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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
FOR
APRIL, 1959

HW--60236-Del.

DE93 001225

Compiled By
OPERATION MANAGERS

MAY 21, 1959

HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON

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

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

APRIL, 1959

GENERAL SUMMARY

PRODUCTION

The production of plutonium from the separations plants was only 58 per cent of the monthly commitment as a result of extended difficulties in the Purex Plant.

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

Although the production of unfabricated plutonium metal was markedly reduced because of feed shortage, inventories of material were such that all shipping commitments were met on schedule. Shape production and shipments exceeded the Official Forecast by 14 per cent. The higher than forecasted output resulted from an AEC request for additional weapons parts for this fiscal year.

ENGINEERING

The Purex HS Column, which was repaired in October, 1958, developed another leak and was by-passed on April 18, 1959. With the loss of the HS Column decontamination capacity, both product streams were out of gamma activity specifications for about two weeks, resulting in large quantities of plutonium and uranium which required reprocessing. At month-end the process was improving rapidly and both products were approaching specifications.

A Palm recovery run at Purex, utilizing a new all-reducing flowsheet, resulted in 87 per cent recovery and excellent decontamination of the product.

The prototype dual-pass silver reactor in C-cell at Purex plugged and became inoperable after processing off-gases from 4,600 tons of dissolved uranium.

Processing of unclarified feed through Purex solvent extraction continued, extending to 45 days the test for long-range deleterious effects.

Redox dissolver batch sizes for E-metal processing were increased from 1.75 to 2.0 tons. The change resulted from a more careful evaluation of data obtained on criticality tests performed in a mock-up dissolver at Oak Ridge.

Testing of the first extraction cycle acidic flowsheet at Redox continued. The neptunium losses to HAW were below detection limits; however, neptunium reflux was less than previously observed. Ruthenium in LAFS stream caused increased (10 fold) F.P. activity, but was removed in the acid deficient uranium cycles.

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In a program aimed at drying and storing wastes permanently, sampling of five to seven years old non-boiling wastes was initiated.

A more controllable process than the present nitric-hydrofluoric acid scheme for the dissolution of plutonium metal is being explored. It is based upon the use of sulfamic acid and with the exception of a small residue not attacked by sulfamic acid, appears to be advantageous from a safety and productivity viewpoint.

Scope design for one new multipurpose dissolver for the Redox plant was completed.

Scoping of the Task III portion of the RMA line replacement at Z Plant continued. Study drawings, dealing with alternate means of positioning the pressure vessel within the transfer tube, were completed and are being evaluated.

A comparison was made of the shielding effectiveness of one-fourth inch medium density x-ray type lead glass and high density lead glass. Equal thicknesses of the two glasses in shielding tests at Recuplex showed the x-ray glass to be 75 per cent as effective as the high density glass.

A transparent plastic air helmet was adapted for use with building fresh air systems and one unit was delivered to Radiation Monitoring, Hanford Laboratories Operation, for evaluation.

GENERAL

Effective April 27, 1959, the responsibility for the clerical portion of the Personnel Accounting function was transferred to the centralized group within Contract and Accounting Operation.

A Construction Completion and Cost Closing Statement was issued for Project CA-513-E, Expansion of 200 Area Facilities, with a final cost of \$2,351,367.

The Chemical Processing Department achieved its Fifth President's Award on April 23, 1959.

The Department Safety Lingo Program was successfully conducted with seventy-two per cent of eligible department personnel participating. Forty per cent participation was the highest level previously attained at HAPO.

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STAFF

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

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CHEMICAL PROCESSING DEPARTMENT
NUMBER OF EMPLOYEES
APRIL 30, 1959

<u>OPERATION</u>	<u>EXEMPT</u>		<u>OTHER</u>		<u>TOTAL</u>	
	<u>3-31-59</u>	<u>4-30-59</u>	<u>3-31-59</u>	<u>4-30-59</u>	<u>3-31-59</u>	<u>4-30-59</u>
GENERAL MANAGER'S GROUP	10	10	1	1	11	11
PRODUCTION	6	6	3	3	9	9
PUREX	48	48	211	212	259	260
REDOX	50	51	220	218	270	269
FINISHED PRODUCTS	57	51	243	241	300	292
POWER & GENERAL MAINTENANCE	39	44	247	254	286	298
FINANCIAL	19	19	37	38	56	57
FACILITIES ENGINEERING	69	69	21	21	90	90
RESEARCH & ENGINEERING	61	61	24	24	85	85
RELATIONS PRACTICES	<u>24</u>	<u>10</u>	<u>50</u>	<u>8</u>	<u>74</u>	<u>18</u>
TOTAL	383	369	1057	1020	1440	1389

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CHEMICAL PROCESSING DEPARTMENTPATENT SUMMARYFORMONTH OF APRIL, 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

NONE

TITLE

General Manager
Chemical Processing Department

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CHEMICAL PROCESSING DEPARTMENT
PRODUCTION OPERATION

APRIL, 1959

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I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Production Statistics

1. Purex Operation

	<u>April</u>	<u>March</u>
Tons uranium processed	270.04	538.68
Average production rate during operation (T/D)	11.0	22.5
Total waste loss (%)		
Uranium	0.14	0.05
Plutonium	0.53	0.18
Average cooling time (days)	107	108
Minimum cooling time (days)	93	91
On-line efficiency (%)	82.5	81

2. Redox Operation

	<u>April</u>	<u>March</u>
Tons uranium processed	77.1	50.6
	56.9E) 20.2)	
Average production rate during operation (T/D)	5.3	6.3
Total waste loss (%)		
Uranium	0.16	0.21
Plutonium	0.42	0.53
Average cooling time (days)	219 E 108	250
Minimum cooling time (days)	190 E 97	177
On-line efficiency (%)	66.0	35.7

3. 234-5 Operation

	<u>April</u>	<u>March</u>
Batches input to Task I	137	242
Runs completed through Task III	119	239
Batches through Product Recovery	61	61
Reduction yield (%)	98.7	98.8
Waste disposal (units)	320.87	395.75

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4. UO₃ Operation

	<u>April</u>	<u>March</u>	<u>To Date</u>
UO ₃ loaded (tons)	(72.9 E	124.3 E	215.86 E
	(457.3	439.1	32 613.50
UO ₃ approved for shipment(tons)	(47.1 E	95.0 E	142.47 E
	(451.9	454.1	32 452.48
UO ₃ shipped (tons)	(95.15 E	95.37 E	
	(454.37	450.69	
UNH backlog (tons)	(33 E	43 E	
	(75	248	

5. Power

	<u>200 East</u>	<u>200 West</u>
Raw water pumped (gpm)	8 589	3 750
Filtered water pumped (gpm)	895	785
Maximum steam generated (lbs/hr)	240 000	124 000
Average steam generated (lbs/hr)	166 335	86 446
Total steam generated (M lbs)	119 761	62 241
Coal consumed, est. (tons)	7 541	4 259

6. Waste Storage

	<u>Equivalent Tons U</u>	
	<u>April</u>	<u>March</u>
Salt waste reserve storage capacity-Redox	3 700	3 776
Salt waste reserve storage capacity-Purex	32 588	32 868
Coating waste reserve storage capacity-Redox	30 735	30 812
Coating waste reserve storage capacity-Purex	45 383	45 663

E. Reports and Documents

1. Prepared and Issued

HW-59870 RD Redox Plant Production Schedule, April, 1959
D. McDonald

HW-59871 RD Purex Plant Production Schedule, April, 1959
D. McDonald

HW-59872 RD UO₃ Plant Production Schedule, April, 1959
D. McDonald

HW-59873 RD 234-5 Plant Production Schedule, April, 1959
D. McDonald

HW-60018 Essential Materials Consumption-Purex, Chemical Processing Department for March, 1959, J. E. Lentz

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HW-60065 Chemical Processing Department Waste Status
Summary for March, 1959, J. E. Lentz

HW-60203 RD Forecast of First and Second Quarters FY 1960
of Nuclear Materials Requirements, R. E. Roberts

HW-59988 Essential Material Area Report to Cost and Pur-
chasing-Production Operation, Chemical Processing
Department for March, 1959, J. E. Lentz

CLVI-693 Official Quarterly Forecast Chemical Processing
Department, April, 1959 through December, 1959,
D. McDonald

2. Prepared for Signature and Issuance

HW-59848 Production, March, 1959, W. E. Johnson

CLVI-695 HAPO Production Forecast, April 24, 1959, W. E. Johnson

III. ORGANIZATION AND PERSONNEL

A. Safety

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

B. Security

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

Manager - Production

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CHEMICAL PROCESSING DEPARTMENT
PUREX OPERATION

April, 1959

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I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Processing Experience

1. Production Statistics

a) Production - Percent of Monthly Commitment

Uranium	67.5 Percent
Plutonium	48.0 Percent

b) Production Rates

Processing rates were at 2.4 CF except for three short unscheduled outages due to equipment failures.

c) Operating Continuity

Uranium	70 Percent
Palm	13 Percent
Overall	83 Percent

d) Waste Losses

Uranium	0.14 Percent
---------	--------------

e) Uranium Re-treated through Silica Gel 80 Tons

2. Normal Processing

Normal processing was started up on April 8 after a very successful Palm recovery run. The plutonium and uranium production was short of forecast because of three unscheduled outages for mechanical reasons and inability to produce specification material under the resulting conditions.

After startup, difficulty was experienced with the resin movement in the plutonium ion exchange unit. Resin had a tendency to pack in the resin receiver tank and failed to drop into the resin reservoir. During this trouble, which lasted several days, the plutonium

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stream was routed to the stripper and concentrator in L Cell. The resulting product failed to meet specifications and was recycled back to the system.

A leak developed in the HS column and it was by-passed when the leakage rate approached six gallons per hour. With the HS column by-passed and other mechanical difficulties complicating the attempt to reach an equilibrium operating condition it was not possible to produce specification product during a two-week period. As a result large quantities of plutonium and uranium were recycled through the process.

Typical of the above-mentioned difficulties, the J-1 pump developed a leak and necessitated a four-hour outage for the pump replacement; three days later the diaphragm-operated valve in the HAW jumper failed and a forty-five hour outage resulted. During this outage the HAF pump and its associated control-valve and rotameter assembly were replaced in order to provide better control of the HA column saturation. However, at the end of the month the process performance was improving rapidly and both products were approaching specification.

Partial loss of partitioning occurred several times during the month. The cause of this difficulty was traced tentatively to the back-cycling of nitrite in the 2HX organic stream to the IX column. Reduction of the nitrite flow plus the addition of ferrous sulfamate to the 2HX stream appeared to remedy the problem.

The large amount of rework was responsible for the abnormal losses.

The D-2 waste losses were reduced by about one-half of previous values by rerouting the dissolver rinse water to the recycle system. This test was discontinued with the by-passing of the HS column which limited the decontamination capabilities of the process.

3. Special Processing

A Palm recovery run, utilizing a new all-reducing flowsheet was made during the first four days of the month. Recovery (about 87 percent) and decontamination were very satisfactory.

One batch of F-8 rework, which had been refluxing since early in March, was reworked without difficulty. Approximately 1800 pounds of uranium and 680 units of plutonium were reclaimed.

The thiosulfate flush of the B-2 reactor and its subsequent regeneration have fully restored the silver reactor to normal air flow and iodine retention.

After the initial startup, the IC column interface was switched to the bottom of the column. High uranium losses were encountered

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before the pulser frequency and ICX flow were increased to optimize the flowsheet. Approximately 700 pounds of uranium were lost with better than 400 pounds being segregated for future rework. After the HS column was by-passed the IC column was operated with top interface.

The L-11 to E-6 transfer line was flushed with hot acid to determine the amount of plutonium holdup in the line. Less than fifty units were recovered, which is considered a normal holdup.

B. Radiation Experience

The total iodine 131 emission for the month was 25 curies. The maximum during a seven-day period was 8.8 curies.

Two Radiation Occurrences were incurred during the month. One of these resulted from a mistake in totaling weekly exposures and a second was a skin contamination of 40 mrad/hr. Weekly exposure limits were not exceeded in either case.

Extensive in-cell decontamination of the HS column permitted it to be removed from the cell for preliminary inspection. The column was inspected at deck level at a maximum dose rate of 2 r/hr. at three feet. The highest contamination level detected was 23 rads/hr. at 18 inches on a portion of the lower dunnage. Further decontamination and shielding will be required prior to repair of the leak.

C. Mechanical Experience

The B Cell off-gas steam heater was replaced with a new unit on 4-13-59 after developing severe steam leaks on both flanged heads. The new heater was an all-welded unit designed to eliminate the long-standing problem of steam leaks at the flanged head connections.

The H-1 pump, which was exchanged with the F-13 pump on 3-26-57 due to a minor upper seal leakage, was finally removed from service on 4-26-59 after the seal leakage became excessive. A new replacement unit equipped with an improved floating conical seal was installed on the H-1 position.

Two magnaflow pumps with associated piping and electrical connections in N Cell hood were installed during the month. These units are designed to perform the same function as the present XAF pump, which will serve as an installed spare unit until the reliability of the new pumps are proved. The new pumps are currently undergoing recirculation run-in tests before being introduced to actual processing service.

Failure of the control valve on the HA jet-out jumper compounded the shutdown problems and caused additional delay in jetting out the HA column for the HAW replacement. Tests indicated that the diaphragm of the control valve had ruptured, as was the case with the HAW valve. An investigation is being made to find a better diaphragm material.

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D. Analytical Performance

Operating difficulties and unstable process conditions during a large portion of the month resulted in the need for numerous special analytical services. The revised flowsheets for Palm recovery and the fission product recovery program also required varying analytical techniques. Modified methods for determining plutonium in resin, zirconium and niobium in the first cycle waste, cesium 137, cerium 141-144, and cobalt 60 in first cycle wastes were developed and are available for future use.

In addition to the routine reactor effluent analyses for IPD, considerable time and effort was given to the support of the fuel element rupture detection problem and for the new nickel-clad fuel element development program.

E. Improved Performance

1. Process Tests and Revisions

Approximately 700 gallons of gelatin-treated, centrifuged IWW were processed through the IWW ion exchange unit as a mechanical operability test. The bed quickly plugged and it was necessary to fluidize the bed frequently in order to maintain flow through the resin bed.

A program of adding Permacol #120 to the Purex steam supply was started as a means of inhibiting further corrosive action of the steam on process steam piping. The treatment has loosened pipe scale in the steam lines which is being removed by blowing down all steam traps at regular intervals.

F. Inventions and Discoveries

Nothing to report.

G. Events Influencing Costs

The low production for the month, plus the large amount of rework, will result in abnormally high unit costs.

The ceramic Berl saddle coating unit produced approximately 30 cubic feet of coated saddles at a saving of approximately \$6,000 under other sources of supply.

The HS column, which was repaired in October 1958, developed another leak. It is planned to decontaminate and attempt repairs to the column. Procurement action was initiated to obtain a new HS column because of the short in-service life of this piece of equipment.

III. ORGANIZATION AND PERSONNEL

A. Safety

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

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B. Security

There was one open file violation during April.

C. Personnel

F. J. Soback, Supervisor, Analytical Control, transferred to the Purex Technology Operation.

R. W. James, Chemist, transferred to Analytical Control Operation from Finished Products Operation.

E. Brodaczynski, Pipefitter, retired after fifteen years service with General Electric Company.

Members of the Joint Committee on Atomic Energy and aides visited Purex on April 2, 1959. The visitors were: Senators Clinton P. Anderson, Bourke B. Hickenlooper, Henry C. Dworshak, W. Bennett; Representative W. Bates; and Col. Richard Lunger, J. Conway, and R. K. Donovan.

P. H. Murray
Manager-Purex

PR McMurray:EAF:gt

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CHEMICAL PROCESSING DEPARTMENT
REDOX OPERATION
APRIL, 1959

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I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Processing Operation

E-Metal processing was conducted as scheduled for the month and by April 24, 1959 the E-Metal building inventory had been depleted. On this same date, operations were diverted to the processing of normal uranium and dissolving in both available dissolvers (A&B) was started. Processing of normal uranium through the extraction columns started at 0330 on April 27, 1959 at 80 percent of nominal rate. As the concentrators built up to normal concentrations the rate was increased to 100 percent on April 28, 1959, and continued at this rate until 2100 on May 1, 1959, at which time the normal weekend shutdown was taken. The E-Metal monthly production was exceeded by 26 percent and normal uranium production amounted to approximately 20 units.

The quality of both product streams was under good control during the month. No tail-end treatment was required on any of the UNH produced. Three batches of E-3 plutonium were slightly above specifications in uranium content, but were returned to the columns for reprocessing before going through the concentration step. Four batches of E-12 UNH were slightly higher than normal in sodium content, but were satisfactorily blended at the UO₂ Plant. Batch concentration of the plutonium product stream, which was started during March, has continued to improve the iron content of the plutonium production. The iron content which was approximately 28,000 parts per million parts of plutonium during the first part of the month was reduced to 12,500 during the latter part of the month.

Product waste losses were under satisfactory control for the month

Nine batches of D-9 waste were above discarding limits in plutonium content, but were reprocessed via the head end feed preparation tank. The 1-S precycle column was utilized for approximately eight hours processing a waste solution containing approximately 12 units of uranium and 25 units of plutonium, which resulted from cake removal in the H-2 centrifuge.

In preparation for processing normal uranium metal, 60 percent nitric flushes were processed through the 233-S Concentration Building and 10% in the 1-A, 1-S, and 2-D columns of the 202-S Building. Approximately 200 gallons of salt waste was also used to flush the last of the E-Metal from the head-end processing vessels prior to the start of normal uranium processing on April 27, 1959.

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Iodine 131 emission to the 291-S stack totaled 9.5 curies for the month and was under satisfactory control except for the last week of the month. The maximum emission for a 24 hour period was 1.9 curies which occurred on April 24, 1959 during the dissolving of normal uranium metal in the B-2 dissolver. Since several elements in the silver reactor heater had previously failed, both the heater and the silver reactor were replaced on April 28, 1959. Replacement of the silver reactor was considered advisable since the unit had been in service for approximately ten months, a period considerably longer than the normal expected life. However, daily iodine 131 emission rates are still up slightly since installation of the new units and at month end investigation in this area was continuing.

Redox dissolver batch sizes for E-Metal processing were increased from 1.75 to 2.0 tons this month. This change resulted from a more careful evaluation of the data obtained on criticality tests carried out at Oak Ridge in a mock-up dissolver. During March the critical batch size had been reduced to 1.75 tons pending a more careful review of the Oak Ridge data. The 2.0 ton limit is a practical and beneficial increase since it will permit the 100 Areas to load the buckets to 350 pieces and provides some increase in dissolver capacity.

B. Maintenance Operation

Considerable difficulty was experienced with the Redox Canyon Crane this month. On March 27, 1959, a wheel bearing failed on the trolley of the left hand auxiliary hoist. Replacement was accomplished without incident during the early part of this month. Personnel exposures ranging from 300 to 500 mrad/hr. were required to accomplish the work.

On April 15, 1959, the 60 ton hoist on the canyon crane stalled with a cell block suspended approximately three feet over G cell. The trouble was finally traced to the failure of the starting relay for the 10 ton hoist motor, which in turn caused shorting of the 10 ton hoist motor and failure of the 25 KW direct current generator which is common to both the 10 and 60 ton hoists. Final repairs were completed on April 18, 1959 and the crane returned to service on this same date. It is apparent that the 25 KW generator is under-designed for the 50 H.P. motor on the 60 ton hoist. Plans are now being considered to either replace the 25 KW generator with a larger 30 KW unit, or install amplidyne controls similar to those on the Purex crane.

The B-3 silver reactor heater failed on April 23, 1959, and was replaced with a new unit on April 28, 1959. Since indications were that the silver reactor was also losing its iodine removal efficiency, the reactor was also replaced. The replacement reactor was one which had been repaired and regenerated by the Redox Equipment Decontamination and Repair Facility at 221-U Building. To date both replacement units are operating satisfactorily.

All of the new jumpers necessary to divert the H-6 condensate from the D-12 crib sampler to the D-13 waste receiver have now been completed and installed. New jumpers HG-81, H-T-35, and DT-19 to DT-22, were installed this month, thus completing the work. The purpose of this

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change is to reduce the amount of radioactive materials going to the cribs.

The B-2 dissolver was taken out of service on April 30, 1959 because of a leaking coil. It is planned to replace this unit with the A-2 dissolver which is now undergoing repairs in the 221-U Equipment Decontamination and Repair Facility. Fortunately, fabrication of the new standard dissolver is now complete and this unit will be installed in the now vacant C-2 position. Two dissolvers will thus be available for the May production run.

C. Waste Handling and Decontamination Operation

1. Waste Handling

Redox Coating Waste Received (S Farm)	14,632 gallons
Redox Salt Waste Received (SX Farm)	85,180 gallons
Total Gallons Boil-Off Salt Waste	122,340 gallons
Waste Received at TX (From 221-U)	None

The coating waste pump, which is used periodically to pump waste from the 107-S to 107-U Tank, failed during March. A new spare pump has now been assembled and installed and pumping of coating waste to the 107-U Tank is planned for the early part of May.

Efforts to unplug the Redox non-boiling waste line between the 153-U and 155-TX diversion boxes have been unsuccessful to date. Work on alternate routings was started this month with the activation of two abandoned transfer lines that were formerly used for metal waste removal. At month end the work was approximately 75 percent complete.

2. Equipment Decontamination and Repair

a. Regulated Steam Pit

Nine vehicles, four pieces of heavy equipment, and seven miscellaneous items were decontaminated during the month. A total of 77 manhours was charged to this operation.

b. Railroad Equipment

Eighty-seven manhours were charged to decontamination and operational coverage for repairs to equipment at Riverland. Decontamination work included locomotives No. 19, 25, 29, 32, and 59; and well cars No. 44, 45, 98, and 99.

c. 221-U Canyon

Decontamination and repair of the Redox A-2 dissolver pot continued this month. The leaking coils were removed, repaired, and pressure tested. All welds have been satisfactorily dye tested. Reassembly of the unit is scheduled for the first week of May, and installation in the Redox B-2 dissolver position scheduled for the middle of May.

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One repaired and recharged silver reactor was shipped to the Redox Plant on April 23, 1959. A savings of approximately \$3,300, over the cost of a new unit, was realized.

Decontamination and repair of two Redox steam trap jumpers was completed at a savings of approximately \$2,000. Repairs to the E-5, 2-A column feed tank pump, were also completed this month. This unit is to be held as a spare for the Redox Processing Operation.

Decontamination of two impact wrenches for the Purex Plant was completed and the units returned to the Purex Maintenance Operation for repair. Decontamination of the Purex K-1 pump was also started this month. To date, radiation readings have been reduced from 100 mr at 150 feet to 1r at 2 inches.

Seventy-five reactor pigtailed were decontaminated for the Irradiation Processing Department. Smearable contamination was reduced to less than 300 c/m and the work was completed without incident.

d. 221 and 224-T Buildings

Decontamination work in F and G cells in the 224-T Building was completed this month. This work was requested by the Power and General Maintenance Operation.

Preliminary work at the 221-T Building continued this month in anticipation of the relocation of the Redox Waste Handling and Decontamination Operation from 221-U to 221-T. The work included: (1) complete overhaul of the 75 ton canyon crane, (2) fabrication and installation of a crane maintenance platform, and (3) relocation of swimming pool equipment from 221-U to 221-T.

D. Analytical Control Operation

Twenty-four hour analytical support and the loan of manpower to the Research and Engineering Group was provided during the palm production run which was made this month. Special analyses were also made on the Redox acid flowsheet test run which is aimed at establishing the potential of the process for palm recovery. Other analytical work was confined primarily to routine operation.

E. Radiation Monitoring Operation

Two radiation occurrences were recorded during the month. One involved the use of contaminated regulated equipment outside a radiation zone and the other resulted in the potential loss of contamination control within a regulated zone, when contaminated equipment was found in a repair rack. Both occurrences have been publicized and corrective action taken to minimize the possibility of future incidents.

Six cases of personnel skin contamination were incurred during the month, the maximum level encountered being 10,000 c/m fission product. All

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contamination was promptly and readily reduced to non-detectable.

On April 16, 1959, the 60 ton hoist on the canyon crane stalled with a cell block suspended approximately three feet above its normal position over G cell. A maximum dose rate reading of 9 rads/hr. was measured while the crane was in this position. However, most of the radiation was coming from the craneway floor and not from the open cell. Subsequent flooding of the craneway floor with water reduced the dose rate to a maximum of 500 mrad/hr. and enabled the electricians to make temporary repairs so that the block could be released and the crane moved to the crane maintenance platform where permanent repairs were made.

F. Improvement Experience

1. Process Tests and Revisions

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

2. Inventions or Discoveries

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

G. Events Influencing Costs

Spare parts inventory reductions during April amounted to \$5,705. Total reductions for CY 1959 to date amount to \$47,818.

The processing of 90 units of normal uranium will reflect an increase in costs well in excess of \$50,000 since this was unscheduled production. These costs will be spread over the months of April and May.

H. Plant Development and Expansion

1. Preparatory Engineering

Redox Inert Gas System

The silica gel dryer and filter have now been installed and piped to the point of tie-in with the existing system. Tie-ins will be completed when sufficient building down-time permits. The replacement high-pressure receiver is scheduled to arrive on site May 20, 1959. Pending arrival of this unit, installation should be complete by June 1, 1959.

2. Design and Construction Liaison

CG-764 - Test Wells - 216 BC Crib Area

The well screen has been installed and the well has been developed by surging and boiling. Detergents were used to aid in the removal of the mudding agent. It is expected that pumping tests will be completed by June 1, 1959.

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CG-772 - Multi-Purpose Dissolvers, Redox

This project is now being rescoped and the Project Proposal Revision No. 2, is expected to be submitted to the Commission in May.

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

The contractor has cleaned up all exceptions except the high pressure control electrical mechanism, which was installed by a subcontractor. Final inspection and acceptance will depend upon the elimination of the remaining exception.

CAC-812 - Equipment Decontamination Building, 2706-W

Work is continuing by the AEC-CPFF construction contractor for renovation of utilities to points of tie-in. Jensen-Rasmussen and Company was the successful bidder at \$87,750 for construction of the building.

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

This project was completed April 20, 1959, except for placing the landings and cover, and painting the inside surfaces. The physical completion notice with accruals shows a total cost of \$67,000.

AR-59, CPD-32 - High Level Radiation Alarms

The HLO Instrument Shop is proceeding with instrument fabrication. The mounting brackets have been completed and delivered and wiring for the Redox Facility is approximately 50 percent complete.

I. Reports Issued

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

III. ORGANIZATION AND PERSONNEL

A. Safety

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

B. Security

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

C. Personnel Activities

G. A. Halseth, Supervisor, Redox Processing Operation, attended the Work Shop Seminar at Bear Mountain, New York, from April 12, 1959

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through April 29, 1959. In conjunction with this trip, General Electric Plants at Schenectady, N.Y., Pittsfield, Massachusetts, and Cleveland, Ohio, were visited.

Dr. Kenneth Newman, Turco Company, Los Angeles, California, visited the Redox Waste Handling and Decontamination Operation on April 6, 1959, to discuss equipment decontamination problems.

Mr. Bruce Schmalz, AEC, Idaho Falls, Idaho, visited the Redox Waste Handling and Decontamination on April 14, 1959, to discuss the handling of liquid and dry radioactive wastes. Mr. T. P. Lenahan, Haliburton Company, Duncan, Oklahoma, visited the same facility on April 22, 1959, to discuss decontamination of equipment and waste disposal for commercial application.

Mr. E. C. Bryson, Redox Journeyman Power Operator, retired on April 30, 1959. A party in his honor was given at the Non-Commissioned Officer's Club in North Richland on April 28, 1959.

C. T. Groschwitz

Manager - Redox

CT Groschwitz:HWM:mh

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CHEMICAL PROCESSING DEPARTMENT
FINISHED PRODUCTS OPERATION
MONTHLY REPORT

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APRIL 1959

I RESPONSIBILITY

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

II ACHIEVEMENTS

A. Processing Operation

Gross production of unfabricated plutonium was down sharply during April, to about 50% of schedule. Acute shortages of feed due to processing difficulties in the primary plants was the cause of this reduced production. However, inventories of material were such that all customer requirements were met on schedule. The Recuplex (recovery) facility operated at scheduled rates throughout the month. The Uranium Reduction Operation met production and shipping schedules for both normal and enriched material. A total of 476,070 pounds of 100% nitric acid was delivered to Purex from the recovery system of the Uranium Reduction Operation.

Prolonged operating difficulties at the Purex plant had a seriously adverse affect on feed availability for the plutonium processing line during April. No plutonium nitrate, within normal specification, was received from that source during the month. Several batches of material slightly high in G/AT were accepted on a waiver basis and successfully blended with feed from Redox and Recuplex. A high proportion of the total production of unfabricated plutonium during April was from material recovered from scrap by the Recuplex Operation. Mechanical difficulties were few with, vacuum troubles late in the month, on the drum filter system, being the most serious.

The Recuplex Operation processed at normal rates during April, 78 Kg of plutonium were recovered during the month from 41 slag and crucible runs, plus metal dissolver, supernatant and Purex nitrate feed streams.

Uranium Reduction operations were normal during the month. The operating difficulty at Purex has reduced the backlog of available UNH to a very low point at month end. The changeover of Redox from enriched to normal metal will cause production curtailment of E metal for an, as yet, undetermined period. There is essentially no E metal UNH available, however, shipping schedules for the coming month have been met and some material has been processed to meet a small part of the June 1 requirement.

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A. Processing Operation (Cont'd)

Work has started on the cleanout of the vacuum header in the 234-5 Building. While procedures are not yet firm, early results indicate the general plan of attack to be satisfactory. Work on the job will be accelerated during the coming month.

B. Fabrication Operation

The production and shipping of 65 Model Assemblies exceeded the April schedule by 13.7%. This higher than normal output came as a result of a request by the AEC for additional weapons parts for this fiscal year.

Fabrication activities progressed better than in any previous month. This performance was a continuation of the favorable trend which began in mid-March. However, reject rates are slightly higher than desired and casting quality continues to fluctuate widely.

A new 3-station prototype induction heat melting apparatus was placed in service during the month. Several melts have been made in this equipment which seems to function largely as intended.

Improvements were made in the filtration of liquid waste from the machining and degreasing operations. This waste now contains only _____ and approval has been requested for the routine discarding of this material by burial.

Essentially no fabrication work was done during the month in the new machining hoods. The equipment was in suitable condition to operate but other problems such as hood leaks and glove port repair and re-inforcement slowed the use of this new equipment.

C. Maintenance Operation

Equipment used in plutonium metal fabrication functioned well during this period. The high rate of failure of heating elements in Task IV has dropped and is now considered to be normal.

The operation of equipment used for plutonium metal preparation was good during the month. No unscheduled shutdowns of equipment due to mechanical failure were required.

The product recovery equipment functioned well during this period with the exception of the H-1 column bellows which failed twice.

The Uranium Reduction plant equipment operated with very little difficulty during the month, with minor difficulties involving feed pump bearings, and commutator brushes on the ACA motors.

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D. Control Operation

Analytical work proceeded routinely during the month with the performance of 4,104 determinations made on 1,007 samples. The sharp drop from March was due principally to the reduced spectrographic workload on buttons. All buttons sampled met purity specifications (average of 1,205 ppm impurities, excluding carbon), although several had to be recycled because of low density.

The purity of acceptable parts averaged 99.796%.

There were 11 radiation occurrences, 16 cases of skin contamination and 5 cases of clothing contamination during the month. There were no known incidents resulting in internal deposition. Stack emission at 234-5 Building averaged 22.3 microcuries per day, ranging between a high of 261 and a low of 4.1 microcuries per day. As a result of the increasing levels several exhaust filters were replaced. The high average is due principally to two cases where activity levels surged in the course of construction work. In the Uranium Reduction plant, the average stack emission was 10 microcuries per day. Average year-to-date gamma exposure to personnel was 410 mr, with 990 mr being the maximum. Currently 10 people are receiving radiation exposure at a rate exceeding 3 r per year.

E. Improvement Experience

1. Process Tests and Revisions

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

2. Inventions or Discoveries

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

F. Events Influencing Cost

Nothing significant to report.

G. Plant Development and Expansion

1. Projects - Study, Scoping or Approval Phase

A project proposal for reduction of radiation exposure in the Button Lines, 234-5 Building has been submitted for comment.

Project CGC-813, Recovery of Pu from Waste, is being routed for Company approval.

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

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

Phase II of Project CGC-811, Additional Fabrication Equipment, is being scoped.

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 Building.

Construction funds have been released for Projects CG-725, Liquid Waste Handling Facilities, UO₃; CGC-811, Additional Fabrication Equipment, 234-5 Building; CG-789, Additional Fire Protection, 234-5 Building; CG-723, Conversion of Recuplex to a Manufacturing Facility; and CGC-843, Disposal of UO₃ Condensate.

3. Projects - Completed

No capital expenditure projects were completed during the period.

III ORGANIZATION & PERSONNEL

A. Organization Changes

H. S. Gile, Chemist, Control Operation, was transferred to the Electronic Data Processing Operation, Contract and Accounting.

R. W. James, Chemist, Control Operation, was transferred to the Control Operation, Purex.

V. C. Haugen, Specialist Processing, Fabrication Operation, terminated to enter business for self.

B. Safety Experience

No disabling injuries or serious accidents occurred during April. Eleven medical treatment injuries were experienced as compared to ten in March. The frequency rate rose from 2.09 to 2.41.

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).

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D. Security Experience

There were no security violations experienced during the month.

E. Personnel Activities

Trial evacuations were held successfully at Z and U plants on April 17. No significant deficiencies were evident. A total of 207 persons participated.

F. Miscellaneous

L. A. Berry, on Special Assignment for the Manager, Finished Products, visited the Rocky Flats Plant of the Dow Chemical Company for the purpose of observing and discussing criticality control methods.

WN Mobley
Manager - Finished Products

WN Mobley:JPT:jjh

CHEMICAL PROCESSING DEPARTMENT
POWER AND GENERAL MAINTENANCE OPERATION

APRIL, 1959

I. RESPONSIBILITY

Effective April 1, the Power and General Maintenance Operation assumed responsibility for Mail and Duplicating Services in the Chemical Processing Department.

II. ACHIEVEMENTS

A. Operating Continuity

There were no outages of steam, water, or emergency electrical services that affected continuity of operation of the prime production facilities during the period covered by this report.

B. Inspection, Maintenance, and Replacement

Fabrication of a model 3 dual pass silver reactor for the Purex Facility is in progress and scheduled for completion June 7. Upon completion, the unit will be held in spare parts inventory for future use.

A vendor fabricated B-2 off-gas steam heater was insulated and made ready on a crash basis for installation in the Purex Plant when continuity of operation was acutely threatened by leaks in the existing equipment.

An electron beam furnace, designed to produce high purity plutonium by high vacuum and heat intensity vaporization of contaminants, is under construction by the Shops Operation, and was an estimated 38% complete at month end. Target completion date is July 1. The unit will be installed in the Hanford Laboratories Operation's 231 Facility.

Completed ahead of schedule was the fabrication of a standard dissolver vessel for the Redox Operation. This vessel was credited by Facility Engineering Operation's inspectors and welding engineers with having joint fit-up, welding and general fabrication characteristics superior to any vessel ever fabricated for HAPO either on or off-site.

Withdrawn from Spare Parts, assembled and made ready on a crash basis, was a Purex HA pulse column cartridge. The work was performed in anticipation of the necessity for replacement due to the suspected failure of existing equipment; however, process flows were corrected without replacement of the existing cartridge. The new unit will be held as a spare for installation when required.

Replacement of the panel on the machining hood, which was damaged by the recent explosion in the 234-5 Laboratories, was successfully accomplished. This was a noteworthy achievement in that extreme contamination problems were encountered and overcome without further contamination spread and without personnel becoming grossly contaminated.

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Fabrication of a Plutonium Ozonator for the Redox Facility is in progress and 60% complete at this time. The unit is designed to provide additional ruthenium decontamination of the plutonium stream. Target date for completion is June 15.

Progress continued on the sulfuric addition system at the UO₃ Plant in support of Project CG-767. Installation of the metering pump, piping, and electrical and instrument equipment is complete and acceptance tests are in progress. The project was an estimated 95% complete at month end.

Progressing satisfactorily is work on Project CG-725 (Waste Handling System at the UO₃ Facility). At month end the project was 50% complete and on schedule.

Extensive repairs to the T Canyon crane are in progress. Accomplishments to date include replacing two drive wheels, three idler wheels, overhauling gear boxes, and fabrication of a maintenance platform for use in servicing the crane. This repair program is in support of the planned removal of the Decontamination Operation from U Plant to T Plant.

Other work completed in support of the Hanford Laboratories Operation included the relocation of a metal turning lathe from 272-Z Building to the 231 Building, installation of a 125 ton extrusion press in the 231 Building and the installation in the 272-Z Building of a heavy duty rod straightener.

Other work currently in progress includes the installation of a high level radiation alarm system in the 231 Building which is progressing on schedule and is approximately 35% complete. Scheduled completion date is May 15.

Fabrication and installation in the 231 Building of two complete high vacuum systems, and the furnaces and associated electrical, instrument, and mechanical equipment for the oxide hood was approximately 90% complete at month end.

C. Improvements

A new type conical splined floating slinger was installed in a process pump (F-13) for use in H-1 tank at the Purex Facility. The slinger is a HAPO development and is designed to alleviate wear on a carbon bushing thus extending the leak-free life of the pump.

Fire hydrant #12 located immediately east of the 2713 Building, 200 East Area was replaced in the interest of better fire protection. A different type unit was installed to eliminate operating difficulties encountered with the original unit which operated against the water pressure. Included with the new installation were isolating valves in accordance with HAPO plant standards.

Eight dry wells (2" pipe sunk to a depth of 20') were provided in the area south of Gable Mountain for use by the Hanford Laboratories Operation's Chemical Effluents Technology component.

April 30 marked the close of the first month in which filming amines

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were fed into the process steam supply - no adverse effects have been observed to date.

D. Inventories

The Chemical Processing Department's Precious Metals inventory was reduced by \$34,855 as the result of a shipment of contaminated precious metals being sent off-site for reclaiming.

The annual physical inventory of steam coal in custody of the Power and General Maintenance Operation was conducted as of midnight March 31. Quantities of coal in storage pits, railroad cars, bunkers, hoppers, and the East Area silo were included. A summary of the inventory indicates:

	Value	Tons
Physical inventory value	\$768,101	96,623
Book value	<u>\$734,818</u>	<u>92,175</u>
Over book value	33,283	4,448
Physical variance to book	-----4.6%	

III. ORGANIZATION AND PERSONNEL

A. Safety and Security

No disabling injuries or security violations were incurred during the month.

A total of 18 medical treatment cases were reported reflecting a frequency rate of 3.88%.

B. Personnel Activities

P. E. Cunningham assumed managership of the 200 Power Operation effective April 1, 1959.

J. R. Goggin attended the Machining and Tooling Development Conference at Hotpoint Division of G.E. Company, Cicero, Illinois, on April 14, 15, and 16.

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

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CHEMICAL PROCESSING DEPARTMENT
FINANCIAL OPERATION

APRIL, 1959

I. RESPONSIBILITY

Effective April 27, 1959, the responsibility for the clerical portion of the Personnel Accounting function was transferred to the centralized group within Contract and Accounting Operation.

II. ACHIEVEMENT

A. Production Cost

Conferences with operating management and the Specialist-Procedures resulted in revision of the Steam and Water Distribution Report and Landlord Cost by Buildings Report. These revisions were made for the purposes of clearer presentation and reduction of clerical preparation time.

Production Cost personnel assisted in preparation of several engineering proposals involving cost estimates on NPR, NPF and Fission Products.

The 200C machining hood prototype was capitalized in April business, at a net book value of \$56,526.

A report of CPD FY 1959 estimated cost of radiation and safety activities was prepared and issued in response to a special request from the AEC.

Initial advice received informally from the local Commission indicated a favorable reaction to estimates submitted for FY 1960 and 1961. Estimates were felt to be generally tight and commensurate with production assumptions. Revised production assumptions, to be published in May, will result in some revision of 3000 production cost estimates.

Contaminated precious metal, involving the remaining portion of the old filter boats, was held, awaiting AEC disposition instructions. This material was shipped offsite April 24, for decontamination and reclamation. The reserve established, on previous Commission advice that the material could not be reclaimed, was closed to cost.

The physical inventory of steam coal, taken at the end of March, was reconciled and the report issued. The 4% disparity between book and physical was not adjusted, according to accepted practice, due to error inherent in the survey method of inventorying. Work is proceeding to determine whether a bias exists in the present consumption measurements.

B. Personnel Accounting

The Federal Income Tax Law provides for additional withholding of tax by voluntary agreement between the employer and employee. This provision stipulates that tax in amounts in excess of those required under the

law may be withheld upon written agreement. At HAPO this method of tax relief to employees in higher income brackets extended only to employees on the exempt payroll, and the right of exempt personnel to obtain this relief had not been made an item of general information.

Recently a nonexempt employee in FPD who knew of this procedure raised a persistent and most vocal objection when he was not granted the same privileges upon request. Because of his persistence, the FPD Manager of Personnel Accounting discussed the whole subject with Data Processing and received a decision that some re-programing would be done to provide a similar procedure of Federal Withholding Tax deduction for nonexempt employees. This new payroll tax deduction provision will be publicized through the various HAPO publications in the near future.

To guarantee correct balances in the payroll deduction accounts (2200 series) Personnel Accounting established absolute reconciliations with General Books and committed these reconciliations to a transmittal addressed to the Contract and Accounting Operation, Manager-General Accounting. In addition, balances have been reached for gross payroll earnings, taxable gross for Washington State Unemployment Tax, FICA and pensionable gross.

Statistics

1. Salary Payments

	<u>Gross Payroll</u>		<u>Overtime Payments</u>	
	<u>April</u>	<u>March</u>	<u>April</u>	<u>March</u>
Nonexempt*	\$554 271	\$558 912	\$7 706	\$9 158
Exempt	<u>322 976</u>	<u>324 849</u>	<u>2 125</u>	<u>2 846</u>
Total	<u>\$877 247</u>	<u>\$883 761</u>	<u>\$9 831</u>	<u>\$12 004</u>

*Payments cover a four-week period.

C. General Accounting

The March General Ledger Trial Balance and Reports of Travel and Living expenses were delivered to Contract and Accounting Operation on schedule.

As of March 31, 1959, expenditures of \$11,638,342 and commitments of \$294,391 had been incurred against active CPD projects with \$16,388,537 of authorized funds.

No new projects were authorized by the AEC during April, 1959. CG-723 - Conversion of Recuplex to a Manufacturing Facility, was increased to \$252,000 by the AEC to cover remaining construction. CG-754 - RMC Fabrication Line, 234-5 Building, was increased to \$1,050,000 by the AEC; the additional \$50,000 to cover transferred capital property.

A Construction Completion and Cost Closing Statement was issued for CA-513-E, Expansion of 200 Area Facilities with a final cost of \$2,351,367.

Appropriation Requests approved in April, totaled \$38,600 for the following:

1000 Ton Hydraulic Press	R&E	\$17 000
Alpha and Beta Air Monitors	Redox	12 900
Portable Industrial Television Chain	FEC	6 000
Mechanized Heliarc Cutting Unit	P&GM	<u>2 700</u>
Total		<u>\$38 600</u>

Two major property transfers were completed during the month. The first transfer was from Contract and Accounting Operation, transferring electrical equipment determined by inventory to be the custodial responsibility of CPD. The second transfer involved the 284-W boiler addition which was transferred to FPD.

The physical inventory of 234-5 spare equipment has been completed and a report is in progress.

D. Auditing

A formal audit report was issued covering the findings and recommendations relating to an audit of the General Electric Employee Pension Plan. In our opinion the activities audited were excellent.

A review was completed and an audit memo issued covering the findings and recommendations relating to CPD utilization of premium procurement practices. In our opinion, CPD's performance in this area was satisfactory; however, there were certain areas relating to required delivery dates where improvements would be desirable.

Field work was started on an audit of Sundry Employee Benefit Plans and Payroll Reports.

Field work was started on an audit of material control, contract AT(45-1) 1402 - Additional Facilities for Purex Tank Farm Vapor Wastes.

A detailed review was made of the proposed HAPC OPG - Control of Property Furnished Fixed Price Construction Contractors. In our opinion the proposed OPG discounted the responsibilities assigned to J. A. Jones Construction Company, Construction Engineering and Utilities, and the contractual obligation of the fixed price contractor. These and other irregularities or omissions were pointed out to J. W. Harris in a letter dated April 14, 1959. Further review of this proposal with Project Engineering personnel is planned.

E. Procedures

Procedural study of the FEO Material Control Group has been completed, and the report draft submitted to C. E. Kent, who requested the study. Following his review of this draft, the entire subject will be discussed with him, and the final report will be issued.

The factor value concept of controlling reserves for depreciation and computing reserve accruals was recommended in memorandum form for adoption at HAPO. This would benefit required, annual adequacy reviews. Characteristics of the concept is its flexibility in making it possible to express each acquisition cost in terms of a common acquisition date (the factor value), and basing all computations of reserve on individual, periodic depreciation amounts. The concept is even more valuable when applied to electronic data processing.

The procedure for recording and accumulating maintenance measurement statistics within the Purex Operation, was devised and necessary reports were programmed for IBM 702 application.

F. Measurements

The CPD Quarterly Measurements Report was prepared and issued. The CPD Productivity Report, together with the Redox and Purex Productivity Report, for the first quarter of CY 1959, was 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

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

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

B. Reports Issued

HW-59812	March Operating Report	MM McDonald
HW-59926	Essential Material Inventory and Consumption Report - March	GE Dyreng
HW-60014	March Unit Cost Information	BM Dobbs
HW-60031	Purex Cost and Production Analysis - March	GH Temple
HW-60032	Finished Products Cost and Production Analysis - March	GH Temple
HW-60033	Redox Cost and Production Analysis - March	GH Temple
HW-60129	Redox Productivity Report 1st Quarter CY 1959	GH Temple
HW-60130	Purex Productivity Report 1st Quarter CY 1959	GF Temple
HW-60213	Offsite Transfer Voucher	KG Grimm
CLVI-690	CPD Cost and Production Analysis - March	KG Grimm
TS - DR	Product and Cost Report - March	BM Dobbs

Acting Manager - Finance

May 8, 1959

CHEMICAL PROCESSING DEPARTMENT
FACILITIES ENGINEERING OPERATION

April 1959

I. RESPONSIBILITY

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

II. ACHIEVEMENTS

PUREX OPERATION

A. Research and Development

Rare Gas Processing

Document HAN-71897 requested comments on testing of the new Arco low-temperature rare gas stripper on simulated Purex off-gas to decrease uncertainties in the Hanford design. Document HW-60128 indicated that such a development program was considered unnecessary, since the HAPO design employed well-proven cryogenic steps used for years by industry. Large portions of the Arco installation would have to be rebuilt to permit testing of simulated Hanford off-gas.

B. Process Technology

Demister Installation for Purex E-F6 Concentrator

A preliminary drawing delineating the installation of a demister vessel between the Purex E-F6 concentrator and T-F5 acid absorber has been completed, to serve as the basis for detail design of the prototype unit. A work order has been issued for completion of design drawings covering installation of the demister and jumpers on a test basis. The short range objective of the demister installation is to ascertain the degree of improved E-F6 vapor decontamination possible with the present two-stage (E-F11 and E-F6) waste concentration process. The long-range objective of the demister installation is to remove the E-F11 concentrator from service using E-F6 for high-level waste concentration with single stage vapor decontamination only.

C. Plant Engineering

Sample Pit Piping

Design and drawings for remote connector have been completed. This new type connector facilitates rapid installation and removal of the piping in the sample pit.

DECLASSIFIEDREDOX OPERATION**A. Research and Development**Redox Multipurpose Dissolver

Scope design work for one new multipurpose dissolver for the Redox Plant has been completed. Comment prints and a rough draft of the scope document (HW-60143) are being circulated. Preparation of the final document has been started and final issuance is expected in the early part of May.

B. Plant EngineeringSwitchgear and Control Drawings

A new set of drawings has been completed on the 2400 volt switchgear and control for the 204-S Building. Other drawings such as the one-line diagram from electrical power, wiring diagram on the silver nitrate reactors, have been completed as-built. The updating of electrical drawings to as-built status is continuing.

Dissolver Repair

A welding procedure was provided the Decontamination Operation for repair of a Redox dissolver. This procedure covers welding details for worn areas and butt welds on the coil, and re-welding of the vessel seam. Type 308L wire was specified for welding 309 Scb as a result of corrosion tests made to check the adequacy of joints fabricated from this combination of materials.

C. Project ActivitiesMA-10 - 113-SX Waste Tank Leak Detection

The Physical Completion Notice was issued April 20, 1959. The AEC CPFF Construction Contractor is completing the exceptions to closing the project.

Authorized Funds	\$ 85,000
Financial Closing Cost	67,000
Target Schedule Date	12-19-58
Actual Completion Date	4-10-59

CA-783 - Additional Fire Protection - 222-S

The Physical Completion Notice was submitted April 14, 1959. Final acceptance is being withheld until completion of the inspection by the Insurance Rating Bureau.

FINISHED PRODUCTS OPERATION - Z PLANT

A. Research and Development

Chemical Processing and Reduction

Scoping of the Task III portion of the RMA line replacement has continued during the month. Several study drawings were completed and are ready for review. Study drawings dealing with alternate means of positioning the pressure vessel within the transfer tube have been completed and are being evaluated.

A study drawing for a dispenser to be used for charging Task II powder into the crucible has been completed and reviewed. The design includes provision for viewing the powder to determine if it is acceptable and also for diverting the powder to a chamber for recycling back to the vibrating tube if the powder is off-color. Scoping of the pre-reduction and kiln process equipment is essentially complete. The work remaining in this area involves the study of various schemes for providing a Hood 6 function for the RMA line. The primary question here is that of evaluating the need for weighing product versus volume measurement for accountability purposes.

RMA Button Line

Some specific decisions have been reached for a testing and design verification program in support of the RMA button line equipment. The principal items of this program are as follows:

a. Induction Heating

This work involves the development and testing of low frequency induction coils for application to the screw conveyor, vibrating tube and Task III furnaces on the new RMA line and also for application to the screw conveyor and vibrating tube in Hood 9 on the RMA line.

b. Slurry Filter Media

This work involves the determination and testing of filter media to be used on either the vacuum drum filter or a vacuum disc filter for filtering plutonium oxalate slurry. Tests already run on stand-in materials indicate high efficiency and low waste losses can be attained using metal mesh filter media on either vacuum drum filters or disc filters. Most of the work done in this area was associated with the prototype hot button line program. The work remaining involves determination of suitable means of removing cake from the filter media and positively charging it into the calciner screw.

c. Vibrating Tube Off-Gas Filter

The work in this area involves the determination of suitable filter media for the vibrating tube off-gas system and means of cleaning the filter media during operation to minimize downtime and maintenance

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difficulties. Also as a part of this work, a scheme for recycling of Task II powder is being investigated.

d. Bellows

This work involves the determination of a suitable bellows material and configuration which can be used on the RMA fluorinator. The main objective is to design a bellows that will have long life.

Z Plant Radiation Study

A comparison was made of the shielding effectiveness of 1/4 inch medium density x-ray type lead glass and high density lead glass. With laboratory source samples, the 1 inch high density glass was found to be about four times as effective as the 1/4 inch x-ray glass in reducing radiation for plutonium metal. This factor was confirmed under process conditions in the solution and blending hood in Recuplex. Equal thicknesses of the two glasses in shielding tests in Recuplex showed the x-ray glass to be 75 percent as effective as the high density glass.

Hood radiation in Recuplex of 30 mr/hour at one foot was reduced by a factor of 2 with 1/4 inch of x-ray glass. An appreciable reduction with 1/4 inch x-ray glass for other hoods in Recuplex, as reported by others, indicated varying radiation conditions on different hoods in the line. An even more detailed study of shielding requirements on an individual hood basis is indicated.

Neutron Instrumentation in Recuplex

Recommendations are being prepared on installation methods for several additional monitors for plutonium concentration. A hold-up tank for a process line, and associated shielding against background is one of the items. An in-line installation is desired on the CAW stream. A safe method of installing shielding for an installation on the G-10 tank is also being studied.

A problem in the instrument application on some tanks is the high temperature which can seriously affect the operation and calibration of the neutron detector. Test work is in progress on this problem.

Weapons

Design scope and preliminary engineering work was continued throughout the month in conjunction with Research and Engineering on the hooding and installation of the Pratt & Whitney six-coordinate gage, the Sheffield gage, a remotely operated Whitney balance, and a prototype facility for the sub-assembly of Pit 65 weapon components.

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B. Process Technology

Progress was made during the month on the study to improve process hood designs and to decrease hood costs. A prototype hood was fabricated to evaluate the degree of tightness that can be achieved by the use of a self-sealing weather strip to join a plastic panel to the hood wall. If these tests prove successful, it may be possible in the future to eliminate a large portion of the stainless steel Nelson studs, acorn nuts, and clamping strips. Also, a series of tests were conducted to evaluate the application of adhesives for attaching plastic glove port rings to hood panels. Of nine adhesives subjected to the test, only two were considered to merit future consideration, these being Miracle NP-428 and Homolite 1800.

Plutonium Losses in 234-5 Plant Wastes

Control charts were plotted for the reported Pu losses in the CAW and the D-6 waste streams from the 234-5 Plant. These charts show no significant reduction in the concentration or quantity of Pu being released in these streams to cribs for the 14-month period January 1958 through February 1959.

Preliminary calculations indicate that if Pu can be recovered from the concentrated bottoms, the value of this recovered material will equal the steam costs for reducing the concentration of Pu in the D-6 stream to 0.1 MPC by evaporation.

C. Plant Engineering

Personnel Exposure Survey - 234-5 Building

A study is in progress to determine levels and personnel exposure by location and activity in the production areas of the 234-5 Building. Two sets of data are required: (1) the amounts of time operators spend engaged in each of the many activities taking place, for each of several dozen locations in the area, and (2) the levels of both gamma and neutron radiation existing in these locations. A major part of the data has been accumulated.

D. Project Activities

CAC-798 - Crib and Test Wells for 234-5 Building - 216-Z Crib

The Physical Completion notice on this job was issued April 10 and the one remaining exception was completed during the month.

Authorized Funds	\$ 18,700
Financial Closing Cost	\$ 18,700
Directive Completion Date	4-30-59
Actual Completion Date	3-24-59

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Project CGC-800 - Reduction of Personnel Exposure, RMA Line

The scope of this project was reviewed during the month primarily from the standpoint of determining what could be done to reduce exposure in Zone III without exceeding the authorized project funds. Preliminary agreement has been reached by the representatives of the various components that the installation of 1/4 inch x-ray glass to the backside of all process hoods from Task I through Task IV is justified. A revision to the scope document is being prepared.

GENERAL ACTIVITIES

A. Research and Development

Fission Product Recovery

Studies of both the long-range and interim fission product recovery programs were continued. Under the long-range program cost estimates were obtained for the conversion of B Plant into a "production pilot plant" capable of processing the entire Purex Plant output of cerium, strontium, and promethium. The estimated cost of this plant, exclusive of the packaging facilities, is about \$3,500,000.

The interim program, as currently envisioned, will provide limited quantities of mixed fission products for reprocessing elsewhere. The fission products will be collected in an in-line filter device in the Purex Canyon and loaded out of the Purex Building for direct shipment to the customer.

Rare Earth Recovery and Purification

A preliminary review of the Ames-developed ion exchange process using EDTA and copper sulfate solutions to obtain sharp "bands" of the specific rare earths indicates the principal problems anticipated in development of this process to Hanford fission product recovery are:

1. Questionable resin stability in the high radiation field.
2. Possible convection currents in the columns due to low solution velocities.
3. The large heat generation potential of the fission products solution.

Non-Production Fuels Reprocessing

Activities concerned with NPF Reprocessing are summarized below:

1. Cask Acceptance Criteria

Comments on the Hanford criteria for the receiving of irradiated power fuel casks have been received from the AEC. These comments and other information developed since the original issue have been incorporated into a final issue that will be transmitted to the AEC for use in the power fuel reprocessing contract.

2. Dissolver Design Parameters

A rough draft report has been prepared defining the parameters of dissolver design, as applied to the NPF program and presenting the highlights of the batch-circulation dissolver system in the light of the design parameters.

3. Scope Design Criteria

A preliminary EFD for the U Plant bathtub cells has been made, and a tentative layout of metal solution storage vessels has been completed. These items contain sufficient information to permit initiation of drafting. The scope design for the transfer facility has been started.

Plastic Developments

A transparent plastic air helmet has now been adapted for use with building fresh air systems. One unit has been delivered to the Radiation Monitoring group, Hanford Laboratories for evaluation.

Critical Incident Alarms

The fabrication of the instruments is now proceeding rapidly in the shops. The installation designs are nearly complete and installation work is in progress.

B. Plant Engineering

F-6 Concentrator Tube Bundles

Joint designs and welding procedures used in making workmanship samples of tube-to-tube sheet welds for the F-6 concentrator tube bundles were reviewed. Etching of sectioned welds revealed all joints were acceptable; however, welds having optimum throat dimensions and preferred contours were made in joints with the tubes recessed 1/16 inch and the weld deposited at approximately 100 amps. The volume of base metal between holes in the tube sheet appears to substantially affect the amount of current required in making these welds.

C. Project Activities

Project Cost Information as of April 19, 1959:

Total Authorized Funds - 21 Active Projects	\$14,018,000
Total Cost-To-Date	9,403,000
Commitments and Open Work Releases	436,000
Unencumbered Balance	4,179,000
Costs Charged to Above Active Projects -	444,788
3-15-59 to 4-19-59	

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Project CA-773 dropped from Active Status during this period:

Authorized Funds

\$ 39,100

Total Cost

\$ 30,430

III. ORGANIZATION AND PERSONNEL

A. Personnel

P. W. Smith, rotational trainee, joined Process Design and Development on April 13, 1959.

B. Safety

Interest in safety activities continues to be satisfactory. No particular trends have been noted.

C. Safety and Fire Prevention Activities

An explosion occurred in a research process column in 222-S with \$200.00 damage to the laboratory equipment. No injuries, fire, or contamination spread resulted.

A disabling injury was sustained by the retroactive classification of a February 7, 1958 knee injury. As a result, the disabling frequency for that year was revised from 0.0 to 0.34 and the severity rate from 0.0 to 5.43.

Advice and Counsel

Purex - Guarding air compressors, design approval on stepladder for L Cell, gas cylinder installations, acid tank personnel entrance, simulation of hood fires, approved repair procedure for leaking HS column.

Redox - Testing of heat detector devices, use of demand-type breathing mask, use of SS corrugated flexible hose, ventilation recommendations for oil storage building.

Power & General Maintenance - Compressed air line safety valves, proper gas cylinder storage at 272-W, hydrogen atmosphere sintering of brass in TS Shop.

Finished Products - Survey of hard hat and eye protection zones and safety shower distribution.

D. Inventions

None

E. Reports Issued

HW-59836, "Shielding - RMC Button Line, Project CG-734," RA Ciccarelli, March 31, 1959.

HW-60041, "Installation of Additional Manufacturing Facilities Inside the 234-5 Building," E. O. Swain, April 14, 1959.

HW-60042, "Facilities for Sub-Assembly of Ball Type Plutonium Weapon Components," J. R. Fritz, April 15, 1959.

HW-59013, Rev. 1, "Budget Study Report, FY-1951 Plant Acquisition and Construction Budget - NPR Reprocessing Requirements - UO₃ Plant," L. D. Gustafson, April 24, 1959.

HW-59345, Rev. 1, "Basis for Scope Design of a Non-Production Fuel Reprocessing Facility", by Members of Extraction Design and Development, April 7, 1959.

HW-60128, "Purex Gas Purification - Development Studies," J. H. Warren, April 24, 1959.

HW-60158, "Trip Report - Discussions at Mound Laboratory on the Separation of Xenon Isotopes by Thermal Diffusion", L. R. Michels, April 30, 1959.

HW-58318, "Plutonium Recovery from Contaminated Materials - 234-5, Project Proposal Revision 2", dated April 20, 1959 by R. H. Silletto.

HW-59081, Plant Equipment & Analysis Report, "Plutonium Recovery From Contaminated Materials - 234-5", dated February 2, 1959, by R. H. Silletto.

HW-59243, "Purex 216-A-4 Crib Replacement (Project Proposal)", dated April 24, 1959, by L. W. Finch.

HW-59805, Scope Revision No. 1, Project CGC-789, dated April 14, 1959, by R. H. Silletto.

HW-59931, "NPR Fuel Reprocessing Facilities - 200 Area (Data Sheet)", dated April 9, 1959, by D. R. Gustavson.

Letter, transmittal for document HW-59345, Rev. 1, to distribution from H. P. Shaw, April 28, 1959.

F. Trips

J. B. Fecht attended the Reliability Symposium in Schenectady, New York on April 1, 2 and 3, 1959.

L. R. Michels visited Michigan Chemical Company on April 6, 1959, to obtain information on the commercial recovery of rare earths, and Mound Laboratory on April 10, 1959, to ascertain progress in the field of xenon separation.

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L. R. Michels attended the Nuclear Congress at Cleveland, April 7 to 9, 1959, to present a paper entitled, "Design and Operating Considerations for Off-Gas Systems in Nuclear Processing Plants". He also attended The National Industrial Conference Board session on "The Commercial Future of Radiation", and made vendor contacts at the Atom Fair on heat transfer equipment.

J. R. Fritz visited the Sheffield Corporation at Dayton, Ohio, on April 14 and 15 and the Pratt & Whitney Company, Inc., at West Hartford, Connecticut, on April 16 and 17, to discuss various problems concerning the gages which these companies are providing for installation in the 234-5 Building.

H. P. Shaw attended the Engineering Meeting conducted by General Electric Engineering Services for Managers of Engineering and Managers of Laboratories in Schenectady - April 27 through May 1, 1959.

G. A. Conner, visited the Western Metals Congress and the Fabriform Metals Products Company in Los Angeles, California, March 16-19, 1959.

P. S. Kingsley visited the following locations in the period from March 29, through April 4, 1959: Battelle Memorial Institute, Columbus, Ohio; General Electric Evendale Plant, Cincinnati, Ohio; Union Carbide Metals Co., Niagara Falls, New York; General Electric Research Laboratory, Schenectady, New York. Purpose of the trip was to discuss improvement of existing materials for power reactor fuel dissolver construction.

G. Visitors

Mr. R. E. Myers, Betz Laboratories, visited the plant on April 16, 1959 to consult with plant personnel on filming amine treatment of process steam.

Mr. R. F. Doupe of General Electric Apparatus Sales Division Service visited the 203-A Building, April 14 to make adjustments on electrical controls of the second remote crane.

Dr. Frank Neumann, Seismologist at the University of Washington, visited HAPC April 22 - 24, 1959, to perform natural ground vibration studies in accordance with Consultant Agreement CA-204.

Manager
Facilities Engineering Operation

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CHEMICAL PROCESSING DEPARTMENT
RESEARCH AND ENGINEERING OPERATION

APRIL, 1959

PUREX PROCESS TECHNOLOGY

Head End

Irradiated uranium, cooled from 93 to 106 days, was dissolved to form solvent extraction feed. The processing of unclarified feed in the solvent extraction section continued during the month as part of a test to determine if any long-range adverse effects resulted from processing uncentrifuged HAF.

The differential pressure across a plugged silver reactor was reduced from 38 to 2 inches water pressure (at comparable air flows) by flushing with 2 M $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$ - 0.2 M NaOH. Since regeneration, the reactor has operated normally. The C-Cell prototype dual-pass silver reactor became inoperable because of plugging and thus is also scheduled for sodium thiosulfate-caustic flushing. Prior to its removal from service, off-gases from approximately 4600 tons of dissolved uranium had been processed through the reactor with only two regenerations; however, one regeneration was on the lower bed only rather than both upper and lower beds. All ammonia scrubbers functioned satisfactorily but no quantitative data as to ammonia recovery have been obtained.

Fission Product Recovery

No additional solids removal was experienced when a once-centrifuged batch of IWW was gelatin-treated (addition of 0.002 lb./gal. gelatin and digested for one hour at 80° - 85°C) and recentrifuged. Testing of two feed rates (11 and 26 gal/min.) during recentrifuging indicated markedly less solids removal at the higher rate. The final "clarified" IWW was depleted in zirconium and niobium by factors of 2.5 and 1.4, respectively.

Solvent Extraction

Upon completion of the neptunium recovery run, irradiated uranium processing was initiated; however, because of process upsets and malfunctioning and/or equipment failures a major portion of both products contained high gamma activity and failed to meet product specifications. Specific items which contributed significantly to the subnormal decontamination were as follows:

- a) Bypass of HS Column - The HS Column was bypassed when a leak developed in the bottom disengaging section; thus, the two to three decontamination factor normally attained in this column was no longer available.
- b) High fission product activity in the 3WB - Abnormally high gamma activity was experienced in the 3WB stream when severe entrainment and foaming of acidified IOW refluxing in the

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rework tank added incompletely hydrolyzed waste to the 300. The addition to the 200 of solvent recovered from the 20W also appeared to be related to the high 3WB gamma activity.

- c) Low HA Column decontamination - A fluctuating HAF flow rate produced lower-than-normal HA Column decontamination performance by preventing control at the optimum organic uranium saturation until the HAF rotameter and pump were changed. Frequent shutdowns and startups also contributed to the poor HA Column performance.
- d) Crosscontamination - Some crosscontamination of the intercycle solvent extraction product streams occurred when the solutions used for in-cell decontamination of the HS Column were transferred to waste via a common header.
- e) Operation of L-Cell Package - When the Plutonium Ion Exchange Unit equipment did not function properly (see Plutonium Concentration), plutonium concentration was accomplished in the L-Cell Stripper and Concentrator. Thus, the decontamination factor of ten, which can be attained in the plutonium ion exchange unit, was not available.

As a result of the above-mentioned difficulties, both uranium and plutonium productions were curtailed. However, despite the relatively poor plant performance, forty percent of the uranium produced met product specifications, and another 35 percent was acceptable after either blending or processing through silica gel. Twenty-five percent was reprocessed because of high gamma activity or to permit recycling of out-of-specification plutonium. Only fifteen percent of the plutonium product was acceptable for plutonium fabrication without further decontamination; however, twenty percent was accepted by the Finished Products Operation for processing through Recuplex. The remainder of the plutonium required recycling through the Purex Plant before meeting specifications.

At month's end all plant equipment was functioning properly with the HS Column bypassed, and indications are that normal decontamination performance will result. Both the HAS flow and HA Column pulse frequency have been increased ten percent to assist in improving decontamination.

Temporary brief periods of partitioning failure were experienced throughout the month with up to sixty percent of the plutonium measured in the IBU stream. Based on the belief that the nitrite in the 2BW stream (now returned to the IBXF Tank) caused the partitioning loss, the 2AF sodium nitrite addition was decreased twenty percent and the IBX flow increased twelve percent, but neither adjustment corrected the partitioning problem completely. However, preliminary results indicate that the addition of 0.045 M sulfamic acid to the 2BX has returned the IBU plutonium content to a normal 0.4 percent.

Successful bottom interface operation of the IC Column (which increases the column capacity approximately thirty percent) was demonstrated during the month; however, about 700 pounds of uranium were lost via the ICW before the

proper operating conditions for the organic continuous column were firmly established. Normal ICW uranium losses were achieved by increasing the IC Column L/V from 0.92 to 1.15 and increasing the pulse frequency from 42 to 92 cycles per minute.. The major portion of the uranium accumulated in the ICW was segregated for rework.

Neptunium Recovery

The April neptunium run utilized the 2A Column for separating neptunium from fission products and plutonium while processing reduced 3WB. Both ferrous sulfamate and hydrazine were added to both the 2AF (3WB) and 2AS. The 2AP (containing the neptunium and uranium) was processed in the IBX and IBS Columns with the bulk of the uranium going to the IC Column and the ICU Concentrator. The neptunium remained in the IBP stream, was again reduced and then returned to the 2A Column after all the 3WB had been processed. The final reflux-recycle operation of the 2A - 2B Columns reduced the fission product concentration to an acceptable level and provided additional plutonium decontamination.

Operation of the new flowsheet was quite satisfactory. Gamma decontamination was good ($CF = 20$), considering the low gamma activity of the feed ($\sim 1.5 \times 10^6$ uc/gal), and the 2AW neptunium loss ranged from 0.5 to 1.0 percent. High, but tolerable, uranium concentration resulted from discontinuing 2A - 2B Column recycle prior to completion of the IBX Column stripping. Eight-hundred grams, equivalent to ninety percent of the neptunium in the 3WB processed, were recovered and sent to the purification facility.

A higher percentage of virgin neptunium has been accumulated in the 3WB during the April uranium processing than has been previously experienced. This has been achieved by better control of nitrite concentration in the HA Column since the 2BW was rerouted into the IBXF instead of the HAO. Consequently, the neptunium losses in the HAW, as well as the 2DU, are near the lower analytical limits of detection; however, at the present time these limits represent a HAW loss of ten to fifteen percent and a 2DU loss of one to two percent.

Plutonium Concentration

Because the resin pushes were extremely erratic and frequent plugging of the resin receiver occurred, the 2BP was routed to the L-Cell Package during the first part of the month. After a defective gasket in the equalizing line was changed, a new teflon sleeve installed in the three-way valve, the resin replaced, and minor adjustments made in the operating techniques, the unit functioned satisfactorily. Attempts to improve decontamination in the unit by increasing the XAS to 300 percent of flowsheet and the XAF from 6 $\underline{M}$ to 7 $\underline{M}$ HNO_3 did not change the decontamination significantly.

Testing of two modified Corley Magnaflo XAF pumps, installed together in parallel with the existing Lapp Pulsafeeder XAF pump, was started, but one pump developed a severe vibration after about six hours of operation. When correction of a metal-to-metal contact failed to improve operation of the pump, the only remaining cause of vibration appeared to be the carbon thrust bearing loose in its housing. Since facilities are not yet available for replacement of the bearing, the spare pump is being installed.

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Solvent Treatment

The gamma activity of the 100 and 200 increased seven and three-fold, respectively, above normal when high intercycle gamma activity was experienced in the solvent extraction section. However, doubling the frequency of batch washing aqueous changes and the potassium permanganate, IOC and 20S rates for 24 hours plus a general drop in gamma activity levels throughout the remainder of the plant reduced the gamma activity to normal.

Incremental additions to the 200 of 500 gallons of solvent recovered from the 20W over a 24-hour period had no apparent effect on the operation of the 2D Column but correlated with a five-fold increase in the 3WB gamma activity. Approximately 800 gallons of solvent were discarded, after batch washing to reclaim plutonium and uranium, to the organic crib because of high residual gamma activity.

Waste Treatment and Acid Recovery

Frequent plant shutdowns and startups coupled with waste and uranium rework operations precluded optimum operation of the waste treatment and acid recovery equipment and low IWW volumes. Consequently, the waste sent to the underground storage tanks averaged 107, 551, 157 and 4 gallons per ton of uranium for neutralized IWW, solvent washes, cell drainage and centrifuge cleanouts, respectively. The coating waste sent to storage remained at 231 gallons per ton of uranium. Over-all plutonium and uranium losses for the month were 0.47 and 0.14 percent, respectively. Coating waste losses for plutonium and uranium accounted for 11 and 8 percent of the over-all losses, respectively.

Other items of interest in the waste treatment and acid recovery operations were:

- a) A bottoms transfer from the No. 2 Acid (Waste) Concentrator equivalent to five flows was initiated to reduce corrosion resulting from accumulated corrosion products in the here-to-fore stagnant bottoms.
- b) After peaking in the 5000 to 10,000 uc/gal. range during the previous month, the gamma activity of the Purex recovered acid declined to 1000 - 1500 uc/gal. (Normal activity = 500 - 1000 uc/gal.).
- c) Thirty-five hundred gallons of miscellaneous wastes were re-worked with no adverse process effects after 35 days of refluxing.
- d) Gelatin treatment of IWW prior to centrifugation produced no significant reduction in the rate of bed plugging when the treated solution was processed through the IWW anion exchange equipment.

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Self-concentration in Tanks 241-A-101, 102, and 103 continues at boil-off rates of 2.9, 19.6, and 1.0 gallons per minute, respectively. Recent calculations indicate temperature excursion in TK-241-A-101, during which the sludge temperature increased from 136°C to 158°C before the trend was reversed by dilution of the tank contents and increased air flow to the recirculators, may have been caused by overconcentration (greater than 8 M sodium concentration). After receiving process wastes for fourteen months, TK-241-A-102 now contains 64 percent of the terminal 8 M sodium concentration at the hydrostatic head limit.

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DECLASSIFIEDREDOX TECHNOLOGY OPERATIONSolvent Extraction

Testing of the behavior of boric acid in the extraction system was continued in conjunction with evaluation of an acidic flowsheet for the first extraction cycle. One HAF batch was processed using the following HA Column flowsheet:

HAF:HAIS:HAS:HAX = 124:55:25:375

Stream	Molarity						Hexone
	UNH	ANN	HNO ₃	NaNO ₃	Na ₂ Cr ₂ O ₇	H ₃ BO ₃	
HAF	1.62	0.43	+0.28	0.59	0.1	0.05	
HAIS	0.05	2.5	-0.2	0.81	0.06	-	
HAS	-	1.3	+0.2	-	0.1	-	
HAX	-	-	+0.1	-	-	-	100%

Samples of the HAF and other process streams, taken while employing this flowsheet, indicated the boron concentration to be below the detection limit of 20 parts boron per million parts of solution. Spectrographic analysis of the uranium product stream showed the boron to be less than the detection limit of one part boron per million parts uranium. Interference in the spectrographic analysis of the plutonium product stream prevented accurate determination of the boron concentration below 20 parts boron per million parts plutonium.

Neptunium losses in the HAW stream during the test were below the detection limit, which corresponded to a 2 percent instantaneous loss. Approximately 70 to 80 percent of the neptunium in the feed appeared in the HAF stream indicating the reflux to be considerably less than that encountered in earlier tests.

The fission product activity of the LAFS stream increased approximately five-fold as a consequence of the acidic EA flowsheet. This increase in activity, primarily ruthenium, persisted throughout the plutonium cycles but did not necessitate the rework of any plutonium product. The acid-deficient uranium cycles, particularly the 2D Column, removed the additional ruthenium, giving a uranium product stream well below the specification limit for fission product activity.

Laboratory inspection of a few agitated HAW samples revealed the presence of a precipitate, even during the use of the acidic HA Column flowsheet, which had not been noticeable in un-agitated samples. The precipitate, which appears similar to that encountered previously in the LAW stream and the HAIS concentrator, may be the major cause of the precipitate problem encountered during the recycle of the HAW stream to the HAIS concentrator. Further investigation is planned to determine the factors affecting the precipitate formation and the point in the process at which the precipitation occurs.

Operation of the extraction system at rates low enough to conform to the E-Metal dissolution rates necessitated a 40 percent increase in the 2DS flow, to approximately 40 gallons per hour per square foot, to provide adequate sodium removal in the 2D Column. The following flowsheet,

2DF:2DIS:2DA:2DX = 88:16:35:400,

reduced the sodium content of the product stream from 160 to 25 parts sodium per million parts uranium. Despite the reduction in the 2DW salt strength to 0.36 M aluminum nitrate, the uranium recycle averaged only 10 percent.

Cribbed Waste

Diversion of the feed oxidation condensate to the high activity waste system reduced the beta activity of the cribbed condensate to approximately 2 percent of the average for the preceding three years. Following the diversion of the ruthenium-contaminated condensate, the fission product activity spectrum of the cribbed waste was similar to that encountered in the waste concentrator, predominantly zirconium-niobium.

Waste Storage

Sampling of the non-boiling 241-S wastes, which are 5 to 7 years old, has been initiated in a program aimed at evaluating drying and permanent storage of these wastes in the bismuth phosphate waste storage tanks. Samples of the 112-S tank, taken at six different levels, showed the gamma activity, 0.2 curie per gallon, to be essentially all cesium. Specific analyses revealed the strontium activity to be approximately 200 micro curies per gallon. Factors to be investigated for the wastes in this and other non-boiling tanks include the maximum feasible concentration and the thermal characteristics of the dried waste.

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FINISHED PRODUCTS TECHNOLOGYURANIUM CONVERSION OPERATIONProcess Performance

All UO_3 shipped met product specifications. Two containers failed to meet the particle size specifications and required remilling.

Nine hundred thirty three (933) pounds of nitric acid per ton of uranium processed (88.5% of theoretical) were recovered at an average concentration of 47%.

The average operating rate of the calciners was 7.16 tons uranium per unit for each day on the line. The overall calciner operating efficiency was 97.7%. Calcination of enriched metal in the G calciner was continued and averaged 8.4 tons uranium for each day on the line.

Marginal milling performance with the enriched UO_3 was traced to an improperly installed deflector plate in the hammermill.

Process Improvement

Automatic start-up and shut-down controls were installed on the remaining two concentrators. In addition, one concentrator control system was modified to allow the calciner feed tank weight factor to start up and shut down the concentrator as needed.

The condensate piping from the evaporator vapor condenser was revised to prevent the build-up of condensate in the condenser.

The H calciner powder bed was removed for inspection of the agitator. Three hinge pins were found to be broken and two 3/4-inch shear pins, having 5/8-inch shear diameter, were cracked. All notched hinge pins were replaced with solid pins. All shear pins in the hubs with broken hinge pins were also replaced.

One broken thermowell was replaced during the month.

The performance of K calciner, equipped with magnetic flowmeters, was excellent.

METAL FINISHING OPERATIONRecuplex

Forty-five runs, consisting of crucibles, fragments, powders, and clean-outs were processed through the S & C Hood. Slurry losses to crib averaged 0.12 percent of the recovered plutonium. The average number of

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crucibles per Task III crucible run was increased from six to eight, with an associated reduction from 3.5 to 2.8:1 in the Al to F mol ratio. Solvent extraction processing of this feed appears to be satisfactory.

The SE Hood processed 1230 liters per day at 66 percent operating efficiency, for an average instantaneous rate of 1860 liters per day.

The low throughput was probably caused by silaceous scale on the column walls.

The Task I supernatant evaporative heat kill test was completed. Evaporative heat kill produces a concentrated supernatant equivalent to chemical kill, provided about 10 parts of Dow-Corning A-F emulsion per million parts of supernatant are added to the supernatant feed prior to concentration to prevent foaming and short circuiting in the concentrator.

Task I - II

One hundred thirty seven (137) runs were processed with an average filtrate recycle of 4.33 percent.

Operation of the continuous unit was intermittent during the month due to variances in the feed supply. The frequent start-ups required, and a wide variation in feed product concentration contributed to the above normal recycle.

A chemical flush of the drum filter was carried out which proved to be approximately 90 percent effective. A small amount of manual rodding was subsequently required. This was the first clean-out of this type required in the nine months since start-up.

Task III

On a test basis, one reduction was attempted without mixing the calcium with the tetrafluoride. The calcium was placed in the bottom of the crucible and a small amount of iodine booster (0.2 mols) was used. Very little chemical reaction took place, and 87.8 percent of the tetrafluoride powder was recovered and reduced using standard mixing procedures.

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PROCESS CHEMISTRYREDOX PROCESS ASSISTANCE

For several months, a laboratory investigation of the use of 0.7% ozone in air for the removal of fission product ruthenium (as the volatile RuO_4) from Redox 2BP (plutonium product) has been under way. The results indicate that successful ruthenium volatilization from this type solution, at least with this low an ozone concentration, requires that an auxiliary oxidizing agent, or catalyst, be used, that the solution be free of oxidizable organic materials, and that the solution be nearly boiling. In the most successful tests, satisfactory ruthenium removal rates were achieved at 98 C for samples of air-sparged, plant 2BP which had been made up to a composition of 0.5 M HNO_3 , 0.7 g/l Pu, 0.001 - 0.003 M cerium(IV) nitrate, and 1.0 M $\text{Al}(\text{NO}_3)_3$. The system is complicated by these factors: 1) any additives must be compatible with subsequent processing steps; 2) the plutonium apparently must be hexavalent to permit ruthenium volatilization; and 3) although cerium(IV) appears to be the most suitable auxiliary oxidant, it tends to precipitate from solution under the ozonation conditions. The best method found for preventing the formation of insoluble cerium compounds in these solutions is the addition of aluminum nitrate.

NEPTUNIUM PROCESSINGNeptunium Purification

Nine hundred and ten grams of Np^{237} were processed through the anion exchange facility during the month. The material consisted of 110 grams recovered from fluorination ash at Paducah and 800 grams of new material from the Purex plant. A high ratio of natural thorium to neptunium in the Paducah material (1.3/1) and a high uranium to neptunium ratio in the Purex material (20/1) caused poor adsorption of neptunium on the resin, with resulting high column waste losses (about 10%).

While recovering plutonium from neptunium processing wastes, the four-inch diameter, four-foot high anion exchange column shattered. The conclusion reached from investigating the incident was that the rupture occurred as a result of the internal pressure to which the glass pipe was subjected. It is not known if the column broke under the normal operating pressure of 25 to 30 p.s.i., or if an abnormal pressure which exceeded the safe working limits of the glass had developed, through sudden, excess gas evolution.

Neptunium Oxalate Precipitation

Investigations of neptunium oxalate precipitation conditions were continued. Oxalate precipitations were carried out in which the neptunium concentration, neptunium valence state, nitric acid concentration, and temperature of the slurry were varied.

In the present process, in which neptunium(IV) nitrate is added to 1 M oxalic acid, a light-gray, very difficult-to-filter precipitate is formed. This

material gradually changes to a bright green, readily filterable material when left in contact with the mother liquor. It was found that the rate at which the light-gray precipitate turns to a green, filterable precipitate increases with increasing temperature. The rate did not appear to be materially affected by the nitric acid concentration or the neptunium concentration of the slurry. It did appear, however, to be dependent on the particular batch of feed used. In dilute strikes in which the anion exchange eluate was precipitated directly (without evaporative concentration or pre-reduction), a rate difference of a factor of four was observed between batches. When feed material eluted from old resin (resin which had been used for a number of runs) was used, a filterable material was obtained in 30 minutes with hot strikes ($\sim 50^\circ\text{C}$) and in 60 minutes with cold strikes ($\sim 25^\circ\text{C}$). In contrast, when material eluted from new resin was used, a two hour contact period was required before a filterable precipitate was obtained with hot strikes and 4 - 6 hours with cold strikes.

The cause of the high filtrate losses (filtrate neptunium values ranging from 50-140 mg/liter) that had been experienced was found to be the incomplete reduction of neptunium(V). In all cases in which the initial filtrate neptunium values were high, the addition of ferrous ion (to a final concentration of $\sim 0.01\text{ M}$ ferrous ion) produced further precipitation, giving neptunium filtrate values ranging from 12-27 mg/liter. It was also found that the reduction of neptunium(V) during the precipitation step was very slow. When neptunium(V) nitrate was added to a solution containing 1 M oxalic acid and reducing agent to give a final slurry of 0.15 M oxalic acid, 8 g/l semi-carbazide, 10 g/l neptunium, 3.2 M HNO_3 , and 0.006 M ferrous ion, reduction to the Np(IV) state was only 80% complete in 60 minutes at room temperature.

Neptunium Filtrate Recycle

Various ways of recovering the neptunium from the oxalate filtrates were tested. Concentration, reduction, and reprecipitation with oxalic acid gave excellent neptunium recovery, but poor quality product which was contaminated with iron, calcium, and silica. The most attractive scheme appears to be treatment of the filtrate to destroy oxalate, followed by anion exchange recovery. To date, the oxalate destruction has been accomplished on a large scale by concentration of the filtrate to a nitric acid concentration of about 10-12 molar. However, laboratory scale tests indicate that a permanganate kill would also be satisfactory.

ANALYTICAL ASSISTANCE

E-5 Uranium Bias

Analytical investigations were carried out to determine the extent to which the present analytical method used for the Purex E-5 (dissolver solution) uranium assay is biased by the presence of extraneous process constituents - constituents other than uranyl nitrate and nitric acid. Preliminary tests were made using an E-5 composite sample representing the February and March production period. The present non-specific method (uranium calculated from

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solution density) was compared to a specific method for uranium (controlled potential-coulometric titration) using standard solutions to compensate for normal analytical biases. Data obtained from these tests indicate that E-5 uranium results were biased high during the test period by one per cent or more, due to process impurities. Because of the limited nature of the study and the magnitude of the indicated bias, more extensive tests are planned for the future.

Carrier Distillation Studies

Recent work with the carrier distillation method used for the spectrographic determination of metallic impurities in plutonium shows that certain impurity results are dependent on the original form of the sample and the method of sample preparation. The normal practice is to convert the various forms of plutonium (metal, nitrate, fluoride, etc.) to PuO_2 and determine the impurity levels in the oxide by the carrier distillation method. It was found that iron, chromium, and nickel values as measured for a given material varied with the bulk density of the oxide, with oxide of lower bulk density giving higher impurity values. The bulk density of the oxide, in turn, was found to be dependent on the ignition temperature and the form of the material before ignition. Of the sources of oxide studied to date, metal and nitrate, the low temperature ($\sim 500^\circ\text{C}$) ignited nitrate gave the highest measured impurity values.

As a result of these findings, a program was initiated to develop a common sample preparation procedure to eliminate this source of variation.

QUALITY CONTROL AND STANDARDS

The Quality Control Program for the Chemical Processing Department analytical laboratories was maintained as usual. The "Quarterly Analytical Control Quality Report - January-March, 1959", HW-60024, was issued. The results of the plutonium metal sample exchange - Group XIII were submitted to the Rocky Flats Plant in document HW-59922.

A program to investigate the use of plutonium dioxide as a primary standard continued during the month. It has been found that the oxide is readily dissolved by fusion in sodium bisulfate, in an erlenmeyer flask. The mix is heated to $550\text{--}600^\circ\text{C}$ for 45-90 minutes, giving a melt which, when cooled, is readily soluble in water.

234-5 DEVELOPMENT OPERATIONTask I

Several determinations were made of the particle size distribution of plutonium oxalate in a laboratory-prepared Task I slurry. Although the data are somewhat scattered, the upper and lower limits have been fairly consistent. The results are summarized in the table below.

PARTICLE SIZE DISTRIBUTION OF $\text{Pu}(\text{C}_2\text{O}_4)_2 \cdot 6\text{H}_2\text{O}$ IN TASK I SLURRY

<u>Stoke's Diameter</u> <u>Microns</u>	<u>Percentage Of Particles Less</u> <u>Than Given Diameter</u>
5	0
10	1
20	10
50	80
100	95

Two samples of what would be considered good dry plutonium oxalate cakes were taken from the continuous Task I prototype to determine moisture content. Portions of these samples were calcined to PuO_2 and then back-calculated to obtain initial moisture content of the cake. The values obtained were 50 and 37 percent (on wet basis), including water of hydration. Air drying a portion of one sample at room temperature for three days reduced the moisture from 37 to 13 percent.

Continuous Chlorination

Operation of the large Hastelloy demonstration chlorinator reached a rate of 295 grams per hour (as plutonium) for a three-hour run.

Equipment changes have included installing 1/4" Hastelloy C tubing through the furnace as a phosgene preheat line, increasing phosgene valve temperature to 110 - 120 C to prevent phosgene liquification, and increasing the vibrator intensity for better powder flow.

The formation of lumps of plutonium trichloride has become an annoyance by plugging the valve to the chloride receiver. This caking is due in part, at least, to frequent interruptions of operation. No efforts have been made to empty the chlorinator prior to shutdown.

Plutonium Trichloride Reduction

First material from the large-scale continuous chlorinator was reduced on a 30-gram scale. Good yields were obtained and reduction temperature and pressures were normal.

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Task III

The calcium and iodine reaction was carried out in a tantalum crucible in a pressure vessel. This was the first in a series of tests to determine feasibility of using tantalum as a material for reusable reduction liners. The crucible was pretreated by heating in air to oxidize the surface.

The crucible changed from light-grey to black. Some roughness on the inside near bottom was noted, as well as some flaking of oxide coating. It lost approximately one gram in weight. Other than surface reaction, the crucible seems to be unchanged.

Calcium Iodide - Calcium Chloride System

Calcium Iodide - Calcium Chloride System, HW-60151, Unclassified, was issued. The temperature-composition relationships for calcium iodide and calcium chloride were studied between 400 and 800 C, and between 5 mole percent and 100 mole percent calcium chloride.

Dissolution Of Massive Metal In Sulfamic Acid

Tests made in cooperation with Finished Products Technology personnel corroborated that massive metal can be dissolved rapidly in a saturated sulfamic acid solution. One hundred grams from a three hundred-gram piece of metal was dissolved at a rate of 160 grams per hour. If the dissolution rate is proportional to the surface area, this would indicate a nominal 1400-gram piece as charged to the continuous dissolver might dissolve 3-1/2 - 4 times the rate now achieved by the nitric-hydrofluoric acid method. Concentrations of nearly 100 g/l have been made, and high concentrations appear feasible as long as the temperature of the dissolution is controlled and the solution kept saturated in sulfamic acid. The reactor must be kept cool for rapid dissolution.

The product from the dissolution is plutonium(III) sulfamate, plus a black residue which dissolves in hot concentrated nitric acid. Oxidation of the concentrated plutonium(III) sulfamic mixture with nitric acid and heat results in a violent reaction difficult to control. Controlled dilution with nitric acid and heating of the resultant large volumes to complete the oxidation has not been tested. Direct oxidation with sodium nitrite produces a vigorous reaction, but one which can be controlled by proper techniques. The oxidation of sulfamate ion results in the formation of sulfate.

When concentrated solutions are oxidized to the (IV) state, plutonium sulfate precipitates; and without nitric acid addition, it is probable that polymer would form. Close control of dilution is required. The solubility of plutonium in 4 M HNO₃ at 25 C is 60 g/l at a sulfate concentration of 0.12 M, and 18 g/l at a sulfate concentration of 0.36 M.

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ORGANIZATION AND PERSONNEL

Personnel

On April 1, 1959 L. F. Lust returned to the Hanford Laboratories after completing assignment with the 234-5 Development Operation.

On April 13, 1959 F. J. Sobeck transferred from the Purex Operation to the Purex Technology Operation.

Trips

V. R. Cooper attended the annual meeting of the American Chemical Society to chairman the Nuclear Technology Subdivision. This meeting was held in Boston, Massachusetts April 6 through April 9, 1959.

V. R. Cooper visited F. P. Baranowski of the Atomic Energy Commission, Washington, D.C. on April 10 to discuss fission product recovery and Non-Production Fuels Reprocessing.

C. L. Brown attended the 5th Nuclear Congress in Cleveland, Ohio April 6 through April 8, 1959.

C. L. Brown visited C. L. Schuske of the Dow Chemical Company, Rocky Flats Plant, Denver, Colorado on April 9 and 10 to confer on weapon component manufacturing procedures and practices pertaining to nuclear safety.

A. E. Smith visited Kenneth Hupp of Whitman College, Walla Walla, Wash. on April 9 for technical recruiting.

L. E. Bruns visited John Pringle of the Dow Chemical Company, Rocky Flats Plant, Denver, Colorado on April 14 and 15 to discuss plutonium processing and technology.

L. E. Bruns visited R. D. Baker and W. J. Maraman of the Los Alamos Scientific Laboratory, Los Alamos, New Mexico on April 16 and 17 to discuss plutonium processing and technology.

R. E. Van der Cook visited Henry Boppel of the Sheffield Corp., Dayton, Ohio on April 14 and 15 to check progress on measuring machine being manufactured for the Research and Engineering Operation.

R. E. Van der Cook visited W. C. Mullen of the Pratt & Whitney Co., West Hartford, Connecticut on April 16 and 17 to check progress on 6-Coordinate Gage being manufactured for the Research and Engineering Operation.

R. G. Geier visited Robert Hartwell of the Power Reactor Development Company, Detroit, Michigan from April 20 through April 22 to discuss power fuels reprocessing.

Trips (Continued)

W. G. Browne attended the Hot Laboratory Conference in Cleveland, Ohio April 6 through April 10 because of interest in use of hood concepts in the processing of Pu on a production scale.

B. F. Judson visited Dr. Gammill of the Michigan Chemical Company, St. Louis, Michigan on April 6 for consultation on promethium separation process methods.

B. F. Judson attended the 5th Nuclear Congress in Cleveland, Ohio April 7 through April 10. He attended sessions on fission product market forecasts.

R. L. Stevenson visited C. L. Schuske of the Dow Chemical Company, Rocky Flats Plant, Denver, Colorado from April 8 through April 10 to discuss and observe critical mass control practices associated with weapon component manufacture.

E. R. Irish delivered an address before the Idaho District II Science Fair, Lewiston, Idaho on April 4. Contact was made with D. S. Caine.

E. R. Irish delivered an address before the Columbia School District #400, Burbank, Wash. on April 13. Contact was made with D. T. Coates.

E. L. Dunkin contacted G. T. Austin of the State College of Wash., Pullman, Washington on April 17 to set up model of pulse column and waste tank for HAPO display at Engineering Open House.

H. H. Hopkins, Jr. visited A. H. Daane and O. N. Carlson of the Ames Laboratory, Iowa State College, Ames, Iowa on April 13 and 14 to discuss plutonium chloride process and repurification procedures.

H. H. Hopkins, Jr. visited I. B. Venable and J. W. Pringle of the Dow Chemical Company, Rocky Flats Plant, Denver, Colorado on April 15 to discuss plutonium chloride processes and repurification procedures.

H. H. Hopkins, Jr. visited E. Christensen, J. W. Anderson and H. Paxton of the Los Alamos Scientific Laboratory, Los Alamos, New Mexico on April 16 and 17 to discuss plutonium chloride processes and repurification procedures.

R. S. Rosenfels visited B. H. Bieler, L. A. Matheson and J. F. Willging of the Dow Chemical Company, Rocky Flats Plant, Denver, Colorado on April 14 and 15 to discuss ceramic development.

R. S. Rosenfels visited S. D. Stoddard and J. W. Anderson of the Los Alamos Scientific Laboratory, Los Alamos, New Mexico on April 16 and 17 to discuss ceramic development.

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Trips (Continued)

J. S. Buckingham presented a paper at the annual meeting of the American Chemical Society in Boston, Massachusetts April 6 through April 9.

J. S. Buckingham visited C. H. Ice of E. I. duPont de Nemours, Savannah River Plant, Aiken, South Carolina on April 7 and 8 to discuss Palm.

Visitors

D. J. Pflaum of the Atomic Energy Commission, Washington, D.C. visited M. K. Harmon on March 24 to discuss problems of declassification.

D. Musser and D. George of the Atomic Energy Commission, Washington, D.C. visited K. M. Harmon on April 7 and 8 to discuss accountability.

E. F. Greenleaf of the Atomic Energy Commission, Division of Production, Washington, D.C. visited R. E. Smith and A. E. Smith on April 8 to discuss plutonium radiation problems and Hands-Off Program.

H. W. Chandler of Radiation Applications, Inc., New York, New York visited V. R. Cooper, E. R. Irish, W. H. Swift and R. E. Tomlinson on April 16 and 17 to discuss fission product recovery and waste disposal.

C. Pierce of the Brookhaven National Laboratory, Upton, New York visited E. R. Irish and W. H. Swift on April 28 to discuss Purex process and tour the Purex Plant.

J. Evans of E. I. duPont de Nemours and Company, Wilmington, Delaware visited E. R. Irish and W. H. Swift on April 28 to discuss Purex process and tour the Purex Plant.

Inventions

None

Manager
Research and Engineering

**RELATIONS PRACTICES OPERATION
MONTHLY REPORT -- APRIL 1959**

I. RESPONSIBILITY

Effective April 1, 1959, Chemical Processing Department established a Relations Practices Operation, with the following responsibilities:

Manager, Relations Practices
Specialist, Health, Safety and Radiation
Specialist, Salary Administration
Specialist, Wage and Benefits
Specialist, Communication
Specialist, Personnel Placement

II. ACHIEVEMENT

Salary Administration

Participated in meetings to study the overall HAPO position on the evaluation of first-line supervisory positions. The study is incomplete and will be continued.

An analysis of Department position regarding technical graduate people as related to the Company median is being developed. The results will be discussed with the Department General Manager and other appropriate managers.

Wage and Benefits

Two nonexempt jobs were reviewed resulting in upgrading one secretary from Schedule I to Schedule II and the establishment of a new engineering assistant job in 234-5 Development Operation.

Relations Operation has been assigned the responsibility for completing the HAPO Nonexempt Compensation Study. This study is scheduled to be completed in early September.

Two employees were retired and one retirement application was completed.

Suggestion Plan

	<u>March</u>	<u>April</u>
Suggestions Received	88	81
Acknowledgments to Suggestions	90	81
Suggestions Pending Acknowledgement	0	0
Suggestions Referred to Operations for Investigation	90	81
Suggestions Pending Referral to Operations	0	0
Suggestions Completed and Closed	135	101
Adopted Suggestions Approved by Board	30	20
Adopted Suggestions Pending Approval by Board	18	18
Total Net Tangible Savings	\$1,941.50	\$1,103
Cash Awards Paid During Month	315.00	318

As of the end of March, \$1,090.83 has been paid in awards with a total of \$3,717 in net tangible savings. The average award for the 92 adopted

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suggestions is \$11.86 (below criteria of \$25.35) and the ratio of funds to savings is 29.3% (above criteria of 16.0 %).

Total Number of Suggestions Outstanding to
Operations at End of the Month

March
155

April
154

AVERAGE AGE OF OPEN SUGGESTIONS

Participation in Benefit Plans

	<u>March</u>	<u>April</u>
Insurance Plan	99.9	99.8
Pension Plan	99.8	99.8
Stock Bonus Plan	53.8	56.1
Good Neighbor Fund	63.6	64.9
Savings and Security Program	97.0	97.0

Personnel Placement

A. Employment

	<u>Exempt</u>	<u>Non-Exempt</u>	<u>Total</u>
<u>Additions</u>	1	6	7
New Hires	0	0	0
Reactivates	0	2	2
Re-Hires	0	0	0
Re-Engages	0	0	0
Transfers from other components	1	4	5

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	<u>Exempt</u>	<u>Nonexempt</u>	<u>Total</u>
<u>Removals</u>	5	44	49
Retirement	0	3	3
Leave of Absence	0	0	0
Illness	0	2	2
Transfer to Other components	4	38	42
Resigned	1	1	2

	<u>Requisitions Nonexempt</u>	<u>Request for Transfer Exempt</u>
Number on hand at beginning of month	3	5
Number Received during month	8	0
Number filled	2	
Number Transferred		0
Number Closed Out		0
Number on hand at close of month	9	5

Application for Employment (Exempt)

Applications received during month	1
Hired	0
Closed Out	2
Applications on hand at close of month	1

Open Requisitions	2
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An offer was extended to Harold L. Caudill, a June graduate in Chemical Engineering from Montana State University and was accepted. Mr. Caudill is a former Chemical Process Operator from Chemical Processing Department. He will join the Research and Engineering Operation on June 22, 1959.

The Chemical Processing Department had two Pipefitter Journeymen and two Millwrights accept offers for jobs at Vallecitos.

Status - Personnel Development Program for Nonexempt Employees

Number of appraisals scheduled in April	80
Number of appraisals delinquent 4-30-59	28

Military Service Records

Records show that CPD has a total of 110 employees who are subject to military training through Selective Service or Armed Forces Reserve action.

<u>Ready Reserve</u>	<u>Exempt</u>	<u>Nonexempt</u>
Ready Reserve	8	11
Standby Reserve	17	6
Deferments Requested	0	
Deferments Granted	0	
Deferment Requests Pending	3	

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Health, Safety and Radiation

<u>Chemical Processing Department</u>	<u>April</u>	<u>March</u>	<u>Year to Date</u>
Disabling Injuries	0	0	0
Serious Accidents	0	0	1
Medical Treatment Injuries	39	49	167
Technical Overexposure Incidents	0	0	0
Radiation Occurrences	16	15	67
Fires	1	1	4
Security Violations	2	1	8

The Chemical Processing Department achieved its Fifth President's Award on April 23, 1959. Normal advance publicity was dampened by the classification of a Disabling Injury, retroactive to February 7, 1958. Advice and counsel was provided in determining classification of the old injury and its effect on the current award schedule. A policy revision to clarify retroactive injuries is expected from HAPO Relations Operation.

The Department Safety Lingo Program was successfully conducted by the Program Council. Seventy-two percent of eligible Department personnel participated. A review of all previous safety programs conducted at HAPO reveals that forty percent participation is the highest level previously attained. The success of the Lingo program can be attributed to a well developed publicity program, minimum time and effort demands on participants, the element of chance, and a general interest appeal.

The Department's First Aid Training Program continued. Much interest was shown in the film presentation of the Mouth to Mouth Resuscitation Method.

Two bulletins, New Look at Sore Backs, and What Good is an Accident, were issued, directing attention to the complexity of back injuries and the need for thorough investigation of all accidents.

Investigations

A four inch glass column in the Process Chemistry cubicle in 222-S building ruptured during normal operations. Formal committee investigation failed to definitely determine the cause. There were no injuries, no spread of contamination outside the cubicle, and equipment loss was conservative. Recommendations were developed to preclude a re-occurrence.

Civil Defense

The Chemical Processing Department's participation in the National Civil Defense Operation Alert, April 17 was as follows:

	<u>200-East Area</u>	<u>200-West Area</u>
Evacuation Signal	9:30 AM	9:32 AM
Employees to Bus Zones	195	424
Buses to Staging Area	2	3
Passengers on Buses	0	2
Buses Cleared Evacuation Gates	9:38 AM	9:43 AM
Buses Cleared Yakima Barricade	9:56 AM	9:51 AM
Arrived at Staging Area #3	10:12 AM	10:05 AM
Departed from Staging Area	10:14 AM	10:14 AM
Arrived in Areas	10:45 AM	10:35 AM

Totals: Employees Participating 619
 Buses to Staging Area 5
 People to Staging Area 9
 Total Time 1 hour and fifteen minutes

Communication

Information concerning the AEC's decision to let out bids for janitorial services in the 700 -- 1100 Areas was provided appropriate management for oral discussions with the janitors in their components.

Communication activities included making arrangements for a chemical processing display at the Washington State College Engineering Open House on April 17, providing a CPD tour guide for high school students, publicity for the Lingo Contest, National Secretaries' Week, fifth President's Safety Award, component and individual recognition, and organizational changes.

III. ORGANIZATION AND PERSONNEL

For organizational changes see Item I. (above)

The Specialist, Health, Safety and Radiation, presented a safety talk and participated in a panel discussion at the Pacific Northwest Cannery and Freezers Association annual meeting in Walla Walla. He also participated in a panel presentation of the HAPD Radiation Protection Program conducted for the Business Agents of the Building Trades Council, which was held in Pasco.

R. B. Britton
 R. B. Britton, Manager
 Relations Practices

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