD on February 1, 1959.

F. E. Owen, Analyst - Radiation Monitoring, transferred to IPD on February 1, 1959.

The following persons visited Purex during February, 1959.

Lyman R. Fink, General Manager Atomic Products Division,
General Electric Company.

W. H. Martin, Director, Research and Development, U.S. Army,
and military aides, Col. M. P. Difusco, Col. W. A. Edens, Lt. Col.
R. H. Schuler, and Major J. H. Cabiness, Jr.

Manager
Purex Operation

PR McMurray:EAF:gt

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CHEMICAL PROCESSING DEPARTMENT
REDOX OPERATION

FEBRUARY, 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

Processing operations were shutdown during the first ten days of the month to replace the left hand auxiliary hoist and monorail on the 60 ton canyon crane. Details of the hoist and monorail failure were reported in the January monthly report. During this same period the H-2 centrifuge, which failed on February 1, 1959 because of a broken motor shaft, was replaced with a new unit.

E-Metal processing was resumed on February 10, 1959 and continued as scheduled, or as feed was available, to month end. The production commitment was exceeded by four percent while operating at 40 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 stand-by. Also, during the ten day shutdown at the beginning of the month, the dissolvers were operated until all available metal solution storage tanks were filled to capacity.

The production rate during operating periods ranged from 70 to 100 percent of nominal, depending upon the availability of feed solution. The gamma ratio on both product streams remained under good control throughout the month. No tail end treatment was necessary on the uranium product, and only two E-3 batches of plutonium needed re-processing to bring the gamma ratio within shipping specifications.

Waste losses for the month averaged 0.36 and 0.55 percent for uranium and plutonium respectively. The above normal losses were apparently the result of frequent start-ups and shutdowns and the equipment flushes made during the month.

Iodine 131 emission to the 291-S stack remained under good control throughout the month. Total emission for the month was 0.09 curies.

During the ten day shutdown at the beginning of the month, ten percent nitric acid flushes were made in the 1A and 2B columns in an effort to resolve flooding condition which were experienced during

the latter part of the January production run. Sixty percent nitric flushes were also processed through the 233-S Concentration Building to further evaluate and ascertain product hold-up points in critical pieces of equipment. However, no significant quantities of plutonium were recovered which could point to excessive hold-up of product in problem areas.

During the period February 18, 1959 through February 20, 1959, the precycle columns were utilized for processing high D-9 waste solutions which had accrued from column flushing, cell drainage, etc. Five batches of D-9 waste were subsequently returned to head end make-up for reprocessing.

B. Maintenance Operation

The left hand auxiliary hoist and monorail on the 60 ton canyon crane, which fell to the 202-S Canyon deck on January 28, 1959, was replaced and the crane restored to service on February 6, 1959. As reported in January the separation was caused by the shearing of the 5/8-inch bolts which held the monorail to the crane beam. It is apparent that the bolts became weak through wear and shearing stresses to the point that they would not sustain a heavy load.

The new auxiliary hoist which was installed subsequent to the above incident has several improvements, including a centralized lubrication system, new festoon cables, rearrangement of the spare hook hoist to get nearer the cell walls, and plug-ins for the festoon cable to facilitate future replacements. The electrical connection on the impact wrench was also modified so that it will no longer be necessary to disconnect the wrench under high radiation conditions. To reduce the possibility of any similar future incidents, the number of bolts which fasten the new monorail to the crane beam were doubled in number and increased in size from 5/8 to 3/4 inch.

The H-2 centrifuge failed on February 1, 1959 when the centrifuge motor became disengaged from the unit, thus allowing the motor to sever its shaft at the motor base. Installation of a new unit, which was delayed because of repairs to the 60 ton crane noted above, was completed on February 9, 1959 and operation to date has been satisfactory.

The D-14 backcycle concentrator pump was replaced on February 27, 1959 after an extremely successful operational run of 15 months. The failed unit was a newly designed open head type pump equipped with glass bearings and was installed on November 30, 1957. Indications are that the failure was not due to a frozen shaft usually typical of this position, but rather to a galled shaft and bearing caused by a restriction in the flow of process solution past the bearing. Investigation of this condition was under way at month end.

A new helical type heat exchanger was received and installed in the right hand tube chest of the D-12 waste concentrator this month. No exchanger has been in this position since the removal of a tube bundle with a flange leak on December 5, 1958. The new unit is currently operating

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satisfactorily, however there are some indications that a minor leak still persists. At month end the equipment performance was under observation to determine the validity of the suspected leak.

On February 6, 1959, the lower section of the L-3 product concentrator in the 233-S Building was replaced. Although the old section had not failed, replacement was considered advisable because of the above normal iron, chromium, and nickel content of the concentrated product. Past experience with the L-3 concentrator has indicated this section as being the most likely source of corrosion. As an additional precautionary measure a work order has also been issued to the Hanford Laboratories Operation for construction of a lower loop section using pure titanium.

C. Waste Handling and Decontamination Operation

1. Waste Handling

Redox Coating Waste Received (S Farm)	10,423 gallons
Redox Salt Waste Received (SX Farm)	65,465 gallons
Total Gallons Boil-Off Salt Waste	128,308 gallons
Waste Received at TX (From 221-U)	28,562 gallons

Piping modifications were made this month to allow the use of the vent jet on the waste tank vapor vent system in the SX Tank Farm by the simple expedient of opening and closing valves. The revision was considered necessary in case of a vent fan failure.

2. Equipment Decontamination and Repair

a. Regulated Steam Pit

Eighteen vehicles, eight pieces of heavy equipment, and seven miscellaneous items were decontaminated during the month. A total of 139 man-hours was charged to this operation.

b. Railroad Equipment

One hundred and twelve man-hours were charged to decontamination and operational coverage for repairs to equipment. Decontamination work included locomotives No. 25 and 29.

c. 221-U Canyon

Decontamination work on the Redox A-2 dissolver, which was removed because of a leaking coil on September 1, 1958, continued this month. A boroscope inspection of the failed unit revealed two undissolved fuel elements in the tank. A hole, approximately four inches in diameter, was subsequently cut in the bottom of the tank to allow mechanical removal of the fuel elements. Although radiation readings have been reduced considerably, further cleaning will be necessary before repairs can be completed.

Repairs and run-in of the Purex F-7 pump were completed this month. No unusual conditions were encountered.

d. 221 and 224-T Buildings

Decontamination work in F and G Cells in the 224-T Building continued this month and the work is now approximately 80 percent complete.

In anticipation of the relocation of the Redox Waste Handling and Decontamination Operation from 221-U to 221-T, an equipment inventory at T Plant was started. This work is to be completed prior to receiving the 221-T, 211-T, and 291-T Buildings on a Plant and Equipment Transfer from the Power and General Maintenance Operation.

e. Miscellaneous Activity

A request for the decontamination of two waste tank trailers belonging to the Hanford Laboratories Operation was received this month. One unit has been completed with exposure rates being reduced from 6 r at surface to 15 mr at two inches. Personnel exposure rates during trailer loading and unloading operations will thus be considerably reduced.

D. Analytical Control Operation

Analytical support provided during the acid feed test runs conducted by the Redox Technology Operation during the month included the analyses of numerous special samples and also the provision of special sampling equipment for use in taking large samples of feed material. Other work was confined primarily to normal items.

E. Radiation Monitoring Operation

Two radiation occurrences and three cases of low level skin contamination were recorded during the month. The two radiation occurrences involved minor spreads of plutonium contamination which were promptly and effectively cleaned. The three cases of personnel contamination were promptly and readily reduced to non-detectable.

Work on the 202-S Building 60 ton crane involved personnel exposures ranging from 150 to 1500 mrad/hr. A total of 9800 mrem exposure was expended by personnel to complete the job.

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.

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2. Inventions or Discoveries

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

G. Events Influencing Costs

Difficulties with the decontamination and repair of failed dissolvers plus the absence of an immediate critically safe unit has prompted the acquisition of additional backlog equipment. The Power and General Maintenance Operation has therefore been authorized to proceed with the fabrication of an original size conventional dissolver. The new dissolver is expected to be ready for installation by May 1, 1959.

The extensive 202-S Building 60 ton crane repairs, which were made this month, will affect a significant increase in the Redox maintenance operating budget. However, the overall Redox operating cost for February still remains slightly under budget.

Replacement of the left hand auxiliary hoist on the Redox 60 ton canyon crane reduced the Spare Parts Inventory by \$7,240. A corresponding increase in Redox capital equipment resulted.

H. Plant Development and Expansion

1. Preparatory Engineering

The preliminary project proposal CGC-830, "Plant Modifications for Processing Non-Production Reactor Fuels," has been approved by the HAPG General Manager, and the HOO-AEC has submitted the proposal to Washington for approval.

A design order has been issued to the Facilities Engineering Operation to cover the redesign of the 233-S Building L-3 product concentrator loop using titanium in place of stainless steel. An estimate of \$1,700 has been received from the Hanford Laboratories Shop for fabricating the lower section of the loop and a work order has been issued.

2. Design and Construction Liaison

CG-686 - In-Line Monitoring Instruments - Redox

The steam condensate gamma monitor installed by construction forces was calibrated and placed in operation on February 9, 1959. On February 23, 1959 the monitor failed and investigation revealed improper gasketing had allowed water vapor to enter the electrical circuit. New gaskets were installed and the monitor returned to service.

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

Work was resumed this month. The contractor removed his drilling equipment from the well with the broken casing, No. 53, and spudded

in a new well approximately 50 feet north of the original well.

CA-783 - Additional Fire Protection, 222-S Building

The contractor, National Automatic Sprinkler Company, has made excellent time on this project and is very near completion of the facilities. Clean-up items and corrections are now in progress.

CAC-812 - Equipment Decontamination Building - 2706-W

Total funds in the amount of \$140,000 were released for construction of the facility. It is anticipated that all information necessary for bid assembly will have been forwarded to the AEC by March 2, 1959.

I. Reports Issued

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

III. ORGANIZATION AND PERSONNEL

A. Safety

There were no disabling injuries, serious accidents or incidents, in the Redox Operation during February, 1959. Seven medical treatment injuries were reported during the month.

B. Security

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

C. Personnel Activities

K. R. Ridgway, Shift Analyst, Redox Processing Operation, transferred to IPD on February 1, 1959.

Dr. Kenneth H. Newman, Consultant Engineer for the Turco Products Company, visited the Redox Waste Handling and Decontamination Operation on February 6, 1959 to discuss decontamination problems.

C. B. Foster of the Redox Operation visited the National Reactor Testing Station at Arco, Idaho during the period February 18 through 23, 1959. Sites visited included the Westinghouse Company's Expanded Core Facility, the Phillips Petroleum Company's Chemical Processing Plant and Material Test Reactor, and the General Electric Company's Aircraft Nuclear Propulsion Department. Purpose of the visit was to view and discuss mechanical equipment and methods of handling spent non-production fuels.

Chas. B. Groszwith
Manager
Redox Operation

CHEMICAL PROCESSING DEPARTMENT
FINISHED PRODUCTS OPERATION
MONTHLY REPORT

FEBRUARY 1959

I RESPONSIBILITY

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

II ACHIEVEMENTS

A. Processing Operations

Gross production of unfabricated plutonium metal was 10% over schedule in February. All shipping schedules were met without difficulty. Recuplex (recovery) production was 10% over schedule for the month. Production and shipping schedules for uranium oxide produced from both normal and enriched feed material were met without difficulty. 436,144 pounds of 100% nitric acid was delivered to the Purex plant during February from the recovery system at the Uranium Reduction plant.

Despite sharply curtailed receipts of feed material during the last half of the month, operation of the button line presented no particular problems. Several major scheduled maintenance jobs were completed including the replacement of the fluorinator tube in the 9A (continuous Task I and II) unit. The replacement was necessary due to a buckled platinum liner which was restricting flow seriously.

The operation of the Recuplex Recovery facility was satisfactory during the month. A near record output was achieved in spite of difficulty with regard to column flooding and other operating problems. Replacement of the control valve on the organic feed stream, which had been limiting, was instrumental in achieving a higher production rate. 82 kgs of material were processed during the month from 37 slag and crucible runs, plus metal dissolver material. The columns operated at 72.2% efficiency at 1460 liters/day average. Slurry loss was at 0.07% while the column waste losses were 0.4%. Concurrent with the replacement of the organic control valve mentioned above, column waste losses were only 0.14%.

The Uranium Reduction Operation started processing "E" metal at mid-month and completed the scheduled production of this material without difficulty. Reclamation of the uranium associated with old used filter bags which had been in storage for a number of years was completed during February. Approximately 14,000 pounds of uranium was recovered from this account by washing the bags in nitric acid in one of the Luckey (gas-fired) decomposition pots. These filter bags will be kept clean on a current basis in the future.

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B. Fabrication Operations

February shipping schedules for model 65 assemblies were met, however, production was 4% short of the goal forecast schedule.

Fabrication activities were devoted entirely to the preparation of 65 model assemblies. Reject rates were unusually high during the month and detracted significantly from the generally satisfactory operation of the equipment. Casting quality was lower than normal and more parts were lost due to difficulties such as voids and inclusions. Machining rejects were higher due both to mechanical failures and operator deficiencies. A significant number of 6506 parts were lost due to a defect which had not been experienced previously, namely chipped or cracked threads.

Plutonium parts were fabricated for the first time on one of the new Gorton lathes which has been installed as a part of Project CG-745. Performance to date appears to be satisfactory.

During February, it was discovered that local opinion regarding the quality of plutonium parts on arrival at the customer site, was in error. Recent information indicates that about 6% of Hanford parts require waivers of acceptance. Previously we had felt that none of the parts were being waived. The reason for the development of this discrepancy appears to be that the customer was not placing the same degree of significance on waivers as we had been doing here at Hanford. This attitude at the customer site, led to his failure to notify us of the waivers.

C. Maintenance Operations

The operation of the equipment used for plutonium metal preparation was generally fair. It was necessary to perform three major replacements; Hood 9A fluorinator tube; Task III sander elevator; and Task III induction heating coil.

Extensive equipment failures are continuing to be experienced in Recuplex. Major failures this month included dissolver condensers, R-24 and R-25; aqueous pump H-9; and concentrated feed pumps, G-47 and G-48.

The equipment employed in fabrication work functioned well during the month. Furnace element failures were reduced considerably from those experienced during January and no other significant unscheduled outages occurred.

The replacement of the by-pass vacuum header in the 234-5 Building has been completed and the new line is now in service. Cleanout of the old header has not yet started but action should begin within the next week.

The plant forces work necessary for the activation of Project CG-745 (RMC Fabrication Line) is complete. Some calibration work remains to be done, however, this will not interfere with the use of the equipment.

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C. Maintenance Operations (Cont'd)

Uranium Reduction equipment operated very satisfactorily during the month with only one calciner having to be shut down for shear pin replacement. Other maintenance work was of a routine nature. Two of the calciners were altered to permit the segregated processing of "E" metal. The ACA continuous calciner drive motors continue to be a source of trouble due to excessive wearing of the commutator brushes. It was necessary to replace complete sets on three of these motors during the month.

D. Control Operations

Analytical work proceeded routinely during the month, there being 6473 analysis made on 1224 samples. The quality of the plutonium buttons appears to be the best in several months. Only one was rejected, and that for exceeding total metallic impurities. The general purity dropped about 0.1% to 99.75% during the week ending February 23, coincidentally with lower density in the castings.

Reject rates on 6506 and 6507 shapes were 44% and 30% respectively. The metal appeared to be quite brittle and this may have contributed to the problem.

Approval was obtained from LASL inspection personnel to revise the Hanford Radiographic techniques. These changes will reduce operator fatigue and avoid increased operating cost (approximately 2 men per year) in the future through reduction in processing time.

There were 6 radiation occurrences and 32 cases of skin contamination recorded. The latter figure represents a sharp drop in skin contamination at Z Plant and an off-setting 23 cases of minor hand contamination at U Plant resulting from the handling of uranium-contaminated equipment under wet weather conditions.

Z Plant stack emission was under good control with an average of 4.4 micro curies/day plutonium being discharged.

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.

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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 March.

Project CG-723, Conversion of Recuplex to a Manufacturing facility, is awaiting AEC approval and release of additional construction funds.

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

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

Phase II of Project CA-826, Vacuum System Improvements, 234-5 Building, is being circulated for Company approval.

2. Projects - Construction

A total of four projects are in the construction phase for the Finished Products Operation. They are: CG-734, RMC Button Line; CG-767, Miscellaneous Improvements, UO₃; CGC-800, Reduction of Exposure, RMA Line; and CGC-826, Phase I, Vacuum System Improvements, 234-5.

Construction funds have been released for Projects CG-725, Liquid Waste Handling Facilities, UO₃; CGC-811, Additional Fabrication Equipment, 234-5, and CG-789, Additional Fire Protection, 234-5. Detailed design work is underway on all projects.

3. Projects - Completed

Project CG-745, RMC Fabrication Line; and CAC-798, Cribs and Test Wells, 234-5, have been accepted with major exceptions by the Finished Products Operation.

III ORGANIZATION AND PERSONNEL

A. Organization Changes

Final realignment of personnel to achieve the new Finished Products organization was accomplished this month.

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The following men took up their duties in the new position of Supervisor, Processing, Processing Operation, responsible for shift operation of Uranium Reduction, Button Line, Recuplex, and related functions:

G. E. Backman, formerly on Special Assignment to the Manager, Finished Products Operation.

E. F. Curren, formerly Specialist, Union Relations, Employee Relations Operation and more recently, in training in the Processing Operation, Finished Products Operation.

V. W. Smith, formerly Supervisor, Processing, Metal Finishing.

R. C. Alstatt, formerly Analyst, Processing, Metal Finishing.

In addition to the above, the following two men were assigned duties as Specialists, Processing, Processing Operation:

H. Q. Snyder, formerly Process Engineer, Research & Engineering Operation.

G. C. Devalon, formerly Specialist, Processing, Purex Operation.

Also, A. H. Hinkson, formerly Supervisor, Processing, was assigned as Supervisor, Fabrication, and E. T. Walsh, formerly Specialist, Development, Employee Relations Operation, was assigned as Analyst, Process, Fabrication Operation.

B. Safety Experience

No disabling injuries or serious accidents occurred during February. Three medical treatment injuries were experienced as compared to seven in January. The frequency rate decreased from 1.27 to 0.64.

All supervisors are attending the latest Safety Training Course.

L. A. Berry is presenting the material on all shifts over a five-week period, twenty sessions being required for full coverage.

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 - D).

D. Security Experience

There were no security violations experienced during the month.

E. Personnel Activities

Twenty-eight employees of the operation are currently taking the Red Cross First Aid Course.

Seven exempt employees have started Professional Business Management - I.

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F. Miscellaneous

On February 2, 1959, Mr. W. H. Martin, Director, Research and Development, Department of the Army, and five assistants visited the 234-5 Building on an inspection tour.

W. N. Mobley, Manager, Finished Products, was in Washington, D. C., from February 1, 1959, through February 9, 1959, and from February 11, 1959, through February 13, 1959, acting as a consultant on power reactors.

W. N. Mobley, Manager, Finished Products, represented HAFO in New York City on February 10, 1959, in a task force which discussed radiation protection.

P. B. Fisk, Supervisor, Product Inspection, Control, visited the Los Alamos Scientific Laboratory, Los Alamos, New Mexico, on February 9, 1959, through February 10, 1959, and on February 12, 1959 through February 19, 1959, to discuss non-destructive testing and inspection problems. On February 11, 1959, he visited the Dow Chemical Company of Rocky Flats, Colorado, to discuss the same subjects.

N. S. Wing, Supervisor, Analytical Control, visited the Los Alamos Scientific Laboratory, Los Alamos, New Mexico, on February 9, 1959, through February 13, 1959, for training in Co⁶⁰ Radiography of Weapon Shapes.

W. N. Mobley, Manager
Finished Products Operation

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**CHEMICAL PROCESSING DEPARTMENT
POWER AND GENERAL MAINTENANCE OPERATION**

FEBRUARY 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

Major excavations in the 200 East Area included widening the Industrial Burial trench an additional 9 feet, and an additional pit 70' long and 11' wide in the Trash Disposal Grounds for non-combustible material.

A burial of miscellaneous contaminated scrap material from the 221-U Canyon was completed without incident in the 200 West Area dry waste burial trench.

A 45 foot air re-circulator was installed in the 101 tank in the 241-A Tank Farm. Due to the high radiation level and the short time limit it was necessary to use two motor cranes simultaneously. The plug from the tank opening was pulled with one crane while the other lowered the re-circulator into the tank. This unit is an additional method of agitating or mixing the liquid in the underground storage tank.

Extensive efforts are being placed on weed control with emphasis on the application of CMU for soil sterilization. Of those areas designated for this treatment, approximately 90% in 200 East and 60% in 200 West are completed. Preparation of the ground also continues for use of the Dynacutter, a weed cutting device which will be used during the growing season to cut the weeds down to a controlled height.

Landlord activities included the following leasing and/or renting actions:

Building 212-P was leased to CEO for six months to conduct tests on the building walls. Full restoration was agreed upon.

Two offices in 2704-W were rented to Atmospheric Physics.

Building 292-T was rented to HLO for conducting experiments to measure the Fission Products volatilized from heated irradiated fuel elements. A clause is in the agreement which would facilitate the recall of the building for production use if required.

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Building 242-B was rented to HLO for installation and utilization of experimental prototype equipment in studying decontamination methods suitable for NFR. A clause is in the agreement which would facilitate recall of the building for CPD production use.

Operability tests on the car shaker recently installed at the coal unloading site, 200 West Area, were completely satisfactory and the unit was placed in service February 10.

Installation of a new 1,000 GPM Ingersol-Rand pump on the sanitary water system in the 283-E Building is 95% complete. The new unit replaces pump on which maintenance costs have historically been excessive.

Fabrication and installation of equipment for the treatment of process steam with a filming amine was 96% complete at month end.

The air conditioning system in the laboratories of the Purex Facility were surveyed. Evidence accumulated indicates requirements are in excess of equipment capacity. Remedial measures were recommended.

Ventilation acceptance tests of the new RMC line at the Finished Products Operation were conducted prior to the line being placed in service. Numerous tests were conducted to determine the best method of controlling helium consumption in the machining hoods.

Excessive amounts of "fines" have appeared in coal car shipments recently received in the 200 Areas. A number of cars contained an estimated 50% of "fines" as compared to a maximum of 15% permissible under the current contract. A complaint was registered with the supplier via the Purchasing Operation and correspondence received indicates the condition has been brought to the attention of the mine owner and that the situation will be corrected. Only minor improvements have been noted to date.

Fabrication of a model 3 dual pass silver reactor has continued and this unit is now 25% complete.

Installation of a stainless steel expansion coupling in the downcomer of the spare Purex F-5 fractionator was completed and the unit is now ready for service on demand.

Repair of an F-2 off-gas steam heater was completed in the Purex hot shop under SWP conditions. Leaks had developed in the head gaskets of this old type heater with bolted flange heads, and corrections were made by removal of the gaskets, plugging the bolt holes, and welding the mating flanges together. The unit is back in service and performing satisfactorily.

Further testing has been carried out on the vendor fabricated spare B-2 off-gas steam heater which failed to pass the high pressure test last month. This unit is of the new type with heads integral with the shell, and it was necessary to cut off both ends by heliarc torch. Use of a pressure type Freon leak tester verified the leak but could not identify it with a specific area. A vacuum type helium leak detector is now being

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used and at this time the leak has been localized but not located.

On-site work on the vendor fabricated Purex off-gas filter vessel has been completed with exception of the sheathing which is awaiting delivery of the stainless steel sheets.

Fabrication of a standard Redox dissolver vessel is under way and the unit is now about 10% complete. A combination of situations, including indications of impending failures at the plant, has dictated that this vessel be completed by May 15 as a crash project.

A helix type tube bundle for the Redox D-12 concentrator was fabricated, tested, and shipped to the plant. This unit is to be installed in place of the longer bayonet type which was removed because of indications that a foreign object in the concentrator did not allow sufficient clearance to seat and seal the flange.

Fabrication of the three unit stacked crucible furnace hood, including equipment and related fittings, was completed after some delay caused by major design revisions in the equipment.

Installation of the chlorinator hood at 234-5, including placement and sealing of plexiglass panels, and pressure testing of the unit, was completed.

Installation of a sheet metal floor over the grating on the "bag tower level" at 224-UA was finished this month, completing the laying of this solid type floor on all three levels of the silo section of the building. This revision will localize a contamination spread to one level whereas formerly any release of powder would contaminate the entire section.

Fabrication of 19 replacement pipe jumpers was completed - 13 being for Purex and 6 for Redox.

A study to develop practical standard estimating units for fabrication of pipe jumpers is now in progress.

The installation of the prototype chlorination hood, 234-5 Building, is complete and hot tie-in made to the calcination hood No. 6. The unit is now ready for operation.

Installation and modification of the prototype vacuum casting furnace, 234-5 Building, as specified on the original work order is complete.

Additional modification will be made to the equipment as soon as drawings are completed.

Phase I of the modification of the 26" vacuum system, 234-5 Building, is complete. This included the installation of 3", 4", and 6" stainless steel pipe by-pass headers for the present system. Eleven sight glasses were installed in these headers. Due to criticality problems, it was necessary to remove the 30' of 6" pipe and replace it with 4" pipe. During the pressure test of the system, a split was discovered in a section of 3/4" line. Thirty-five feet of this 3/4" line was replaced when inspection indicated that it all had the same heat numbers. Seven hot tie-ins

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were made to the existing header with no loss of radiation control.

The steam operated water still in 222-U Building failed due to corrosion and was replaced with a new unit which is electrically operated.

The reheat coils (three sets) in the No. 3 unit in the ventilation system in the 222-S Building were replaced. Replacement was necessary when several leaks developed.

Several modifications were necessary before the 280-ton extrusion press in Cell 1, 231-Z Building could "go hot." Modification to the piping and ventilation systems was made to control the temperature of the equipment. Control systems were fabricated for the ram, billet loader, and furnace door. A monorail, storage cabinet, and hoists were installed for changing the billet container.

In connection with the Whitney Program two electronic systems were custom built in the Instrument Shop to be used to analyze results of plutonium experiments in the internal friction equipment. Also, a temperature control and recording system was installed.

III. ORGANIZATION AND PERSONNEL

A. Safety and Security

No disabling injuries were experienced by the Operation.

No security violations were incurred during the month.

B. Personnel Activities

The Section Manager fulfilled two speaking engagements during the month - the Chinook Professional and Business Womens' Club in Yakima, and a Youth Banquet at Grandview.

A technical paper authored by J. H. Palmer, titled "Developing Fire Resistant High Efficiency Air Filters," was prepared for release to trade journals.

P. E. Cunningham was appointed Chairman of the Parsonage Maintenance Committee of C.U.P. Church in Richland.

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

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CHEMICAL PROCESSING DEPARTMENT
FINANCIAL OPERATION

FEBRUARY, 1959

I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Product Cost

A revised Maintenance Assignment ticket form was prepared by the Procedures Specialist, reviewed with, and accepted by, the interested parties during the month. The revised form which will be used in connection with March business is expected to simplify the key punching operation and reduce the possibilities of error, both in filling out the ticket by maintenance employees and in the key punching operation.

At a meeting attended by representatives of General Maintenance, Transportation and Product Cost, CPD was relieved of rental charges totaling \$12,400 annually for certain pieces of heavy equipment. This cost reduction is the result of an integrated effort of both Product Cost and General Maintenance personnel.

Man-day liquidating rate studies were completed for Facilities Engineering and Research and Engineering Operations. No rate changes were made at this time for the Facilities Engineering Operation; however, Research and Engineering's Advance Process Development Operation's rate was reduced to \$54 per day for all liquidations, previously the rate was \$54 for laboratory assistance and \$60 for all others, effective with March business.

The personnel budget for FY 1960 and FY 1961 was submitted to, and approved by, the HAPO General Manager.

Considerable effort was expended in examination of all available information concerning Spare Parts and presentations of this information to management. The purpose of this study is to keep management more fully informed as to the status of Spare Parts held for the various CPD components and obtain an indication of the year-end charge necessary to bring the reserve to the required level.

An extensive study is being conducted to substantiate a proposal for changing the method of calculating B-PID.

B. Personnel Accounting

For the first time at HAPO distribution of weekly salary checks was made by plant mail on February 13. Utilization of this service will free Personnel Accounting personnel for other pressing work.

The number and amount of Contract and Savings Bond Account checks issued during February are as follows:

	<u>Number of Checks</u>	<u>Amount</u>
Contract Account covering payment of FICA Taxes, Federal Withholding Tax, Union Dues, Insurance premiums, and other payroll deductions.	46	\$270 083.96
U. S. Savings and Stock Bonus Account covering purchase of U. S. Savings Bonds and refund of unused balances, plus refund of Savings and Security contributions.	11	52 628.38

Statistics - Salary Payments

	<u>Gross Payroll</u>		<u>Overtime Payments</u>	
	<u>February</u>	<u>January</u>	<u>February</u>	<u>January</u>
Nonexempt	\$565 835*	\$ 699 047**	\$11 373*	\$13 684**
Exempt	326 707	330 870	2 850	2 894
Total	<u>\$892 542</u>	<u>\$1 029 911</u>	<u>\$14 223</u>	<u>\$16 578</u>

* Payments cover a four-week period.

** Payments cover a five-week period.

C. General Accounting

During February General Books issued 21 checks totaling \$4,771.84. Of the 21, 7 checks totaling \$74.88 were for replacement of contaminated personal effects.

The January General Ledger Trial Balance was delivered to Contract Accounting one day early. The reports of Travel and Living Expense were delivered on schedule.

A study is currently being conducted to determine the feasibility of distributing transportation tickets to individuals traveling on Company business at the same time the Cash Advance is made.

A procedure for the handling of carrier refunds made directly to employees while traveling was reviewed and revised. This process resulted in the reduction of the number of internal procedure steps from ten to four and eliminated the necessity of Traffic writing letters to carriers requesting refunds, which have previously been made.

The General Books procedure for the issuance of checks has been revised to eliminate use of the voucher request.

As of January 31, 1959, expenditures of \$10,983,700 and commitments of \$642,258 had been incurred against active CPD projects with \$15,668,037 authorized funds.

No new projects were authorized by the AEC during February, 1959. The G.E.-managed portion of CAC-812, Equipment Decontamination, Building 2706-W, was increased by the AEC to \$27,000.

Physical Completion Notices were received for Projects:

CA-513-E	Expansion of 200 Area Facilities
CG-722	Utilization of 224-U Acid at Redox and Purex
CA-750	Office Annex to 234-5 Development Laboratory

Appropriation Requests approved during February amounted to \$57,202 for the purchase of the following:

	<u>Operation</u>	<u>Cost</u>
Oxygen and CO ₂ Analyzers	P&GM	\$11 844
Diversion Box Catch Tank	Purex	16 643
Vertical Leaf Filter	R&E	6 515
Alpha Hand Counters - Transistor Type	FPO	15 200
Shearing and Forming Machine	P&GM	7 000
		<u>\$57 202</u>

D. Auditing

A formal audit report was issued covering the findings and recommendations relating to the audit of the G.E. Insurance Plan.

Audits in progress at month end are as follows:

- a. Audit of General Accounting - Cash and Travel.
- b. Audit of G.E. Savings and Security Plan.

Meetings were held with AEC and G.E. Security and Audit personnel to firm up a new procedure for the control and accountability of Material Passes.

Discussions were held with Purchasing and Stores personnel to establish a more economical method of accounting for pre-mixed arc gas purchased and utilized under the terms of Special Agreement SA-32 with Union Carbide Corporation.

E. Procedures

At the request of the Manager, FEO-Project Engineering Operation, a study of procedures of their Material Control group was initiated on

January 27. The specific major point of interest is control of CPD material and equipment after delivery to the Hanford site. The study necessarily involves both CPD operations and those of R&UO and CEO involved in procurement, payment, inspection and warehousing of CPD material and equipment. Several meetings have been held with personnel of R&UO Procedures, Accounts Payable, and/or Inventory Systems and Control Operations to attack problems of (1) placing prompt notification of receipt of CPD materials in the hands of the Material Control group, and (2) duplication of effort in the inspection of engineered materials and equipment as procured. Report summarization of the results of this study are scheduled for April.

F. Measurements

Productivity reports for Redox and Purex covering the fourth quarter of CY 1958 and total CY 1958 were prepared and issued.

Cost and production analysis reports for Purex, Redox and Finished Products comparing actual cost and production with forecast were prepared and issued to interested Section Managers.

III. ORGANIZATION AND PERSONNEL

A. Safety and Security

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

B. Reports Issued

HW-59044	Redox Productivity Report	GH Temple
HW-59045	Purex Productivity Report	GH Temple
HW-59097	CPD Operating Report	MM McDonald
HW-59148	Essential Material Inventory and Consumption Report - January	GE Dyreng
HW-59224	Unit Cost Information - January	BM Dobbs
HW-59254	Redox Cost and Production Analysis	GH Temple
HW-59255	Purex Cost and Production Analysis	GH Temple
HW-59256	Finished Products Cost and Production Analysis	GH Temple
HW-59423	Off-Site Transfer Voucher	KG Grimm
CLVI-630	CPD Cost and Production Analysis - Jan.	KG Grimm
TS-RD	Product Cost Report - January	BM Dobbs

Manager - Finance

CHEMICAL PROCESSING DEPARTMENT
FACILITIES ENGINEERING OPERATION

February, 1959

I. RESPONSIBILITY

The Project Engineering Operation was assigned responsibility for screening requests for removal of equipment from 221-U, 271-U and 291-U Buildings.

II. ACHIEVEMENTS

PUREX OPERATION

A. Research and Development

Gas Processing

A report was prepared for publication compiling the data collected during the review of Case III of the krypton and xenon recovery facility proposed for Purex. In the report, the calculation method used to determine the performance of concentric tube thermal diffusion columns for the separation of xenon isotopes was presented.

Magnetic Flowmeter for Jumper Service

The prototype installation of a magnetic flowmeter on the 2AF stream has continued to operate satisfactorily this month.

Means of procurement are being reviewed and specifications are being prepared for a magnetic flow transmitter which would be suitable for lines carrying high gamma radiation activity. It would be desirable to install this type metering service on the HAF stream.

pH Meter Application

The fabrication of a jumper has been completed for installing a pH probe as a prototype in the E-3 tank. Other wiring and instrument installation work for the test is in progress.

B. Process Technology

Titanium Tube Bundles for Purex Acid Concentrators

Preliminary process specifications for a titanium reboiler for Purex

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acid concentrators were prepared to serve as the basis for the negotiation of a design-development contract for design only or for competitive proposals for fabrication. A letter was issued defining the advantages of the former course of action. A more highly optimized design and greater freedom of action in the subsequent procurement of the reboiler would be afforded by negotiating a contract for design only.

Decontamination of Vapor from E-F6 Concentrator

A recent Purex Technology suggestion proposed the removal of E-F11 concentrator from service and converting E-F6 concentrator to #1 acid waste service. At present, condensed overheads from E-F11 are routed to E-F6 where a second stage of evaporation is performed to achieve adequate vapor decontamination prior to rectification of F-6 overheads for acid recovery. If E-F11 is taken out of service, an over-all decontamination factor of about 7×10^5 must be obtained in E-F6 to limit the activity of recovered acid and fractionator overheads to present values.

The installation of a demister vessel mounted on top of the E-F6 concentrator is considered promising for decontamination of F-6 overheads prior to rectification in the in-canyon fractionator, T-F5. At present, fine tantalum wire is considered the most promising material for the demister filter material. Several vendors have been contacted for recommendations on optimum demister design for this application.

An alternate to the above process re-routing merits consideration. In the event that the HAW stream is routed to E-F6, the E-F6 bottoms might then be discharged to E-F11, if adequate routings can be obtained, and further reduction of high level waste volumes could be obtained through the further removal of nitric acid from the LWW stream. This would have two primary advantages in 1) reducing the costs for high level waste storage and 2) concentration of wastes for eventual fission product recovery.

C. Plant Engineering

Instrument Air Compressors

Air pressure was increased from 78 psi to the required 90 psi operating range by increasing seal water flow to the compressor. One compressor is now able to supply plant instrument air requirements. Test data sheets and instructions were prepared to obtain information for complete performance curves.

D. Project Activities

CA-513-E Purex Facility - Expansion of 200 Area Facilities

The Physical Completion Notice on Project CA-513-E was issued on February 9, 1959. The estimated final cost of the project was \$2,340,784 indicating an underrun of authorized funds of approximately 3 percent. Completion of the minor exceptions is underway.

REDOX OPERATION

A. Plant Engineering

Improved F-1 Vessel Design

Design improvements were made to the F-1 vessel so that the coils can be removed with the top portion of the vessel. This change in design will allow easier decontamination and repair in the event of coil failure. An order is currently being placed for a unit of this design as a process spare.

L-3 Concentrator Loop

Redesign of the L-3 concentrator loop was started by the Drafting Operation. This loop is being designed for fabrication from titanium instead of stainless steel to improve corrosion resistance of the equipment, thereby reducing corrosion contamination of the product. Preliminary drawings of the lower section are expected to be ready for shop estimating purposes the week ending March 6, 1959.

FINISHED PRODUCTS OPERATION - Z PLANT

A. Research and Development

Chemical Processing and Reduction

Scoping Task I, II, and III Equipment

Scoping of the new Task I, II and III equipment has continued and the Task I and II portion is essentially complete in scope concept. Further scope drafting is required, however, and is continuing within the limits of the manpower available.

Continuous Centrifuge

The design of the 6 inch continuous centrifuge has been reviewed with the Bird Machine Company and verbal agreement has been reached with them to design and construct the centrifuge. Functional specifications

for the unit have been prepared and are now ready for transmittal to Purchasing.

Weapons

Design changes were initiated near the end of the month to convert the R&E prototype continuous casting unit from a tilt-pour crucible to a bottom-pour crucible. Along with this conversion, the turntable inside the furnace will be removed and the pouring crucible and its induction coils designed so they may be removed from a flange on the upper part of the vacuum chamber.

B. Process Technology

E-4 Process and Laboratory Exhaust System - 234-5 Building

Drawings were prepared which show the current E-4 exhaust system, including duct routings and sizes, test parts, controls, and filters. These drawings were prepared for use in analyzing potential needs for budgeting system improvements, and as a complete system description for reference use.

C. Project Activities

Project CG-734

The Project Acceptance Test Procedure, ATP 2106, has been approved and is being issued.

Design has been completed for a new Task III crucible and pressure vessel to yield a 3 inch diameter cylindrical button with sanding since production of both alpha and delta phase buttons is anticipated. Reduction tests indicate that alpha phase buttons can be made without sanding; delta phase reductions require sanding. Design has been completed for the installation of a continuous dissolver for massive metal in the presently-unused portion of Hood HC-42.

A decision was made during the month to provide shielding at the walls of all process hoods on this project in order to allow processing of material exposed in the range of 800 to 1000 MWD/T. Scope is progressing on methods for applying this shielding and at the present time planning is based on adding one inch of high density lead glass over the lucite panels and providing glove port shielding covers. This amount of shielding is expected to reduce gamma dose rates by a factor of ten. Neutron shielding would also be added at those places along the hoods that do not require a large amount of visibility and accessibility.

A. Research and Development

NPF Reprocessing

A preliminary cask acceptance criteria, Appendix C - HAPO was completed and forwarded to the AEC together with comments on the proposed AEC Licensing agreement with prospective power reactor operators. It is intended that these criteria, considerably more detailed and comprehensive than those seen to date from other sites, will serve as a design basis for the receiving and transfer facility. A preliminary draft covering the scope design basis for NPF reprocessing was completed. This report summarizes the basic concepts upon which information agreement is needed before definitive scope design work may proceed.

Fission Product Recovery

The preliminary design of megacurie Cerium-144 collection and shipping containers was completed. The collection tube envisioned is an in-line filter apparatus approximately 8 inches in diameter and 24 inches long. The internal filter is a star shaped sintered stainless steel filter upon which a layer of cerium sulfate approximately 3/16 inch thick is collected. After the cerium precipitate is collected and dried the tube is sealed and placed in a shielded shipping cask.

Two possible methods for dissipating heat from the shipping cask were investigated. One method made use of a natural refrigeration cycle using Freon-113 as the coolant. In this case heat is transferred from the filter tube to a water layer in the cask annulus and then to the cooling coil containing the Freon-113. The other method made use of the natural convection circulation of the annulus water to cool the water in an internal air cooler.

While the second method involved a simpler method than the first, it does present the hazard of bringing radioactive material from the inside of the cask to the outside in the event of a filter tube failure or leak.

In both cases it was calculated that the equilibrium temperature of the cerium sulfate would be about 1000° F. Data on cerium sulfate indicate no change in chemical composition other than the loss of water of hydration up to 1580° F. Thus, this appears to be a feasible scheme for shipping large amounts of fission products.

Waste Storage

Dr. Frank Neumann, Seismologist from the University of Washington, was invited to HAPO in accordance with Consultant Agreement CA-204,

February 4, 1959. Regions of incomplete seismological data were defined and a tentative scope is being prepared by Dr. Neumann to provide a study and test program during 1959. The program will establish earth vibration characteristics at any selected site, instrumentation for quake intensity calibration, quake occurrence potential and expected intensity.

After the seismology and geology have been defined as best as current data is available, a structural engineering evaluation will be made of pertinent HAP0 facilities to define their potential soundness.

B. Process Technology

Replaceable Air-Lift Circulator

The prototype circulator was installed in self-boiling waste storage tank 241-A-101 on February 11, 1959. The 101-A tank was self-concentrating at a rate of $3\frac{1}{2}$ gallons per minute at the time the installation was made.

C. Plant Engineering

Management Practices - General Maintenance

A Job Ticket form was designed in co-operation with Financial and was placed in use this month for buildings and grounds work. It was designed to fit the requirements of the entire General Maintenance Operation. Job description write-ups were prepared for the new jobs under the revised work order control procedures, to be followed when the maintenance improvement program is put into effect. These job descriptions also allow for the use of a Job Ticket system.

D. Project Activities

Project Cost Information as of February 15, 1959:

Total Authorized Funds - 23 Active Projects	\$15,674,000
Total Cost-to-Date	11,218,000
Commitments and Open Work Releases	946,000
Unencumbered Balance	3,510,000
Costs Charged to above Active Projects, January 18, 1959 to February 15, 1959	392,000

Projects dropped from Active status during this period were:

<u>Project Number</u>	<u>Authorized Funds</u>	<u>Total Cost</u>
CG-718	\$50,000	\$42,727
CA-750	8,100	6,517

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HW-59434 **DECL**

AR-59-CFD-32 - High Level Radiation Alarms

Development and design work is in progress on high level radiation alarm instruments for use as criticality incident detectors. A total of 35 instruments will be fabricated for Purex, Redox, Finished Products, and 231-Z Facilities.

A prototype instrument will be fabricated early in March and component procurement for quantity production has started.

III. ORGANIZATION AND PERSONNEL

A. Personnel

L. A. Hedenstrom, Engineering Designer, was transferred to the Drafting Operation, FPD, effective February 1, 1959.

B. Safety

The FEO Safety and Housekeeping Inspection Committee completed inspecting the buildings and offices during February. Corrective action has been initiated on the items listed in the reports.

C. Inventions

None

D. Reports Issued

- HW-58969 - "Waste Disposal for CFD, FY-1961 Plant Acquisition and Construction Budget, Study No. 1," by H. W. Stivers dated January 30, 1959.
- HW-59225 - "Recovery of Plutonium From Miscellaneous Materials and Equipment - FY-1961 Plant Acquisition and Construction Budget - Study No. 2," by H. A. Moulthrop, dated February 10, 1959.
- HW-59161 - "Budget Study FY-1961 Plant Acquisition and Construction Budget, Radiation Detection Instrumentation for High-Level Incidents," by M. T. Slind dated February 10, 1959.
- HW-59181 - "New Recuplex Facility - Z Plant, FY-1961 Budget Study Report," by D. E. Braden dated February 6, 1959.

- HW-59243 - "New Assembly Facility - Z Plant, FY-1961 Budget Study Report, by E. O. Swain and J. R. Fritz.
- HW-59366 - "Budget Study Report, New Button Line Facilities for High Exposure Plutonium," by J. W. Kolb and W. A. Graf, February 27, 1959.
- HWS-6745 - "Specifications for 6" Centrifugal Separator for 234-5 Building," by H. J. Bellarts.
- HW-59057 - "Budget Study Report FY-1961 - E-Metal in Purex," by L. D. Gustafson, January 30, 1959.
- HW-59061 - "Budget Study Report, FY-1961 Plant Acquisition and Construction Budget, Palm Recovery - Redox," D. T. Crawley and R. J. Pence, February 13, 1959.
- HW-59100 - "Budget Study Report FY-1961 Plant Acquisition and Construction Budget, New Separation Plant Definitive Process Design," L. R. Michels, February 10, 1959.
- HW-59125 - "Budget Study Report - FY-1961 Plant Acquisition and Construction Budget - Nitric Acid Removal from Purex 1WW by Reaction with Formaldehyde," M. L. Oldfather, February 1959.
- HW-59201 - "FY-1961 Plant Acquisition and Construction Budget, Reuse of Purex Coating Removal Solution," J. M. Gerhart, February 19, 1959.
- HW-59252 - "Budget Study Report - FY-1961 - Redox NPR Fuel Reprocessing," L. D. Gustafson, February 17, 1959.
- HW-59345 - "Rough Draft - Basis for Scope Design of a Non-Production Fuel Reprocessing Facility," M. L. Oldfather, February 25, 1959.
- HW-59167 - "FY-1961 Budget Study, Process Equipment Decontamination, Inspection and Repair Facilities," by D. A. Snyder, February 9, 1959.
- HW-59160 - "Emergency Communications System," by J. F. Kane, February 6, 1959.
- HW-59154 - "Services - 234-5 Building," by R. C. Tabasinske, February 6, 1959.

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HW-59063 - "Budget Study - Additional Facilities to Permit Segregation of NPF Recycle - Redox," by A. C. Morgenthauer.

Letter, J. T. Christy from H. P. Shaw, "Hanford General Cask Acceptance Criteria for Power Reactor Spent Fuel Elements," February 13, 1959.

E. Trips

A. C. Morgenthauer attended the 11th Annual Industrial Engineering Institute at Berkeley, California February 6 - 7.

R. A. Ciccarella visited the Bird Machine Company, South Walpole, Massachusetts, on February 9 and 10 to provide them with more complete data on the modifications that would be required to the proposed 6" continuous centrifuge.

R. A. Kennedy visited the NRTA during the period February 19-24 for the purpose of reviewing fuel handling techniques and facilities. Visits were made to the ANP facility of General Electric, Expanded Core Facility of Westinghouse, and MTR and ICPP of Phillips.

F. Visitors

Mr. John Dickinson, Linde Company - Seattle, Washington, visited the 200 Area Shops February 13 to discuss tungsten-arc cutting procedures and equipment, and welding equipment for remote applications.

Mr. C. D. Wegener, National Cylinder Gas Company - Portland, Oregon, visited the 200 West Area Shops February 26 to discuss automatic welding equipment and stainless steel electrodes.

Mr. F. P. Robinson, General Electric Company - Pasco office, visited the plant February 24 to inspect ACA motors.

Mr. R. E. Myers, Betz Laboratories, paid regular monthly visit on consultant contract for process steam treatment, February 26.

Mr. Sheldon Dunning, Northwest representative for the Amer-coat Co. visited the area to inspect the Amer-coat paint on the viewing windows received for project CG-734.

Mr. Eustace Vynne, Jr., representative of Cascade Distributing Co., Seattle, Washington, visited the Purex plant on February 24 and 25 to aid in obtaining improved performance of the drilling operations on Purex cell cover bail replacement.

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Dr. Frank Neumann, Seismologist from the University of Washington, visited HAPO February 4, 1959, in connection with Consultant Agreement CA-204.

Facilities Engineering Operation

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CHEMICAL PROCESSING DEPARTMENT
RESEARCH AND ENGINEERING OPERATION

FEBRUARY, 1959

PUREX PROCESS TECHNOLOGY

Head End

Radioiodine emissions were reduced from 2.8 to 0.7 curies per day by the addition of 5×10^{-4} M mercuric nitrate to the metal storage tanks. For the major portion of the month the ammonia scrubbers have been out of service because of a failure in the effluent line to the crib.

During the neptunium recovery operation (see Neptunium Recovery) initial studies of fission product recovery from IWW were made, utilizing a head end centrifuge to separate gamma activity bearing solids from IWW. The first test tentatively established the upper limit of solids content of IWW as 5.1 volume percent for a 7.5 to 9 minute centrifuge holdup at 1000 G centrifuge force. Based on preliminary analytical results, three 0.5 M oxalic acid leaches of the cake cumulatively removed 22, 32, and 35 percent of the total zirconium but only 11, 18, and 20 percent of the zirconium-niobium. Approximately 1.5 megacuries of fission products were leached from the cake. The plutonium and neptunium contents of the leaches were negligible.

In a second test a cake with greater gamma radiation (about twice that of the first) was obtained during centrifugation of an equivalent amount of IWW. During and after skimming (with a small, if any, loss of cake) the radiation readings increased from 530 to 550 to 580 R/hr., thus indicating a removal of liquid shielding the cake followed by self-drying of the cake. The clarified IWW was subsequently used for a test in the IWW Anion Exchange Unit (see Waste Treatment and Acid Recovery).

Solvent Extraction

Normal uranium processing was conducted at a 2.7 capacity factor for 45 percent of the month, after which a neptunium recovery operation was performed. During normal processing, operation was smooth and testing was confined to minor process changes designed to improve neptunium accumulation in the 3WB. Typical performance data for this period are summarized below:

Cycle	Log Decontamination Factor, dF		Instantaneous Loss, Percent	Recycle, Percent	
	Plutonium	Uranium	Plutonium	Plutonium	Uranium
First	4.5	4.4	< 0.02	-	-
Final	3.1	2.3	0.003	0.62	4.5
Exchange	> 0.6	-	-	1.7	-
Overall	> 8.2	6.7	< 0.023	2.32	4.5

Decontamination performance was satisfactory except for a short period just prior to

The principal points of the scheme were as follows:

- (a) Only the 2A and 2B Columns were used. Adjusted 3WB was pumped directly into the 2A Column which used IOO for 2AX.
- (b) The flowsheet featured sodium dichromate in the feed for adjustment of neptunium to the VI valence state, and hydrazine in the 2BX for reduction of neptunium from valence VI to V. This latter effect produced partitioning from uranium and plutonium.
- (c) As in previous runs, the 2BP stream was entirely recycled to the 2AF tank to obtain maximum fission product decontamination plus adequate uranium and plutonium separation.
- (d) The 2AW was returned for use as future 3WB, and the 2EW was routed to the HAO Tank.

Prior to the actual start of the recovery operation on February 22, several new routings were installed as follows: a) 3WB to the 2AF Tank; b) IOO (No. 1 System solvent) to the 2A Column for use as 2AX; c) 2EW to the HAO Tank; and d) 2BP temporarily to the 2AF Tank.

During the course of the run some process difficulties were encountered. The major ones were:

- (a) Initial 2EW neptunium "losses" were as high as 100 percent. A reduction in the 2BX acidity from 1.0 to 0.5 M HNO_3 , plus an adjustment which lowered the 2AX flow rate (160 percent high as a result of instrument failure) dropped the loss to ten percent or less.
- (b) After the synthetic 3WB was introduced to the 2A Column, decontamination from residual gamma activity (60 percent Zr-Nb - 40 percent Ce) was initially nil. When the 2A Column scrub section L/V was increased from 0.25 to 1.0, the decontamination performance was increased to levels approximately equivalent to those experienced with previous flowsheets.
- (c) The capacity of the 2B Column (operating as an IBX Column) was only fifty percent the planned rate; however, by operating the 2A Column streams at 50°C the capacity was increased to 85 percent.

Principally because of the problems noted, neptunium product removed from the plant was only 0.13 kg out of 0.71 kg processed, representing 19 percent recovery; 80 percent of the neptunium was returned to the backcycle system via the 2EW. Fifty percent of the fission product activity in the final neptunium product was cerium 144.

Waste Treatment and Acid Recovery

During the normal processing period the average IWW flow slightly exceeded the flowsheet rate, and thus the neutralized IWW was 60 gallons per ton of uranium. Other waste volumes sent to self-concentrating underground storage tanks were increased by shutdown activities and averaged 524, 13, and 158 gallons per ton of uranium for solvent washes, centrifuge cleanouts, and cell drainage, respectively.

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shutdown when the HA Column saturation was lowered slightly to reduce the neptunium loss via the HAW. Uranium product produced during this latter period contained fission products equivalent to 110 percent of the 2.0 gamma ratio specification but was blended so as to meet shipping specifications. Control of plutonium and uranium in the waste streams was excellent, and no high losses occurred.

Items of interest which occurred during normal operation included the following:

- (a) No adverse effect on plant performance resulted when the temperature of the 3WB stream operated at 74°C instead of 50°C for an undetermined period of time because of a faulty instrument.
- (b) The 2D Column performance was not affected when the 2DIS-HNO₃ addition was reduced from 8.5 to 6.6 flows.
- (c) A heel of waste uranium rework was processed through the Final Uranium Cycle with no detectable effect on the process.

Neptunium Recovery

Neptunium recovery was excellent during normal processing, and approximately 0.85 kilograms had been accumulated in the 3WB system at the time of plant shutdown for a special recovery run. Several flowsheet changes were made (from the conditions described in the January report) which reduced neptunium losses to the HAW and 2EU.

The more successful of these were:

- (a) After the neptunium loss increased to greater than 100 percent of the neptunium in the HAF due to high HA Column uranium saturation, a decrease in HA Column saturation and an increase in HAW acidity (accomplished by raising the HAF acidity from 0.66 M to 1.1 M) reduced the loss to a normal 10 - 15 percent of virgin neptunium introduced into the column.
- (b) Neptunium loss to the 2EU was reduced two-fold by a ten percent higher L/V in the 2D Column scrub section and a reduction of the 2DIS-HNO₃ addition rate from 8.5 to 6.6 flows.
- (c) No significant change in neptunium losses occurred when the sodium nitrite addition in the IOO was decreased from 0.001 M to 0.0005 M, and the nitric acid concentration was increased from 0.009 M to 0.016 M.
- (d) No effect on neptunium loss was noted when a batch of IWW was reworked for neptunium recovery.

During the time the uranium rework was processed through the Final Uranium Cycle, the neptunium loss in the 2EU was three- to five-fold above normal. The increased loss was attributed to the following: a) a decreased L/V in the 2D Column scrub section; b) poor uranium saturation control; and c) poorer quality of the No. 2 Solvent System solvent.

The neptunium recovery run performed in February utilized an entirely new and simplified processing scheme to separate accumulated neptunium from the 3WB.

The coating waste sent to storage was 231 gallons per ton of uranium. Overall plutonium and uranium losses for the month were 0.19 and 0.06 percent, respectively. Coating waste losses for plutonium and uranium accounted for 30 and 47 percent of the overall losses, respectively.

The seventh concentrator tube bundle failed after thirty months of service in the HCP Concentrator and seven months in an acid concentrator. In addition, a hydrostatic test of the No. 2 Acid Concentrator revealed a small leak (possibly a corrosion failure) in the shell near the overflow. Since this concentrator is normally operated with the liquid level below the overflow, no difficulty in operation is anticipated.

In a test to determine the decontamination achieved in the No. 1 Acid Concentrator tower, the No. 2 Acid Concentrator bottoms were transferred to the receiver tank and sampled. The decontamination factor determined from the analysis was 2.3×10^3 . On the basis of 500 - 1000 uc/gal gamma activity in the recovered acid, the No. 2 Acid Concentrator tower decontamination factor is in the 200 to 400 range.

Approximately 900 gallons of centrifuged IWW were pumped through the prototype IWW Anion Exchange resin column at a nominal rate of 1.5 gallons per minute to test operability of the equipment. Although the bed slowly plugged or packed over a $1\frac{1}{2}$ to 2 hour period, the flow rate was restored by partial fluidization of the bed which was accomplished by temporary periodic reversals of the flow through the bed. Data for calculation of plutonium recovery was inconclusive, but recovery efficiency was expected to be low because the acidity of the feed was only 3.9 M; the test was designed to study mechanical, rather than process performance.

Self-concentration continues in tanks 241-A-101, 102, and 103 at 3.3, 16.4, and 1.3 gallons per minute, respectively. Probe measurements indicated the supernate pH in these tanks to be 6.0, 7.5, and 9.5, respectively. After adding excess caustic to tanks 101 and 102, probe readings were 9.5 and >12.0 , respectively.

Installation of a replaceable recirculator through the 42-inch nozzle of Tank 101 was accomplished without incident; however, from the nature of the vapors released from the tank while the nozzle was open, it appears that boiling at 3.5 gallons per minute is accompanied by minor periodic steam releases. No significant change in sludge depth during the past four months was detected in either Tank 101 or 103 by recent measurements.

The document, "Purex Test Program - January through July 1959", HW-59035, was issued during the month.

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REDOX TECHNOLOGY OPERATION**DECLASSIFIED**Dissolution

Only the A and B dissolvers were used throughout February. Approximately 55 tons of E-metal, cooled an average of 277 days, were dissolved at a sustained rate of 0.98 ton per day per dissolver. The percent decrease in sustained dissolution rate, from that attained in January, resulted primarily from (1) an increase in the proportion of solid slugs from a negligible amount to 50 percent of the metal charged, and (2) a decrease in exposure of the metal processed during the month from 800 to 550 MWD/ton.

Evaluation by Hanford Laboratories personnel of recent E-metal criticality experiments at ORNL revealed the safety factor provided by randomness of slug distribution to be variable and considerably less than previously allowed. Elimination of randomness from the criticality calculations thus necessitated a reduction in the allowable charge size from 3.0 to 1.75 tons. It is anticipated that the sustained dissolution rate will be decreased approximately in proportion to the change in charge size. Since the charge size averaged 2.39 tons in January and February it is estimated the dissolution rate in March will average between 0.7 and 0.8 ton per day per dissolver.

A plant test is scheduled in March to confirm the behavior of boric acid in the extraction system. The inclusion of boron, in excess of 1 gram per liter, in all solutions entering the dissolver should permit doubling the maximum charge size allowed in the absence of boron.

Solvent Extraction

The HA Column was operated on the following acid flowsheet for twelve hours in a continuing program aimed at defining neptunium recovery technology:

HAF:HAIS:HAS:HAX = 130:54:25:392

Stream	Molarity				Hexone
	<u>UNH</u>	<u>ANN</u>	<u>HNO₃</u>	<u>Na₂CrO₇</u>	
HAF	1.51	0.43	+0.2	0.1	
HAIS	-	2.5	-0.3	-	
HAS	-	1.3	+0.2	0.01	
HAX	-	-	+0.1	-	100%

Incomplete laboratory data indicate an appreciable reflux of neptunium with waste losses in the range of 3 to 5 percent, comparable to those obtained in January with only the HAX acidified to 0.2 M. Failure of the HAIS back-cycle pump at the start of the test necessitated introduction of the acid-deficient

HAIS directly into the column, rather than line-mixing with the feed, thus increasing the likelihood of reflux and waste losses.

The fission product activity of the HCP stream, as indicated by the in-line gamma monitor, averaged approximately seven-fold higher than normal throughout the acid run. The fission product activity of the final uranium product, after the two additional standard acid-deficient extraction cycles, was only twice the normal value and was within specifications. The plutonium stream, however, after one acid-deficient and two acidic extraction cycles, contained five times the normal fission product activity, principally ruthenium.

The HAIS pump (number 14) failed after approximately 5300 hours of service, twice the life of any previous HAIS pump. This performance is even more significant when compared with HAIS pumps numbers 5 through 13 which had service lives averaging 405 hours. The intentional recycle of uranium to the HAIS stream, 0.05 M, to prevent formation of an iron-aluminum-chromium precipitate is considered the principal factor in extending the pump life.

Concentrated waste was processed through the extraction system, after two hours of digestion at 80 C, employing the following HA Column flowsheet:

HAF:HAS:HAX = 300:60:100

The uranium and plutonium recoveries averaged 97 and 95 percent, respectively, reducing the over-all waste losses for the period to 0.012 and 0.04 percent. Attainment of a first cycle log decontamination factor of 4.1 assured that the waste rework flowsheet can be employed concurrently with normal feed processing.

The discovery that the sodium concentration in the UO_3 from calcined E-metal uranium nitrate was averaging 300 ppm parts uranium, necessitated a change in flowsheet despite the fact that spectrographic analyses of the final UNH product appeared normal. Subsequent to increases of 67 percent in the 2DS stream and 8 percent in the 2DX stream the sodium concentration of the UNH product was reduced to 20 ppm parts uranium. Despite the resultant decrease in 2DW salt strength to 0.45 M aluminum nitrate the uranium recycled from the 2D Column averaged only 5 percent.

Product Concentration

Since the advent of E-metal processing, operation of the plutonium product concentration system at low rates has increased the metallic impurities of the concentrated product stream in approximately inverse proportion to the rate of plutonium throughput. Starting in March it is planned to employ batch-type operation of the product concentration system to minimize the corrosion of the concentrator and hence contamination of the product stream. The seriousness of the problem urgently requires a more quantitative and a more dependable solution, however, and therefore a strong recommendation was made to the Redox Operation management that a new concentrator made of titanium be procured and installed with all possible speed. This recommendation is being acted upon in two simultaneous approaches, one involving a "pure" titanium (A-55 or A-70) and the other an alloy of titanium with aluminum and vanadium.

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FINISHED PRODUCTS TECHNOLOGY OPERATIONURANIUM CONVERSION OPERATIONProcess Performance

All UO_3 shipped met product specifications.

Nine hundred fifty (950) pounds of nitric acid per ton of uranium processed (90% of theoretical) were recovered at an average concentration of 48%.

Early in the month, the gamma radioactivity of the UO_3 was slightly in excess of that of aged natural uranium. The cause of the increase was not determined and, subsequently, the gamma activity decreased to the usual values of about 75% ANU.

Processing of enriched uranium was started during the month. The UNH received from Redox contained up to 300 parts sodium per million parts uranium, but at month end the concentration was reduced to less than 100 ppm Na in current production. It is expected that three carloads will be shipped with sodium concentrations up to about 200 ppm.

The average operating rate of the calciners was 7.6 tons uranium per unit for each day on the line. The overall calciner operating efficiency was 99.6%. Calcination of E-metal in the G-calciner was initiated on February 12 and averaged 8.0 tons uranium for each day on the line.

Process Improvement

Conversion of the acid fractionator (TD-4) to a deentrainment vessel was completed. This conversion allows the entrained UNH in the vapor from the concentrators to drain to the molten UNH storage tank rather than to the waste collection tank.

Two broken 5/8 inch diameter shear pins were found during the month, the first of this size to fail. The K-calciner agitator hub assemblies were dismantled for enlargement of the shear pin holes from 5/8 inch to 3/4 inch to provide more bearing surface for the shear pins and reduce deformation of the holes. The new shear pins will be 3/4 inch diameter with a 5/8 inch diameter relieved section. During inspection of the hub assemblies, two broken hinge pins were discovered. They had failed at the relieved section originally required for the retainer clip. The hinge pins are being replaced by straight pins with no relieved section.

One feed point, which had previously cracked and was repaired by welding, failed completely. No agitator damage resulted.

The program for recovering uranium from used filter bags by dilute nitric acid leaching in the "Luckey" pots was completed. Approximately one

operator man-month of effort was expended to salvage 8360 pounds of uranium from 403 bags, with an estimated recovery of 97%.

The worm drive of the hammermill screw feeder failed during initial testing. The reason for the early failure was not apparent. The feeder has been repaired.

METAL FINISHING OPERATION

Recuplex

Thirty eight (38) runs, consisting of crucibles, fragments, powders, and clean-outs, were processed through the S & C Hood. Slurry losses averaged 0.07% of the recovered plutonium.

The SE Hood processed 1460 liters per day at 72% operating efficiency, for an average instantaneous rate of 2020 liters per day. Waste losses to crib averaged 0.0069 g/L (0.40% of the feed plutonium).

Flowsheet changes were made to improve the stripping column efficiency and reduce extraction waste losses. Some improvement in waste loss resulted. The stripping solution under test is 0.03 M hydroxylamine sulfate, 0.16 M nitric acid, Mistron (100 ppm Pu), and a trace of zirconyl nitrate as a catalyst for Pu reduction.

Neutron counters have been installed in key processing locations to improve process and critical mass control. These locations include the S & C Hood accountability tanks, slurry tanks, extraction waste tank, and the stripping column organic effluent. All counters are in the process of being calibrated.

The continuous plutonium dissolver rate has averaged 1 kg per day, with instantaneous rates in excess of 1.5 kg per day. This rate is more than double that of a batch dissolver. Oxide powders have also been dissolved successfully.

Task I - II

One hundred seventy eight (178) runs were processed with an average filtrate recycle of 3.84%.

Due to intermittent lack of feed, operation of the continuous wet chemistry unit was sporadic during the last week of the month. The resultant frequent start-ups contributed significantly to the above normal average filtrate recycle.

A bulge in the platinum liner to the hydrofluorinator tube necessitated its replacement during the month. Powder had entered between the tube and the liner, and air pressure proved ineffective in flattening the bulge. A suspected hole in the liner could not be verified as physical deformation of the liner was necessary during its removal.

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PROCESS CHEMISTRY OPERATIONREDOX PROCESS ASSISTANCE

A laboratory study has been started of the use of dibasic aluminum nitrate ("diban"), $\text{Al}(\text{OH})_2\text{NO}_3$, in the Redox process. The material would be used, in the form of a concentrated solution, in place of 50 per cent NaOH for acidity adjustment in the solvent extraction feed streams.

The work thus far, using a sample of diban solution obtained from General Chemical, has given these results:

1. Diban solution properties: 4.17 M aluminum; an acid deficiency equivalent to -7.68 M H^+ ; a pH of 2.3; a specific gravity of 1.3639 at 25 C; and freezing and clearing points of -16 C and -13 C, respectively.
2. Rapid mixing of equivalent amounts of concentrated HNO_3 and diban gave a solution similar to that of aluminum nitrate, with a moderate temperature rise but no splattering during the mixing operation.
3. In contrast with sodium hydroxide, the addition of diban to Redox feeds does not cause even temporary precipitation of any of the feed components. In fact, neither uranium(VI) nor plutonium(VI) is precipitated by the addition of a large excess of diban. Diban should also be more suitable for reducing the acidity of plutonium(IV) solutions.

NEPTUNIUM PROCESSING: REDOX FLOWSHEET STUDIES

The document HW-59526, "Recovery of Neptunium by the Redox Process," by T. R. McKenzie and G. L. Richardson has been prepared. The document describes most of the laboratory work done in conjunction with HLO personnel on the development of a flowsheet for the recovery of neptunium in Redox.

Some additional observations have been made of neptunium oxidation-reduction behavior in Redox systems. The results may be summarized as follows:

1. Neptunium(VI) in synthetic Redox HAW (3.8 g/l Np; 1.2 M ANN; -0.33 M H^+ , pH = 2.2; 0.08 $\text{M Cr}_2\text{O}_7^{=}$; 0.02 M Cr^{+3}) was completely reduced to neptunium (V), in 24 hours at room temperature. In synthetic HAFS (3.8 g/l Np; 1.2 M UNH ; 1.2 M ANN ; -0.33 M H^+ , pH = 0.6; 0.08 $\text{M Cr}_2\text{O}_7^{=}$; 0.02 M Cr^{+3}), it was 76 per cent reduced in the same time.
2. The rate of oxidation of neptunium(V) to (VI) with dichromate in synthetic Redox HAW and HAFS solutions was found to be relatively slow. For example, the oxidation in acid-deficient HAW (-0.01 M HNO_3) was only 31 per cent complete after five minutes and 85 per cent complete after 200 minutes. In HAW containing 0.15 M HNO_3 the reaction was 86 per cent complete in five minutes and 98 per cent complete in 60 minutes, showing the increase in oxidation rate with increase in acidity. Similar slow rates and acid dependence were observed with synthetic HAFS solutions.

These results are in contrast with the rapid oxidation observed in two-phase systems, in which the oxidized neptunium was removed from the aqueous phase as fast as it was formed, by extraction into hexone.

ANALYTICAL ASSISTANCE

Redox Accountability Analyses

Efforts to verify the analytical methods used at critical accountability points continued. Tests were carried out to measure the effect of extraneous process constituents on the routine analytical methods used for the analysis of uranium in Redox dissolver solutions and the analysis of plutonium in Redox final product solutions. Composite samples of these solutions, obtained during the Redox Accountability Test, were analyzed by the routine, non-specific methods (U calculated from solution density and Pu by direct X-ray absorption) and by independent, specific methods (U and Pu by controlled-potential coulometer). A comparison of the uranium results showed the routine method to be biased high, ~0.6%, in comparison to the test method. In contrast, the plutonium final product results agreed within 0.15%.

The between-method uranium bias which shows the density method for uranium to be about 0.6% high on Redox dissolver solutions is in good agreement with the bias expected from the amounts of sodium and aluminum known to be present in these solutions. The concentrations of these constituents were estimated from the analyses of special rinses of a Redox dissolver just prior to slug dissolution. In effect, the rinse solution represents a dilution of the coating waste not completely removed from the slugs and the dissolver prior to the acid addition-slug dissolution step.

More recent tests show that the magnitude of the analytical bias, caused by the presence of acidified coating waste in dissolver solution, is greater by a factor of two or three for the processing of I&E and cored slugs dissolved on a small batch (~2 tons/batch) basis. As a result of these findings, a more specific method, the TBP extraction-X-ray absorption method, has been placed in service for the accountability analysis of uranium in Redox dissolver solution. Similar studies are currently being made on Purex solutions.

Alpha Scintillation Counting

Recent modifications of the alpha counting system used for the counting of liquid samples have resulted in a lower resolving time, approximately 1.7 microseconds, and greater stability. As a result of these improvements, the system is now ready for evaluation tests using process samples.

Spectrographic Determination of Molybdenum in Uranium

The carrier distillation-spectrographic method has been extended to include the determination of moderate concentrations (100-1000 ppm) of molybdenum in

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uranium. This extension is required for the support of solvent extraction studies using uranium-molybdenum feed solutions.

QUALITY CONTROL AND STANDARDS

During the month the Quality Control and Standards programs for the Chemical Processing Department analytical laboratories were maintained as usual. A manual containing the specifications for forty plutonium and/or uranium synthetic stream standards has been completed and will be published during March.

Apparatus was installed for burning large pieces of plutonium metal in a controlled, argon-oxygen atmosphere. One hundred grams of metal were converted to oxide for spectrochemical standards. The oxide contained 80 ppm of metallic impurities in addition to 50 parts of silicon.

Initial work on high-fired plutonium oxides has shown that sodium bisulfate used in a fusion with the oxide at 600 C will readily convert the oxide to the sulfate in one hour.

234-5 DEVELOPMENT OPERATION

DECLASSIFIEDContinuous Chlorination

Plutonium dioxide which had been specially dried in argon at ~ 400 C did not tend to cake and plug the reaction tube during chlorination, although the chloride produced was still somewhat lumpy. This indicates that the presence of moisture in the oxide feed may be largely responsible for caking and plugging.

Attempts to prevent the formation of brown solid deposits on the reaction vessel surfaces by purification of the oxide have resulted in no conclusive evidence concerning the source of the solid. Oxide was chlorinated and then reoxidized. It was theorized that this treatment should remove any components in the oxide that might give rise to volatile chlorides. When this oxide was again chlorinated, the usual formation of the brown solid was observed. It is not immediately apparent whether the original chlorination effected little purification or if the formation of the solid deposit is independent of the presence of impurities in the oxide feed.

It has been demonstrated that the brown solid will deposit on a Hastelloy surface as well as on glass.

Plans are being made to observe the formation of solid off-gas products when specially purified phosgene is used as the chlorinating agent.

Plutonium Trichloride Reduction (Batch)

Work continued testing reduction techniques which would eliminate the mixing step. Reducing plutonium(III) chloride by placing the reductant and booster above the trichloride has not worked well so far. The calcium chloride formed floats the calcium away from the plutonium, and low yields result.

Carrying out the reduction by placing the reductant below the plutonium(III) chloride, and the booster plus excess reductant above the trichloride, looks promising. This arrangement would permit addition of the booster just before the reduction. Some difficulty has been encountered in that the booster reacts very rapidly and shatters the upper part of the crucible. Successful reductions can be made when the charge is reduced in size to fit within the nickel-coated portion of the crucible. The best yield to date has been 94 percent on a 600-gram scale.

A 99 percent yield was obtained on a 30-gram reduction using plutonium(III) chloride in the form of lumps.

Experimentation on a small scale (one or two grams of calcium and iodine) showed that plutonium(III) chloride powder temperature should be below 70 C when the powder is placed on calcium and iodine. Above 70 C, iodine begins to sublime rapidly. No reaction between calcium and iodine was

initiated by heating up to 300 C.

To initiate a reaction between calcium and plutonium(III) chloride on a small scale (two grams plutonium), 600 C was required.

The concept of using two reduction liners instead of one liner with sand was tested. Two double reduction liners were prepared consisting of Vycor 7900 outer vessels and close-fitting inner magnesia LHS-109 crucibles. A test of one of these resulted in a good button with 97 percent yield. The molten calcium chloride slag was prevented from reaching the steel pressure vessel. However, the Vycor cracked.

Two one-kilogram buttons were made by melting plutonium skulls in a calcium chloride salt bath.

Recovery Of Plutonium From Chloride Slag And Crucibles

A larger laboratory scale slag and crucible dissolver has been completed and placed in operation. This dissolver will handle the material from one 700-gram scale reduction.

Two experimental runs with nickel-coated crucibles were made. The solution was divided into aliquots and a series of precipitations was made to determine valence adjustment and precipitation parameters which would give optimum filtering time and minimum waste losses.

Optimum precipitation conditions are obtained by adjusting the solution to (1) 0.025 M ascorbic acid; (2) adding hydrogen peroxide to 0.5 weight percent; and (3) adding 0.3 M ammonium hydroxide until a pH of 8.8 is reached. Filtering rates in the order of two liters per hour through a 600 ml medium frit glass filter have been obtained with waste losses of approximately 0.1 - 0.5 mg/l. This is roughly equivalent to 150 l/hr through the 30-inch Recuplex filter block.

Slightly less than eight hours are required for the dissolution step in a recovery run where no volume reduction or plutonium precipitation step are to be made. An additional two hours are needed for filtering through a four-inch coarse frit.

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ORGANIZATION AND PERSONNEL

Personnel

Dorothy E. Bacon took optional retirement commencing February 6, 1959.

G. L. O'Neill transferred to the Reactor Engineering Development Operation, Design Development, Hanford Laboratories Operation.

Trips

R. E. Tomlinson visited E. Lamb, Oak Ridge National Laboratory February 3 and 4, 1959 for consultation on fission product recovery.

A. E. Smith and R. E. Van der Cook attended the Livermore Gaging Information Meeting on February 2 through 4, 1959 at the E. O. Lawrence Radiation Laboratory, Livermore, California. Contact was made with Max Harris.

A. E. Smith visited the following sites to obtain information for administrative use. February 16 E. O. Lawrence Radiation Laboratory, Livermore, California, Max Harris; February 17 - 18 International Business Machines, San Francisco, M. J. LaFaurie; February 19 Albuquerque Operations Office, Albuquerque, New Mexico, Paul Ager; February 20 Los Alamos Scientific Lab., Los Alamos, New Mexico, B. Moore.

R. C. Smith attended the AIIME Society Metallurgical Section Annual Meeting in San Francisco, California on February 15 through 20, 1959.

R. G. Geier visited the Westinghouse Corp., Dale Gray on February 22 through 25, 1959 and the Phillips Petroleum Company, C. E. Stevenson on February 22 through 25, 1959 at Idaho Falls, Idaho to discuss fuel element handling techniques.

Visitors

J. E. Law, Jr. and William Drury of the Nuclear Eng. Co., Inc. visited with R. G. Geier on February 3 to discuss power fuel shipping.

R. D. Gauthier and R. H. Miller of the Dow Chemical Company, Rocky Flats, Colorado visited R. E. Smith and A. E. Smith on February 5 to discuss weapon part specifications.

W. C. Mullin of the Pratt & Whitney Co., W. Hartford, Conn. visited R. E. Smith and A. E. Smith on February 6 to discuss 6-Coordinate Gage.

B. D. Devine of the Argonne National Laboratory, Chicago, Illinois visited R. E. Smith on February 23 for discussions concerning processing of plutonium scraps for recovery.

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Visitors (Continued)

Frank Tober of E. I. du Pont de Nemours & Co., Savannah River Laboratory visited K. M. Harmon, J. S. Buckingham and C. W. Pollock on February 19 for discussions on palm processing; visited H. H. Hopkins, Jr., L. F. Lust and M. J. Rasmussen to exchange technical information; visited E. R. Irish and W. H. Swift on February 20 to discuss Purex process.

Inventions

<u>Name</u>	<u>Title</u>
R. S. Rosenfels	Non-Cracking Setter Plates For Firing Calcium Fluoride Crucibles

Manager
Research and Engineering

EMPLOYEE RELATIONS OPERATION
MONTHLY REPORT--FEBRUARY 1959

I. RESPONSIBILITY

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

II. ACHIEVEMENT

FIRE PROTECTION OPERATION

There was only one fire response during the month. A short circuit in lathe control panel caused overheating and smoke. Extinguished by pulling switch. There was no loss.

During the month 275 fire extinguishers were inspected, one installed, one delivered to new location, ten seals broken and not reported, 25 serviced, and 250 weighed. Twenty gas masks were inspected and five serviced. Fifteen hand lines were inspected. Sprinkler systems in 272-W, 272-E, 277-U, and 277-S were inspected. Daily checks were made on 4-B dry system in 2101 building.

Eighteen man-hours were spent flushing a pipe line in Redox.

In Redox 23 people attended Sessions 1 and 2 of First Aid Training conducted by Fire Protection Operation. Seventeen people from Finished Products Operation participated in Session 1 of First Aid Training. Classes were held each Friday during the month in Civil Defense work.

Forty-four alarm boxes were tested during the month.

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UNION RELATIONS OPERATION

An arbitration hearing was held in Portland on the Walker Case, before Professor P. L. Kleinsorge, University of Oregon. This was the case in which an employee was AWOL a portion of the day preceding a holiday and was therefore denied holiday pay. The Company based its case on the fact that holiday pay was denied for disciplinary reasons.

Considerable research work was accomplished during the month in furnishing Company attorneys with information pertaining to the handling of overtime situations, particularly during lunch periods.

Further information was developed incidental to the lawsuit filed by the Industrial Firemen who are claiming retroactive overtime pay on the premise they have routinely commenced their workday prior to the recognized starting time.

The Wonescott Arbitration case has tentatively been scheduled for March 19 and preliminary meetings have been held to furnish Counsel with information in behalf of the Company's defense.

Only three grievances were received during the month, all of which were processed at Step II in a satisfactory manner.

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UNION RELATIONS OPERATION

	<u>February</u>	<u>January</u>
Bargaining Unit Employees in CPD	813	821
Bargaining Unit Employees Utilizing Check-off	543	540
Percentage of Total Bargaining Unit Employees Utilizing Check-off	66.8	65.8

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

	<u>Unit</u>	<u>Nonunit</u>
Grievances received year to date	16	0
Grievances pending at Step II on 1-31-59	9	0
Grievances received during the month	3	0
Satisfactorily answered at Step I	0	0
Settled at Step I through expiration of 90 day time limit	2	0
Processed at Step II	3	0
Pending at Step II on 2-28-59	8	0
Pending at arbitration		
Active	4	0
Inactive	8	0

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COMMUNICATION

Assistance was provided Relations & Utilities in connection with preparations for the tour by the Under Secretary of Research & Development, Department of Army during the first week of February; and for the February 12 tour by Dr. Fink.

Editorial assistance and counsel were provided the Health & Safety Operation in preparation of two safety booklets; to authors of two signed articles; and to three authors preparing civic talks or technical speeches.

Community Relations activities included providing Relations & Utilities assistance in arranging for four CPD speakers to accept civic engagements; and helping R&U with the initial arrangements for a chemical engineering display for the WSC engineering open house in April.

In addition to the usual types of information, a Round Table publication, a Round Table supplement, four Management News Bulletins, three Headliners, a priority message, and GE NEWS material were concerned with communication of such subjects as National Engineering Week, National Electrical Week, organizational announcements (including promotions and transfers), nine items about Company activities elsewhere, three economic items, and an item on Community Operation employment. In addition, material on the Malcor case, the Guards' suit, and the Firemen's suit were provided CPD Union Relations for use in the UNION RELATIONS NEWS.

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HEALTH AND SAFETY OPERATION

<u>Chemical Processing Department</u>	<u>February</u>	<u>January</u>	<u>Year to Date</u>
Disabling Injuries	0	0	0
Serious Accidents	0	1	1
Medical Treatment Injuries	34	45	79
Technical Overexposure Incidents	0	0	0
Radiation Occurrences	11	24	35
Fires	1	1	2
Security Violations	1	4	5

Comments on Statistics

Spontaneous ignition caused a fire in a small pile of insulation containing asphalt left on top of Tank 152, 204-S Building by workmen. There was no damage.

Programs

Development of a CPD Manual of Radiation Control Standards and Procedures was 15 per cent complete at month end.

The 1958 CPD Annual Safety Hi-Lites report to employees was completed and forwarded for final art work and printing.

A 1959 safety program booklet, Four Steps To Top Safety Performance, was developed for exempt personnel.

Training and Education

CPD's Supervisors Safety Training Program was completed in Financial, Research and Engineering, and Facilities Engineering Operations. The program was started in Finished Products and Redox Operation.

CPD on-the-job First Aid Training was started in Employee Relations February 18, 1959. Twelve Air-Way mouth to mouth resuscitators were purchased for use in First Aid Training Programs and future location in the department.

Advice and Counsel

Redox -	Installation of P-10 gas cylinder, 222-S; cranes maintenance platform suspended catwalk, 221-T Canyon; use of belt type flange guards on chemical lines.
Purex -	Classification of alleged occupational illness case; use of belt type flange guards on chemical lines; checked oxygen deficiency in pump pits 2 and 5.
P & GM -	Safe application of insect spray; sealing fire door in 275 EA.

Production - Use of static resistant polyethylene bags for chemical containers.

Facilities

Engineering - Installation of 222-S sprinkler system, second floor, Project CA-783; final prints for Project CAC-812, decontamination equipment facility; audible signals for radiation warning devices; installation of a work model test incinerator, 271-U Building; proposed tie-in of CPD raw, process, and sanitary water systems.

Employee

Relations - A study was completed of Relations and Utilities Industrial Medical Services and CPD needs; a review was made of CPD notification and reporting responsibilities to HOO-AEC per Manual Chapters 0502 and 0523.

Inspection, Investigation and Audit

Inspections: Redox pipe galleries and storage areas
Sprinkler system installation, 222-S Building
Automatic CO₂ system, 234-5 Building
Remote control station for 272-E Shop crane

Investigations: CPD Serious Accident 59-1, Purex pressurized acid line failure
204-S, Tank 152 fire
Elimination of screw type fluorescent lamp fixture from Central Stores stock
Suggestion No. 18479 - Belt type flange guards
Six other suggestions

Audits: Follow Up Audit of Department's Emergency Rescue and Evacuation Program

Reports Issued

Form AEC-13 Monthly Summary - Accident, Occupational Disease, and Fire Experience
Monthly Health, Safety and Security Performance
Monthly Narrative Report to AEC Safety
Accident Prevention Council Meeting Minutes
CPD Plutonium Deposition Case History
Information bulletins or memorandums were issued on CPD Workmans Compensation Costs and CPD Safety Experience - 1958

PERSONNEL DEVELOPMENT AND PLACEMENT

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A. <u>Employment</u>	<u>Exempt</u>	<u>Non-Exempt</u>	<u>Total</u>
<u>Additions</u>	3	6	9
New Hires	0	0	0
Reactivates	1	1	2
Re-Engages	0	1	1
Transfers from other components	2	3	5
Job Changes - Exempt to Non-Exempt	0	1	1
<u>Removals</u>	7	20	27
Retirement	0	1	1
Leave of Absence	0	2	2
Illness	1	2	3
Transfer to other components	5	9	14
Resigned	0	6	6
Job Changes - Exempt to Non-Exempt	1	0	1
<u>Requisitions (Non-Exempt)</u>			
Number on hand at beginning of month		1	
Number received during month		9	
Number filled		6	
Number on hand at close of month		4	
<u>Request for Transfer (Exempt)</u>			
Number on hand at beginning of month	7		
Number received during month	0		
Number transferred	0		
Number closed out	0		
Number on hand at close of month	7		
<u>Applications for Employment (Exempt)</u>			
Applications received during month	3		
Hired	0		
Closed Out	1		
Applications on Hand	4		
Open Requisitions	5		

Service Pins

A total of 8 pins were issued as follows:

20 yrs. service	1 Male	0 Female
15 yrs. service	0 Male	0 Female
10 yrs. service	4 Male	0 Female
5 yrs. service	2 Male	1 Female

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D. W. Diehl was transferred to the Vallecitos Atomic Laboratory, APED during the month.

Offers were extended to three people as candidates for current open positions during the month.

Mr. R. Jimmo, Manager, Quality Control, Outdoor Lighting Department, Hendersonville, North Carolina, visited HAPO February 16 and 17 to interview personnel for an open exempt position there.

CPD's personnel decreased by 18 during the month. This decrease was due to filling openings in other HAPO components without replacing personnel transferred to those openings. The openings filled included two Electricians in IPD, one Electrician in FPD, one Instrument Technician in IPD and two Millwright Journeymen in FPD.

Two secretaries terminated during the month. By internal adjustment of CPD personnel, no replacement secretaries were brought into the department. The final result was a promotion for one secretary and one stenographer.

Status - Personnel Development Program for Non-Exempt Employees

Number of appraisals scheduled in February	82
Number of appraisals delinquent 2-28-59	79

Correspondence

During January a total of 15 inquiries regarding CPD people were answered. They consisted of:

- 1 letter regarding inquiry of credit
- 14 letters regarding housing loans

Military Service Records

Records show that CPD has a total of 115 employees who are subject to military training through Selective Service or Armed Forces Reserve action.

	<u>Exempt</u>	<u>Non-Exempt</u>
Ready Reserve	8	6
Standby Reserve	17	12
Deferments Requested	0	
Deferments Granted	0	
Deferment Requests Pending	3	

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B. Personnel Training and Development**DECLASSIFIED**Participation in Training Courses

Exempt	39
Non-Exempt	42
G. E. Supervisory Selection Program - No. Completed	2
G. E. Supervisory Selection Program - No. Revaluated	2
Non-Exempt Personnel Counselling	2

C. Office ServicesDuplicating

Copies Produced	144,575
Xerox Masters Made	480

Mail

Total Pieces of Mail Handled	61,089
Registered Deliveries	372

Addressograph

Pieces of Written Material Produced	13,850
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EMPLOYEE COMPENSATION OPERATION

At month end the 1959 Salary Review is being held in abeyance pending an investigation of several factors affecting our overall comparative salary position. It is otherwise approved on the Department level.

Establishment of the new Finished Products Operation organization and associated positions was completed.

Revaluation of one fourth level position was authorized.

Job descriptions have been received for all HAPO nonexempt, non-unit positions selected as benchmarks for the Compensation Study. Evaluation of these jobs has started and should be completed this month. Descriptions prepared using the new format have been received for about 15% of the CPD non-unit jobs.

SUGGESTION PLAN

	<u>January</u>	<u>February</u>
Suggestions Received	132	107
Acknowledgments to Suggestions	132	105
Suggestions Pending Acknowledgment	0	2
Suggestions Referred to Operations for Investigation	132	105
Suggestions pending referral to Operations	0	2
Suggestions Completed and Closed	32	87
Adopted Suggestions Pending Approval by Board	10	12
Total Net Tangible Savings	0	672.20
Cash Awards Paid During Month	0	457.50
Total Number of Suggestions Outstanding to Operations at End of the Month	171	212

AVERAGE AGE OF OPEN SUGGESTIONS

Months

Participation in Benefit Plan**DECLASSIFIED**JanuaryFebruary

Insurance Plan	99.8	99.9
Pension Plan	99.6	99.7
Stock Bonus Plan	53.5	53.9
Good Neighbor Fund	63.5	63.7
Savings and Security Program	96.9	96.8

One employee retired on Normal Retirement during February, namely: B. W. Lewis, Painter Journeyman, Finished Products Operation.

III. ORGANIZATION AND PERSONNELA. Meetings

Members of the Employee Relations Operation attended approximately 70 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

Demonstration and testing of belt type flange guard and demonstration of flammable liquid

The Walker Arbitration hearing

Meeting with HAPO Maintenance managers to discuss union relations problems

B. Personnel Activities

Fire Protection Operation held 110 inside classes and 34 outside drills, in which 5,600 feet of hose and 140 feet of ladders were used. The percentage of time spent in training was 14.3, amounting to 790 hours.

The Specialist, Training participated in a three day recruiting visit at the University of Minnesota during the month.

C. Safety and Security

There was one medical treatment injury in Employee Relations Operation.

D. S. Roberts, Manager
Employee Relations

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