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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
FOR

MARCH, 1960

Compiled By
OPERATION MANAGERS

April 21, 1960

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HANFORD ATOMIC PRODUCTS OPERATION Date [redacted]
RICHLAND, WASHINGTON [redacted]

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

MARCH, 1960

I. SUMMARY

A. RESPONSIBILITY

There were no changes in the responsibilities of the Chemical Processing Department during March.

B. PRODUCTION

The production of plutonium nitrate from the separations plants during March was below the Official Forecast; however, fiscal year-to-date output is slightly above that forecasted.

Neptunium recovery campaigns were successfully conducted in both the Purex and Redox plants and yielded 1.63 Kgs. of material.

The production of UO_3 was slightly below commitment for the month; however, output for the fiscal year exceeds commitment. Shipments of UO_3 conformed to the established shipping schedule.

Although unfabricated plutonium metal production was below commitment, both for March and for the fiscal year, all shipments were on schedule.

C. ENGINEERING

The Purex uranium stripping column (1C) was replaced with a used spare, designed to accommodate flows above 3.0 capacity factor and modified with a removable cartridge. The associated pulser was also replaced with one having a longer stroke.

Slight improvement in the decontamination performance of the Purex solvent extraction system resulted from extensive flushing and from introducing a fresh inventory of new solvent. First cycle uranium decontamination continued to perform below normal; however, Final Uranium and Final Plutonium Cycle decontamination sufficiently improved to offset, in part, this sub-normal performance.

Increased decontamination efficiency of the Purex Plutonium Ion Exchange unit was achieved by doubling the size of the scrub section. Preliminary data indicate an average three-fold improvement over the normal decontamination factor of three.

A new multi-purpose dissolver was installed in the Redox plant during a shutdown the latter part of March. This annular dissolver is critically safe by geometry for fuels of enrichments up to one percent equivalent

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U-235. It will contain fuel elements up to ten feet long and has features which will permit the processing of unusual batch sizes and fuel claddings.

An engineering schedule for the new Purex waste storage tank farm was approved and scoping of the facility is expected to begin the last quarter of CY 1960. Approximately one year will be required for preparation of project proposals, scope and detail design, and approvals. Two years are required for bid time and construction. The scheduled completion date is January 1, 1964.

Definitive process design work was initiated to expand processing capability of the Purex plant to a capacity factor of 4.0. The flow-sheet incorporates continuous neptunium recovery and formaldehyde treatment of waste.

The advantages of closed-circuit television for remote observation of equipment in high level radiation fields was demonstrated for the second time in recent months to inspect a failed acid concentrator at Purex. On the basis of this inspection, design sketches of two possible repair methods are being made.

The study of shipment of NPF uranium nitrate solution was completed. The primary conclusion was that shipment in bulk containers, presumably railroad tank cars, would be the most economical approach.

W. K. MacReady

General Manager
Chemical Processing Department

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS

A. PRODUCTION OPERATION

1. Production Statistics

a. Purex

	<u>March</u>	<u>February</u>
Plutonium nitrate produced (Kgs)	109.9	250.5
Uranium nitrate produced (tons)	233.6	375.7
Average production rate during operation (T/D)	20.2	19.3
Total waste loss (%)		
Uranium	0.46	0.10
On-line efficiency	37.2	70.1

b. Redox

Plutonium nitrate produced (Kgs)	34.2	24.8
Uranium nitrate produced (tons)	43.3	47.7
Average production rate during operation (T/D)	6.9	6.4
Total waste loss (%)		
Uranium	0.25	0.11
On-line efficiency	27.2	37.4

c. Uranium Reduction

Normal UO ₃ loaded (tons)	392.3	404.2
Enriched UO ₃ loaded (tons)	93.7	9.6
Normal UO ₃ approved for shipment (tons)	357.3	505.1
Enriched UO ₃ approved for shipment (tons)	98.2	0
Normal UNH backlog (tons U)	167	309
Enriched UNH backlog (tons U)	7	58

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d. Plutonium Metal Processing

	<u>March</u>	<u>February</u>
Input to Task I (batches)	88	205
Reduction yield (%)	96.4	97.9
Plutonium metal buttons produced (% of commitment)	36.4	93.7
Plutonium metal buttons shipped (% of commitment)	111.5	116.6
Product recovery output (% of schedule)	56.0	80.0
Product recovery backlog (Kgs)	182.9	170.8
Waste disposal (grams)	350	393

e. Plutonium Metal Fabrication

Weapons parts produced (% of commitment)	-	84.0
Weapons parts shipped (% of commitment)	-	118.6

f. Waste Storage

Redox salt waste reserve (tons U)	3 128	3 171
Purex salt waste reserve (tons U)	27 752	27 977
Redox coating waste reserve (tons U)	23 933	23 976
Purex coating waste reserve (tons U)	33 367	33 592

g. Power

	<u>200-East</u>	<u>200-West</u>
Raw water pumped (gpm)	6 108	3 593
Filtered water pumped (gpm)	859	670
Maximum steam generated (lbs./hr.)	220 000	176 000
Average steam generated (lbs./hr.)	135,890	94 290
Total steam generated (M lbs.)	101 112	70 155
Coal consumed, est. (tons)	5 583	4 434

J. W. Warner
Manager - Production

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

MARCH, 1960

II. ACHIEVEMENTS (Continued)

B. PUREX OPERATION

1. Operating Continuity

A Palm recovery run was completed on March 4 with a new record production achieved. Approximately 85 percent of the Palm processed was recovered.

Normal processing was started on March 15; however, a severe leak in the recovered nitric absorber (F5) caused a shutdown on March 17. Operations resumed on March 22 at a 2.4 CF. Rates were slowly increased to 3.0 CF and maintained there for the remainder of the month.

2. Processing Operations

During the Palm recovery run and prior to the start of normal processing, the major portion of the processing equipment was chemically flushed, including the precycle, the final plutonium cycle, the uranium concentrator and sample tanks, both organic cleanup systems, the waste concentrators, the acid absorber, and the Purex recovered nitric system. The entire organic inventory was moved to an outside storage tank and new organic was introduced into the process as a means of improving decontamination. All recovered acid remaining in the system at shutdown was neutralized and discarded to the underground storage tank 241-C-105. Copious chemical flushing of the system followed to remove activity-bearing solids which may affect the decontamination performance of the process.

A leak on one of the tube bundle flanges of the nitric acid absorber was discovered following the startup and it was necessary to replace the unit.

Process performance was adequate following the second startup with the plutonium meeting specification almost immediately and the uranium having gamma ratios ranging from 3 to 5 (prior to silica gel treatment) for the remainder of the month.

The aqueous extractant flow to the IC uranium stripping column was switched from demineralized water to sanitary water in an effort to determine the effects of currently produced demineralized water on the capacity of this column and the final uranium stripping column. Semi-Works studies have demonstrated that the Purex demineralized water adversely affected column capacity. Operation of the IC

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column with sanitary water was stable and permitted a lowering of column temperature without adverse effects.

The silica gel facility processed 114 tons of uranium to meet shipping specifications.

3. Mechanical Performance

Three process pumps (G-1-2, K-1 and J-1) were replaced because of leakage.

Three failed tube bundles (F6 east and west and H4 east) were replaced during the shutdown.

Severe acid leaks at the bolted connections of the nitric acid absorber tube bundle resulted in an unscheduled shutdown of the plant to permit installation of the spare unit.

The carbon steel U6 condensate drain tank was replaced with a spare when the tank developed severe steam leaks.

Modification to the IC and 2E columns and their spares are required for increased processing capacity. The following work, which was completed during the period, will be evaluated before further work is performed. A contaminated spare "C" type column (old H-3 column) was modified to accommodate a removable cartridge. The old column cartridge was replaced by a removable cartridge of new design and the column was installed in the IC position. A spare pulser was modified to increase the pulse stroke from 1 3/8 inches to 2 3/4 inches and was installed to provide pulse action for the "new" IC column.

The scrub section of the final plutonium ion exchange extraction column was extended in length to improve decontamination performance.

Dual parallel filters were installed on the feed line to the ion exchange column. The leaking upper portion of the ion exchange plutonium concentrator was replaced.

4. Radiation Experience

The leaking nitric acid absorber (F5) was removed to the decontamination cell with maximum personnel dose rates of 3 r/hr.

The high gamma uranium solution temporarily stored in the P-4 storage tank created radiation fields up to 1 r/hr. at 5 feet.

Following the small hood fire last month a considerable amount of decontamination effort restored the N Cell area to normal.

There were fourteen cases of skin contamination during the period. All skin contamination was reduced to less than detectable.

5. Analytical Performance

The controlled potential coulometer proved to be the most accurate means found to date in determining final load-out values on the Palm recovery operation.

A series of technitium-99 analyses performed on final uranium product gave a fairly consistent value of 6.8 grams of technitium per ton of uranium processed.

Studies were made to compare Zr-Nb distribution ratios on final uranium cycle feed samples butted with Purex recovered nitric vs UO_3 recovered nitric. The Purex recovered nitric gave poorer distribution ratios. Although suspected, specific correlation of this data with the poor decontamination performance was not confirmed. A process test was initiated for this purpose at the end of the period.

6. Events Influencing Costs

Approximately 13,000 gallons of organic were not accounted for after all of the organic was transferred to an outside storage tank. The discrepancy is attributed to an accumulative inventory error.

Manager-Purex

RR McMurray:EAF:gt

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II. ACHIEVEMENTS (Continued)

C. SPECIAL SEPARATION PROCESSING AND AUXILIARIES OPERATION

1. Operating Continuity

E-metal processing operations were suspended on a planned basis on March 14 to recover the Palm inventory that had been accumulated in the precycle system since December 1959, install a new multi-purpose dissolver, and complete needed equipment repairs. The plant remained down for the balance of the month.

2. Processing Operations

Processing operations were conducted as scheduled during the first two weeks of the month and by mid-month the quarterly E-metal commitment had been exceeded by 16%. On March 14 a planned shutdown was taken and the second Redox Plant Palm recovery run was made. 210 units of Palm were recovered and delivered to the Process Chemistry Group for isolation.

Following the Palm recovery run, a routine six-month acid flush (60% HNO_3) of the plant processing equipment was made. A total of 770 grams of plutonium was recovered from the solvent extraction system with no significant concentration in any localized area. The plutonium recovered represents about 0.25% of the plutonium processed since the preceding flush and is practically identical with that obtained on the previous flush. The problem of plutonium reduction and polymerization appears to be under good control in the extraction system. The recovery in the 233-S Building final plutonium concentration equipment was negligible (less than 20 grams of plutonium), thus indicating the plutonium deposition problem encountered in November, 1958, has been solved.

The recurrent emission of radioactive particles from the Redox ventilation stack is associated with the formation of periodic release of ammonium nitrate. Revisions to the piping and dissolver back-up absorber have been developed which are expected to result in removal of ammonia formed in the de jacketing step before it can react with the oxides of nitrogen from uranium dissolution. It is anticipated that this will eliminate the problem. An increased cost of about \$5.00/ton of uranium processed is anticipated due to a reduction in the quantity of nitric acid recovered.

3. Mechanical Experience

The major maintenance item during March was the installation of the new multi-purpose dissolver, a critically safe vessel for dissolving uranium metal of enrichments up to one percent U-235. The complete assembly included the vessel proper, a new down-draft tower, a new filter and twenty-seven jumpers, plus reinstallation of the old silver reactor and heater. The work was accomplished without incident in spite of the extreme complexity of the installation. The old dissolver and associated equipment, which was removed from this position, was transferred to the Redox Waste Handling and Decontamination Operation for salvage.

The UNH ozonator tank (E-13) was replaced with a new unit during the week-end of 3-26-60 because of a leaking coil. This installation was also completed without incident although it was not as complex as the multi-purpose dissolver.

The pump in the 3D extraction column feed tank failed on 3-9-60 and was replaced. This was an original regenerative turbine-type pump with boron carbide bearings installed on 3-19-51, and operated for 44,335 hours.

4. Waste Handling and Decontamination

Process equipment valued at \$215,000 was received for decontamination this month. Equipment valued at \$113,600 was decontaminated, or decontaminated and repaired during the month, and represents a savings of approximately \$86,500 over the cost of new replacement equipment.

A total of 70 man-hours was charged to the decontamination of railroad and heavy equipment. The following is a breakdown of the decontamination work.

<u>Item</u>	<u>Operation Charged</u>
Flat Car No. 3618	Purex
Well Car No. 98	Purex - Redox
Well Car No. 99	Purex - Redox
Lorraine Motor Crane	P & GM

5. Radiation Experience

A sharp rise in the fission product activity of the air exhaust from the 202-S Building to the sand filter was noted on 3-16-60. This increase in activity was subsequently traced to the initial stages of ozonation of the Palm recovery run in the E-2 ozonator. The activity was greater than 95% ruthenium and a total of 66 curies of ruthenium entered the sand filter in a 7 day period. However, the sand filter retention was 99.93% efficient and only 0.05 curies, an insignificant amount, was released to the 291-S stack.

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Six radiation occurrences were experienced during the month, two of which were significant. The first occurred during an acid flush of the L-3 product concentrator loop in the 233-S Building when product bearing acid escaped from the loop through the L-3 instrument purge line. Wall surface, instrument and floor contamination resulted, with a maximum of 2×10^6 d/m on a floor area of less than 5 square feet. The contamination was confined exclusively to the 233-S viewing room, a zone where respiratory protection is required. The second occurrence resulted when a salt waste concentrator was emersed in a decontamination bath in the 221-U canyon building. The air displaced from the coils caused high fission product air in the canyon for a short period. Two employees received hand and clothing contamination when they exited from the crane cab. However, no over exposure was experienced. The skin contamination was readily removed and the clothing was cleaned and released.

6. Analytical Experience

Laboratory efforts during the month were primarily concerned with providing analytical control for the Palm recovery run made in the Redox Plant. It was necessary to modify the general procedures for both Palm and nitric acid during the run to allow for samples of unusual composition.

7. Events Influencing Costs

The planned shutdown of the Redox Plant for the greater part of the month to process a Palm run, install the new multi-purpose dissolver, and complete needed equipment repairs, will reflect higher monthly unit costs for uranium and plutonium production.

Chas. S. Groszwith

Manager - Special Separation
Processing and Auxiliaries

CT Groszwith:sws

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

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II. ACHIEVEMENTS (Continued)

D. FINISHED PRODUCTS OPERATION

1. Operating Continuity

All shipping commitments were met. No formalized plutonium fabrication was scheduled, but on March 10 the fabrication of the new model 66 parts was started on a limited basis for training and testing purposes. Production of unfabricated plutonium was 35% under schedule due to the lack of feed. Recovery production was 44% under schedule due to delays caused by the processing of flushes to further reduce the high radiation levels which persist in the recovery facilities. Production of "normal" Uranium Oxide was 4% under schedule due to lack of feed, and "enriched" Uranium Oxide production met schedule.

2. Processing Operations

a. Plutonium Fabrication

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b. Plutonium Processing

Production of unfabricated plutonium was substantially under schedule this month due to shortages of feed. Operating difficulties were those which are historically associated with sporadic operation.

In the recovery facilities a scheduled, eight-day, complete outage was taken to complete changeout of the plates in the extraction columns, clean and calibrate tanks and clean hood panels. In addition, lost time was experienced due to the failure of column pulser bellows and pumps. This, coupled with difficulties in processing flush materials, resulted in low production for the month. Cleanup efforts this month have resulted in further substantial improvement in the condition of the Recuplex hood floors.

c. Uranium Reduction

Activities at the Uranium Reduction Plant were sporadic as a result of feed shortages during the month. Piping changes have been made so that recovered acid is now stored in tanks in the 211-U Area instead of the WR Vault area.

3. Mechanical Experience

Activities in all areas were essentially routine. Extra downtime in the plutonium preparation and recovery areas provided opportunity for some extensive, but minor, replacement and repair work. In the uranium reduction area a broken feed point in "L" calciner caused such extensive damage as to require complete disassembly and overhaul of this unit.

4. Radiation Experience

Radiation statistics show a marked rise over the near perfect month of February, but still indicate satisfactory control. Radiation exposure to personnel continued to be a major problem, with efforts continuing to provide extra shielding and cleanup.

5. Analytical Experience

	March	February
No. of Samples Received	599	853
No. of Determinations	5469	8082
Average Shape Purity	99.879%*	99.899%
Average Button Impurity	1236 ppm	1057 ppm

* Average for quarter

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Recovery (for HLO) of approximately 1 Kg of platinum alloyed with plutonium was accomplished by dissolving in aqua regia and separating with ammonium chloride.

6. Events Influencing Costs

During the month a new crib to receive condensate from the acid concentrator at the Uranium Reduction plant was placed in service. At the same time, limestone was eliminated in the treatment of this condensate with savings of \$4800 per year assured.

J. J. Country
Acting Manager - Finished Products

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CHEMICAL PROCESSING DEPARTMENT
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March 1960

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II. ACHIEVEMENTS (continued)

E. POWER AND GENERAL MAINTENANCE OPERATION

1. Operating Continuity

There were no outages of steam, water, or emergency electrical services that affected continuity of operations of the production facilities.

2. Inspection, Maintenance and Repair

Mock-up and testing of the Redox multipurpose dissolver, down-draft tower, off-gas heater, absorber tower and filter, and the 28 component pipe jumpers was completed March 16. This equipment, with exception of the off-gas heater and absorber tower which were returned to Spare Parts Storage, was shipped to the Redox Facility, where remote installation was completed without difficulty.

Modification work necessary to convert an excess Redox H-10 Coating Waste Tank to an E-13 Ozone Contactor was completed March 22. The vessel was immediately shipped to Redox Facility as a replacement for a failed unit.

Revisions and modifications to the Purex I-C Column and Pulse Generator were completed March 10. The changes were designed to increase throughput of plutonium and uranium process solution, and involved fabrication and installation, in the Column, of a new remoteable sieve plate cartridge and installation of a new crankshaft in the Pulse Generator.

A spare F-5 Fractionator was made ready on an emergency basis as required to replace the in-service unit which had developed excessive leakage at the Purex Facility. Modifications to the spare unit included removal of the heat exchanger, which is no longer required, and the elimination of all flanges by butt-welding the joints. The Fabrication Shops operated around-the-clock for a 72-hour period in order to expedite the work.

Construction and installation of a high level cave at the Purex Facility continued to show progress and was an estimated 60 per cent complete at month's end. The installation is being equipped with mechanical manipulators and other facilities designed for handling high radiation level samples in the 202-A Sample Gallery. Final completion is scheduled for June 1960.

Fabrication of a F-F6 Demister for the Purex Facility is again in progress, with total completion scheduled for April 15. Further work on the Demister had been deferred since early February, pending

procurement of an acceptable tantalum filter cartridge, which has since arrived at the job site. The Demister and a component 16" Vapor Jumper are to be installed in the Acid Recovery System, to determine the feasibility of a single-stage acid recovery and elimination of one of the system's two concentrators.

Machining was completed on four experimental shipping containers, each of different design, for test purposes in connection with shipment of new weapons fabrications. Design of these containers has since been frozen, and material required for machining the quantity required by June 30 is being procured.

The removal of 12 contaminated hoods and equipment, from the Hanford Laboratories Operation's 231-Z Facility to the 308 Building in the 300 Area, continued according to schedule. The work is being done on Project CA-747 (PRTR Program) and was an estimated 60 per cent complete at month's end.

Installation of accessory equipment and services required for operation of the Rolling Mill and Hood at Hanford Laboratories Operation's Plutonium Metallurgy Laboratory (231-Z) is 75 per cent complete. The Mill is to be used experimentally for rolling thin plutonium foils. Included in the work was the installation of electric heat to the rolls, run-out tables, a pre-heat furnace, and control and recording instrumentation. The hood has been made vacuum tight to allow for a pull-down to 50 microns.

The Dry Atmosphere Hood at the Finished Products Operation was revised to provide suitable means for the loading-out of new weapons shapes.

Cell pipe jumpers, fabricated as replacement items during the month, totaled 12, of which 8 were for the Purex Facility and 4 for Redox.

The machining of 80 pallets for the Finished Products Operation is 50 per cent complete, with the remainder scheduled for completion during April. These pallets are designed for conveyor line transportation of new model fabrications inside the hooded line.

Five process pumps were withdrawn from Spare Parts and made ready for operation. Four were placed in stand-by status and one, a first-cycle feed (F-1), was immediately dispatched to the Purex Facility as a replacement for a failed unit.

On four separate occasions during the month, grossly contaminated major equipment was removed from the process canyons and buried. Due to existing conditions, rigid radiation and contamination control procedures were necessarily in effect, and personnel exposure was held to a minimum.

Extensive repairs were necessary to the roof of the "T" Area Sand Filter, as canyon-to-stack air flow was being affected by excessive leakage. The Sand Filter had been in lay-away status since July 1957, and was returned to service when the "T" Canyon was reactivated by the Waste Handling and Decontamination Operation in April 1959. Leaks in the Sand Filter roof had grown progressively worse since that time. The facility has functioned satisfactorily since being repaired.

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Building 2716-WA was removed from the site and disposed of through surplus sales. Removal of this building was in connection with long-range plans to remove all excess TC (temporary construction) buildings from the 200 Areas.

No. 1 Boiler in 200 East Area and No. 2 Boiler in 200 West underwent third-party (Travelers Insurance Co. indemnity representative) inspection during the month, as did the air receiver in each Power House. Both boilers and air receivers were verbally reported to be in excellent condition; however, official inspection reports are yet to be received.

As the result of an incident involving a malfunctioning governor on the 200 East Area emergency generator turbine, parts have been ordered that will make it possible to remotely trip-out the turbine in case the over-speed device fails to function properly.

T. G. LaSalle

Manager-Power & General Maintenance

TGL:JFL:ap

CHEMICAL PROCESSING DEPARTMENT

March 1960

II. ACHIEVEMENTS (Continued)F. FACILITIES ENGINEERING OPERATION1. Purexa. Process Design and Development EngineeringNew Purex Tank Farm

An engineering schedule for the new Purex tank farm was approved within Chemical Processing Department. Scoping of this facility will begin the last quarter of CY-1960. Approximately one year is required for project proposals, scope and detail design, and approvals. Two years are required for bid time and construction. The scheduled completion date is January 1, 1964.

Expansion of Purex to 4.0 Capacity Factor

Definitive process design work was initiated to expand processing capability of the Purex plant to a capacity factor of 4.0. The flowsheet incorporates continuous Palm recovery and formaldehyde treatment.

b. Project EngineeringCGC-854 Conversion of Purex Anion Exchange Prototype to a Manufacturing Unit

Modification No. 1 to the Directive was received on March 28. It authorized (1) additional funds of \$27,500, making a total of \$95,500; (2) revised scope to include replacement of the FR ventilation stack and related work; and (3) extension of directive completion date from February 15 to August 1, 1960. Sufficient detail design was completed by March 28 to allow CPFF contractor forces to start fabrication work on the new stack and to continue on an expedited basis.

CG-873 Fission Product Loadout Facility

The authorized work was essentially completed on March 14. The Physical Completion Notice has been prepared allowing accrued funds

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for instrumentation design, procurement, and installation.

c. Manufacturing Engineering

Titanium Reboiler for Purex

Final design on the titanium reboiler was received from the vendor, and the overall design appears to be excellent.

Use of Television in Radiation Zones

Closed-circuit television was used to inspect parts of a concentrator in the F-6 position of Purex. On the basis of this inspection, design sketches of two possible repair methods are being made. This is the second successful application of television in recent months.

2. Special Separation Processing

a. Process Design and Development Engineering

Expansion of Solvent Extraction

Scope design was completed for an expansion in the Redox plant solvent extraction capacity to about 13 tons per day, instantaneous. This expansion entails replacement of three limiting columns and certain accessory jumpers and instrumentation. Three existing spare columns (HA, 1C and 2E) are to be revised for silo installation when the present columns require replacement.

b. Project Engineering

CG-772 Multipurpose Dissolver - Redox

Installation of the dissolver, jumpers, and related equipment was completed and accepted by Special Separation Processing and Auxiliaries Operation March 25, 1960. Installation of the equipment in the canyon was carried out with no fit-up problems. The first charge was put in the dissolver March 27, 1960, and initial experience with this equipment indicates satisfactory performance. The project is being closed out as of March 29, 1960 with one minor exception - the alteration of one instrument. Total costs are estimated to be about \$190,000 as compared with authorized funds of \$265,000. Primary economies were obtained through the use of available material and less than estimated fabrication labor costs.

c. Manufacturing Engineering

Redox Dissolver Model

A comprehensive theoretical model was formulated and presented to OR&S. Several of the equations are currently being rewritten by professional mathematicians to cause them to state more nearly what was intended conceptually. The reduced form equations will probably be presented to the 709 for simultaneous solution on the GCL program in about a month.

3. Finished Products Operation

a. Process Design and Development Engineering

Plutonium Reclamation Facility

Flow diagrams for the Plutonium Reclamation Facility have been discussed, revised, and prepared for issue. Agreement was reached on a process cell arrangement of "hood-alongside-process-cell" instead of the "hood-under-process-cell" scheme. The preferred arrangement eliminates some difficulties with structure and instrument dip tubes.

Recuplex Shielding Wall

Detail designs were completed for a shielding wall on the front side of the solvent extraction hood in Recuplex. This design was based on the use of sliding shielded panels mounted on permanently installed guide rails. Decision was made to purchase twelve shielding panels from a commercial vendor rather than use specially designed shields. The commercial panels are less costly and more readily available.

b. Project Engineering

CG-734 RMC Button Line - 234-5 Building

Monday, March 21, Finished Products Operation began operator training on the RMC Button Line. Hoods No. 10 through 17 have been turned over to Operations with recognized exceptions which will be completed by construction forces.

4. General

a. Process Design and Development Engineering

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DECLASSIFIEDRadiological Development

A modified tunnel-type suit was fabricated of transparent plastic and tested by inflation. This new suit eliminates the need for crouching or crawling as one enters the suit through the tunnel and also improves vision for the user.

Instrumentation with Transistors

A pulse amplifier using transistors has been developed that provides outputs up to 80 volts, which is more than double that of models previously available. This has direct application to in-line neutron monitors now under test and proposed, as well as in other equipment.

Nuclear Reprocessing

The study of shipment of NPF uranium nitrate solution was completed. The primary conclusion was that shipment in bulk containers, presumably railroad tank cars, would be most economical. Such shipment would require relatively small expenditures at both Oak Ridge and Hanford for fixed facilities. Nuclear safety control is to be maintained by controlling the concentration and temperature of the UNH solutions.

b. Project Engineering

Project cost information as of March 20, 1960:

Total authorized funds - 13 active projects	\$ 8,196,000
Total cost-to-date	3,340,000
Commitments and Open Work Releases	1,859,000
Unencumbered balances	2,997,000
Cost charged to above projects 2-14-60 to 3-20-60	410,526

Dropped from active status during this period:

<u>Project</u>	<u>Authorized Funds</u>	<u>Total Cost</u>
CGC-719	\$ 1,068,000	\$ 847,140
CGC-826	160,000	112,671

Manager
Facilities Engineering

HP Shaw:WWC:al

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

G. RESEARCH AND ENGINEERING OPERATION

1. Purex Process Technology -

a. Fission Product Recovery

During the scheduled March shutdown, an attempt was made to recover a semi-refined rare earth fission product fraction from 2300 gallons of IWW (previous batches = 1000 gallons). The run consisted of two successful double-sulfate precipitations followed by an attempted peroxyacetate partition of cerium from trivalent rare earths. Because the 2 M HNO_3 leach of the sulfate cake removed only about ten per cent of the cerium and trivalent rare earths, the test was unsuccessful. It has been postulated that the double-normal-size batch of precipitate in the centrifuge bowl may have generated sufficient heat to form moderately insoluble anhydrate salts in the bowl prior to leaching. Autoclave tests are being performed in an attempt to substantiate this theory.

b. Solvent Extraction

During the shutdown period, uranium solution that had been removed from the Final Uranium Cycle Feed Tank because it contained degraded solvent, was reworked. The degraded solvent, heavier than the aqueous phase, was drawn off the bottom of the tank, carbonate-washed to recover the uranium, and then discarded to the organic crib. Rework of the aqueous uranium solution proceeded normally, but the uranium product ranged from 10 - 1000 fold above the >2.0 gamma ratio specification. The extremely high gamma ratio first appeared when the failed Uranium Sampler Tank empty-out jet was replaced with a like jet from the High Activity Waste Sampler Tank. The high gamma activity material was segregated for later rework.

Despite extensive flushing during the shutdown, the First Cycle decontamination performance was a factor to 2 - 3 below normal at startup, but this subnormal decontamination performance was partially overcome by an increase in both the Final Uranium and Final Plutonium Cycle decontamination. After ion exchange processing, all plutonium batches analyzed $<2.5 \times 10^{-11}$ G/AT.

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Uranium product batches continued to show evidence of recontamination from the equipment for the first two days after startup. Chemical flushing of the Final Uranium Cycle equipment, accomplished during a shutdown which occurred two days after startup because of a leak in the Acid Absorber, reduced the final uranium product to the 5 - 7 gamma ratio range. Continued operation further reduced it to 4.0 - 4.5 range by month end.

Except for simultaneous temporary high uranium losses (up to 1000 fold normal losses) from both the IC and 2E Columns, charged to poor demineralized water quality, solvent extraction losses were generally normal.

Cold Semiworks studies of the correlation between IC Column operating stability and regeneration of the demineralized water cation unit have shown at least a 35 per cent reduction in IC Column operating capacity when using "normal" Purex demineralized water. Demineralized water produced immediately after the cation bed regeneration further reduced the operating capacity. Semiworks operation of the IC Column appeared normal on Purex sanitary (undemineralized) water, an observation which is now being substantiated by operating experience in the Purex Plant.

Current information indicates the demineralizer cation resin has been subjected to attack over a two year period by the 0.3 ppm free chlorine added to the sanitary water for purification. The degraded cation resin apparently is now contaminating the demineralized water with an unidentified organic compound which reduces the operating stability of the C-type columns. Current plans include replacement of both cation and anion resins.

c. Neptunium Recovery

Fourteen hundred and twenty grams of neptunium were decontaminated and isolated from an estimated inventory of 1760 grams in the Backcycle Waste System during the March recovery run. The standard ferrous sulfamate-hydrazine reducing flowsheet was used. Typical "waste losses," recycled for reprocessing during normal plant operation, were 2.1 and 1.5 per cent from the extraction and stripping columns, respectively. The final concentrated neptunium product was unusually low in plutonium and uranium (0.4 and 0.02 per cent, respectively) with better-than-normal gamma decontamination (9.6×10^7 Gamma/Np AT).

Neptunium accumulation has been excellent since startup with the HA Column raffinate (HAW) neptunium loss near or below the lower analytical detection limit which is seven per cent of the neptunium in the HA Column virgin feed (HAF). The loss to the uranium product (2EU) has been two- to three-fold above normal because of a reduced 2D Column scrub stream flow. The 2EU loss is normally about one per cent of the neptunium in the HAF.

d. Plutonium Concentration

In an attempt to increase the decontamination factor of the Plutonium Ion Exchange unit, the length of the two foot scrub section was doubled during the last plant shutdown. Preliminary data indicate an average three-fold increase in the normal decontamination factor of three has resulted from the change.

e. Solvent Treatment

In order to eliminate any possible effect of used solvent on the Purex Plant decontamination performance, the entire 27,000 gallon inventory of solvent was diverted into a storage tank. After the equipment of both solvent recovery systems was chemically flushed, new solvent was introduced into the systems. The gamma activity of the new No. 1 System solvent has remained in the 900 - 1000 uc/gal range since shortly after startup. (Normal gamma activity for the old solvent prior to shutdown was 1500 - 2500 uc/gal.)

The use of a carbonate batch wash in the 20 Column feed tank prior to carbonate washing in the 20 Column has been inaugurated for the No. 2 System solvent.

f. Waste Treatment

Waste volumes sent to the underground storage tanks averaged 52, 845, 518 and 39 gallons per ton of uranium for neutralized IWW, solvent washes, cell drainage and centrifuge cleanouts, respectively. The larger-than-normal solvent wash and cell drainage volumes reflect chemical equipment flushing.

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2. Redox Process Technology - M. K. Hannon

a. Dissolving and Feed Preparation

Recent laboratory experiments have shown that ferric ion will increase the rate of uranium metal dissolution in nitric acid. The effect is particularly noticeable at low concentrations of free acid and high concentrations of uranium in solution, i.e., at or near the end of a "cut", historically the point of lowest rate. This technique for increasing the rate and thereby increasing dissolver capacity, was tested during March. In each of four 2-ton dissolver charges of enriched metal, 40 pounds of scrap iron was added to the dissolver with the slugs to give a final concentration of 0.1 M ferric nitrate in solution. An average time cycle of approximately 24 hours was observed for the test dissolvings in contrast to an average cycle of 36 hours for the two preceding months under standard conditions.

During the last half of the month, the multi-purpose dissolver was installed in B-Cell, replacing the standard dissolver in which the above-mentioned tests were run. (Because of the capacity of the new dissolver and the limited production schedule for the balance of the year, the Redox process will not make use of the ferric ion technique except under emergency conditions.)

The multi-purpose dissolver was designed to provide:

1. A vessel critically safe by geometry for dissolving fuels of enrichments up to one percent equivalent U-235.
2. A vessel which can be charged with fuel elements up to 10 feet long.
3. A vessel in which small charges can be dissolved without using more chemicals than needed.
4. A by-pass routing around the silver reactor during cladding removal.
5. An alternate off-gas routing required for use with novel decladding processes, e.g., Zirflex.

A radical change in the dissolver design was made to accomplish these objectives, but only minor changes in the associated equipment were necessary. The new dissolver is an annular vessel (annulus width, 10.5 inches) the details of which are given in the unclassified document HW-64172, "Multi-Purpose Dissolver - Information Manual", by H. P. Simonds, dated March 4, 1960.

b. Neptunium Recovery

The second neptunium removal was made during the month. The total neptunium accumulation since the first removal in December, 1959, was approximately 500 grams and was reached without signs of approach to an equilibrium loss under established flowsheet conditions.

The original (December) removal plan was modified to extract the neptunium, uranium and plutonium together in the second extraction column and obtain separation of the neptunium from the uranium and plutonium in an acid-deficient partitioning column. This was not successful (only about 25 percent of the neptunium was separated) because too much acid was carried from the extraction column (1A) into the partitioning column (1B). This prevented achieving the acid deficiency needed to reduce the neptunium to the hexone-inextractable pentavalent state.

The over-all recovery was better than the first removal but still was not an unqualified success. The neptunium with the uranium and plutonium was returned to the second extraction cycle and was again processed according to the original plan. The neptunium that was separated in the initial pass had to be recycled for additional fission product decontamination and was "lost" to the waste cell tanks in the course of attempting the transfers. The remainder of the neptunium even after the second pass, had to be recycled again for additional fission product decontamination. A factor of four was desired but only a factor of two improvement was achieved. Only 210 grams were actually removed, due in part to an in-cell equipment leak and "loss" to condensate in a normal stripping vessel used for this run as a concentrator.

The improved flow pattern provided by the newly installed piping was responsible for greatly reduced plutonium contamination of the product. The material balance was much improved with less than ten percent of the 500 grams finally unaccounted for. This is expected to be found in the acid flush of the columns and vessels that followed the removal run. Nineteen grams were irretrievably lost with the waste sent to underground storage; the balance was accumulated in wastes and will be recovered and returned to the internal recycle flow pattern on resumption of operations. The two runs are compared in the tables below.

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	<u>Removal No. 1</u> <u>December, 1959</u>	<u>Removal No. 2</u> <u>March, 1960</u>
Removal, Percent of Starting Amount	37	42
Pu/Np, gm/gm	2.8	0.5
U/Np, gm/gm	3.8	6.1
G/Np, microcuries/gm	1.21×10^4	2.4×10^4

ARITHMETIC FISSION PRODUCT DECONTAMINATION FACTORS(Dissolver Solution $\sim 1 \times 10^{11}$ microcuries per gram of neptunium)

<u>Process Step</u>	<u>Removal No. 1</u>	<u>Removal No. 2</u>
Accumulation	85	500
Precycle	5	8
2nd Extraction Cycle and Partitioning	850	4
3rd Extraction Cycle and Ozonation	20	420
Over-all	8×10^6	4×10^6

c. Solvent Extraction

Following the neptunium removal run, the routine six-month acid purge (60 percent HNO_3) of the plant process equipment was made. A total of 770 grams of plutonium was recovered. This represents approximately 0.25 percent of the plutonium processed since the preceding flush; these figures are nearly identical with those obtained in the previous flush. Although minor flowsheet changes are being made in attempt to reduce this figure, the problem of plutonium reduction and polymerization appears under good control in the extraction battery.

d. Plutonium Concentration

The routine six-month 60 percent acid purge of the final plutonium concentration vessels, recovered a total of less than 20 grams of plutonium. This indicates that the serious plutonium deposition problem encountered in November, 1958, has been solved by keeping the acid concentration above a minimum of 0.45 M HNO_3 in the solvent extraction cycle product which is fed to the solvent stripper to start final concentration.

3. Finished Products Technology - R. E. Smith

a. Uranium Reduction Operation

(1) Process Performance

Failure of an experimental flat type feed injector in the L-Cell calciner resulted in several damaged shear pins and agitator blades. The performance of this type of feed injector has been inferior to that of the current model which is fabricated of schedule 80 pipe. The calciner had operated for 6611 hours since June, 1958, with only minor maintenance attention to the seals and feed systems. The agitator shaft and heat transfer surfaces were found to be in excellent condition with respect to caking. The agitator hub and arm shear pin holes were reamed out to 3/4 inch, and pins of this diameter with a 5/8 inch shear section were installed. All arms were reinforced with heavier weldments at the corners.

Two new type magnetic flowmeters (Fischer and Porter Model 10 D 1415 A, vitreous enamel bonded to glass electrodes) were installed in conjunction with the K-Cell programming equipment. Performance has been excellent. The remaining two meters required to complete the installation are expected during late April.

b. Metal Finishing Operation

(1) Recuplex

Dissolution of the slag and crucibles from ten large (2 kg) metal reduction charges per dissolver run has been made routine. Solvent extraction with this feed, Al/F mol ratio of 1.56, has been satisfactory.

The seive plates in the extraction columns were replaced. The geometry of the cartridge in the scrub (H-2) column was unchanged (nozzle upward plates, 1/8 inch holes, 13 percent free area and 4 inch plate spacing) while that of the extraction (H-1) column was modified to nozzle upward plates, 3/16 inch diameter holes, 23 percent free area and 2 inch plate spacing. Performance of the H-1 column appears to be unaffected by the plate change. Additional testing will be required, however, to obtain HTU and flooding data.

Two submerged neutron counters, the column feed tank (G-10), and the in-line stripping column organic effluent (K-4) were calibrated. The counting rate change for 0.1 grams per liter

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increments of plutonium concentration was too small for analytical accuracy but was sufficient for critical mass control.

(2) Task I - II

Multichannel gamma analyses of the feed solutions from Purex and the product metal indicated essentially no Zr-Nb decontamination. A large portion of the gamma radioactivity in both the feed and the metal was due to a 0.1 MEV source which has not yet been identified. Ruthenium was not present. Studies are in progress to determine a feed solution specification basis using the multichannel gamma analysis rather than the existing μC gamma/AT. In addition to increased reliability in the expected operating range, it is expected that the new analysis will provide significant radiation control data.

Analyses of plutonium tetrafluoride (PuF_4) powders, taken during periods of both normal and abnormal operation, ranged from 98 percent to 60 percent of the fluoride required for stoichiometric PuF_4 . The remaining constituents have not yet been identified. Since these tests were generally directed toward developing analytical procedures, further study will be required to determine the effect of tetrafluoride powder composition on metal yield and quality. Powders containing less than 85 percent of theoretical fluoride were recycled for additional hydrofluorination.

The hydrofluorinator conveyor vibration cycle was studied in an attempt to reduce off-gas powder loading (by reduced intensity) and to standardize the operation. It was observed, however, that significant powder flow aberrations are caused by the formation of cakes or lumps in the reactor tube. The influence of the reactor temperature profile on reducing the caking tendency as well as product quality is under study.

4. Process Chemistry - K. M. Harmon

a. Purex Process Assistance

During the month, another possible source of the white solids recently observed in Purex recovered acids was found. It is believed that these solids contribute toward the poor decontamination performance currently experienced for the HA column (first extraction cycle). Previously, the anion resin used in the water demineralizer was found to be a possible source. In recent tests, irradiation of Purex solvent using a cobalt-60 source produced a white precipitate similar in appearance and behavior to the recovered acid solids.

b. Neptunium Purification

The Dowex 1 x 4, 50 to 100 mesh, anion resin in the four-inch diameter, six-foot high (13 liter) anion exchange column was replaced with Permutit SK, 20 to 50 mesh, resin. The capacity of the Permutit SK resin was found to average about 25 grams of neptunium per liter of resin, whereas the Dowex 1 resin had a capacity of 50 grams of neptunium per liter of resin. Waste losses as high as 10 per cent of the total neptunium loaded on the column were experienced. The greatest percentage loss was found to occur during the fission product and protactinium-233 removal step (HF wash). Neptunium was easily eluted from the Permutit SK resin, giving product concentrations up to 40 grams per liter.

Two hundred and thirty grams of neptunium oxide which was near equilibrium with its daughter, protactinium-233, were dissolved and repurified in the anion exchange facility using the standard flowsheet. (Described in HW-62065, "Flowsheet for Palm Purification by Anion Exchange for the Palmolive Process," J. S. Buckingham, 1959). A gamma decontamination factor of 3.3 for the daughter was achieved by washing the loaded column with 18.4 column volumes of HF wash. Radiation measurements of the repurified oxide were 100 mr/hr at 2 inches in contrast to 850 mr/hr at 2 inches before repurification.

c. Analytical Assistance

(1) UX₁ in plutonium buttons

The non-plutonium gamma emitter of 0.1 Mev energy recently observed in current plutonium buttons has been identified as the uranium daughter, UX₁ (thorium-234). Positive identification was made by separating the thorium from plutonium by a TTA (thenoyltrifluoroacetone) extraction and scanning with a 256 channel pulse energy analyzer.

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5. 234-5 Development - H. H. Hopkins, Jr.

a. Direct Calcination Of Plutonium Nitrate

The calciner unit has been assembled and cold testing has been started. The unit was designed to evaporate approximately four liters of solution per hour. Initial heat load experiments have demonstrated an evaporation capacity less than this. However, the throughput will be sufficient to supply plutonium oxide to the chlorination facility at a rate of approximately 350 grams per hour. The off-gas condenser has a demonstrated condensing capacity of 0.8 liters per hour. Additional heat transfer area and baffles will be added to increase this capacity to meet the calciner off-gas rate. After these adjustments are made, the equipment will be installed in Hood 4 for the "hot" runs.

b. Recuplex Studies

A study has been initiated to determine the limit of extractability, conditions for extraction, and the inextractable species of plutonium in the Recuplex system waste stream. In the first series of tests, plutonium in the waste was shown to be largely extractable.

Recuplex CAW samples were given three additional extractions with 20 percent TBP in CCl_4 freshly washed with sodium carbonate to remove DBP. Each contacting was made with five minutes stirring and with one-half volume of organic. Attempts were made to get at least one CAW sample from each of the various types of feed material processed through Recuplex. The results show it is possible to extract essentially all of the plutonium with TBP. Aqueous wastes after the third extraction averaged 0.013 mg/l plutonium with a range from 0.001 to 0.046 mg/l. The average concentration in the CAW's used for the test was 15.8 mg/l with a range from 1.4 to 75 mg/l.

c. Polyethylene Distillation From Plutonium Dioxide Compacts

Polyethylene has been successfully distilled in cold laboratory tests. Approximately 75 percent of the original charge is collected as a "grease-like" distillate, 24 percent was removed as off-gas, and about 0.5 percent remained in the distillation pot in the form of carbon. Distillation commences at 200 C and is completed around 550 C. This method appears very favorable for separating plutonium oxide from plutonium oxide-polyethylene mixtures which will be reprocessed in the course of the Critical Mass experimental program.

d. Powdered Plutonium Metal

"The Preparation Of Plutonium Powder By A Hydriding Process--

Initial Studies", HW-64289 (Unclassified), by G. L. Stiffler and M. H. Curtis was issued. The "Summary and Conclusions" are as follows:

Micron-sized plutonium powder was produced, in 20-gram batches, by hydriding massive metal and then grinding and decomposing the hydride.

Plutonium hydride was prepared in the following manner:

An apparatus containing clean plutonium metal was evacuated to a pressure of 10 microns. The vacuum was valved off, and dry oxygen-free hydrogen was introduced into the apparatus. The apparatus was then placed in a furnace and heated until the hydrogen and metal began to react. As soon as the reaction started, the apparatus was removed from the furnace. Hydrogen was fed into the apparatus until all of the metal was converted to hydride. The hydride was then decomposed by heating it to 400 C in the apparatus at a vacuum of three microns.

The hydriding reaction could only be initiated between dry, oxygen-free hydrogen and clean metal.

Heat liberated by the reaction sintered the hydride powder into a granular frit. The size of these grains (up to 1/8 inch) was nearly independent of the size and shape of the starting metal or the reaction rate.

Metal produced by decomposing its hydride was porous and would not subdivide further during additional hydriding cycles.

Sintering effects made it necessary to agitate the powder during the dehydriding step. Sintering appeared to begin at about 300 C. A loose sinter cake was formed by 450 C. Beads of metal appeared in the sinter at about 600 C.

An apparatus was proposed for the production of plutonium powder on a 500-gram scale.

V. R. Cooper

Manager
Research and Engineering

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (continued)

H. Financial Operation

1. Production Cost

All operating budget submissions for FY 1961 and FY 1962 were completed on schedule and submitted to Contract and Accounting on April 1 for consolidation with budgets of other HAPO components before going to the Commission. This budget represents as realistic an estimate of CPD's future requirements as is possible to forecast at this time. Research and Development funding had been cleared with the Commission prior to budget completion. Total funds requested in the submission were as follows:

(amounts in thousands)	Estimated FY 1960 Costs	FY 1961 Budget	FY 1962 Budget
Production			
2000 Program	\$18 520	\$19 618	\$20 009
3000 Program	1 579	2 372	2 630
Research and Development			
2000 Program	3 305	3 067	2 950
3000 Program	890	940	790
Equipment Not Included in Construction Projects			
2000 Program	973	1 431	1 275
3000 Program	245	586	592

The bulk of increased operating costs relates to essential materials required for new and increased production. Manufacturing, shipping and testing equipment for new shapes, a titanium tube bundle, and provision for a replacement column for Purex are major among the increased equipment requirements.

FY 1960 Financial Plan (Change No. 5) was received from the Commission this past week indicating funds which are allocated to HAPO for the current fiscal year.

Preliminary analysis indicates that 2000 and 3000 Program totals for CPD are very close to the current control budget. While the 3000 funds are adequate, the very austere 2000 Program allocations leave inadequate safety margin, as evidenced by year to date costs at 99% of year to date allocation despite a 5% reduction in Department manpower during the fiscal year.

2. Personnel Accounting

During the month of March we arranged for a revision of the insurance installment payments being received by the surviving spouse of a CPD employee. Modification and endorsement of existing installment contract was required to insure the spouse an immediate payment of \$1,000.

Medical expenses reimbursed under the G.E. Plan and duplicated as a result of legal action were recovered from the employee concerned and returned to the insurance company.

3. General Accounting

The expenditure pattern for CPD's Plant Improvement Program was completed and incorporated within document HW-63958.

The FY 1962 Plant Acquisition and Construction Budget was forwarded to Contract and Accounting Operation in March. New funds were requested as follows:

Hanford Fission Products Program	\$1 500 000
Radioactive Waste Disposal Systems	6 600 000
New Separations Plant - Design	650 000
General Plant Projects FY 1962	300 000
	<u>\$9 050 000</u>

CPD's OPG 8.10, "Acquisition of Plant and Equipment" was updated to agree with all revisions to applicable AEC Manual chapters.

4. Auditing

An audit memorandum was directed to section managers pointing out minor discrepancies in the administration of the overtime lunch program. It was noted that on occasions the cost of overtime lunches authorized exceeds the maximum provision of HAPD OPG 3.2.5 (\$1.10).

A review was made of certain purchase requisitions noted by C&AO auditors in connection with their examination of Purchasing operations. No irregularities were noted.

A review was made of the Department's usage of grain alcohol during the 12 months period ending January 31, 1960. No exceptions were taken.

Two GAO auditors spent the last two weeks of March in the 200-E Area. Their examination to date has been centered around work orders and controls in the Power and General Maintenance Operation.

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DECLASSIFIED5. Measurements and Procedures

Field testing of the Electrowriter equipment has been complete in the Purex plant. The operational test was satisfactory and the equipment has now been installed to replace the Intrafax system. Resultant annual savings will be approximately \$1,325, which is equal to the purchase price of the equipment.

Section managers were requested to designate one person in their organization to act as records representative. This is the initial step in our over-all records review which will include such items as updating of record flow schedules and disposition of records for obsolete plants and processes.

Manager - Finance

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (continued)

I. RELATIONS PRACTICES OPERATION

1. Salary Administration

Statistics, charts and consultation were provided for the engineering sections of Chemical Processing Department regarding compensation and growth comparisons for their exempt technical graduate people.

The Atomic Energy Commission auditors completed their audit of Chemical Processing Department Salary Administration practices. A report will be forthcoming.

Chemical Processing Department's position in respect to reconciliation of some proposed exempt positions in Irradiation Processing Department was determined and communicated to the Salary Administration Operation of Relations Operation.

The Specialist, Salary Administration, discussed the salary plan with a group of supervisors in the Analytical Laboratory.

2. Personnel Placement

As a result of a resignation, a transfer to the Vallecitos Atomic Laboratory, the honoring of a request for transfer to Irradiation Processing Department, and an increased work load, the Chemical Processing Department has four openings for instrument trainees.

A General Electric employee on educational leave of absence from Apparatus Sales Division, Aviation Department, accepted a position with Facilities Engineering Operation. He will report for work in early April.

Chemical Processing Department has extended offers to two college juniors, a chemistry teacher from Columbia Basin College, and to the head of the Industrial Arts Department, California Polytechnic College for summer assignments.

3. Communications

There were 245 copies of Professional Business Management Book Four, "The Work of a Functional Individual Contributor", distributed through section managers' offices during the month.

Public information activities included preparation of a release for the local newspapers on the new dissolver, assistance in preliminary work on two signed articles and assistance in preparation of one civic talk.

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4. Wage and Benefits

Details of the new non-unit weekly salary plan were explained to all non-unit employees. There are 206 Chemical Processing Department employees who will go on the new plan effective April 11, 1960. It is estimated that initially the plan will increase the nonexempt non-unit payroll approximately \$630 per week.

<u>Suggestion Plan Activity</u>	<u>March</u>	<u>February</u>
Received	36	35
Adopted	16	20
Awards	\$320	\$195
Savings	\$2441	\$476

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

CHEMICAL PROCESSING DEPARTMENT
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III. PERSONNEL ACTIVITIES

A. FORCE SUMMARY

<u>Operation</u>	<u>Monthly Salaried</u>		<u>Weekly Salaried</u>		<u>Total</u>	
	<u>2-29-60</u>	<u>3-31-60</u>	<u>2-29-60</u>	<u>3-31-60</u>	<u>2-29-60</u>	<u>3-31-60</u>
General Manager's Group	10	10	1	1	11	11
Financial	13	13	11	11	24	24
Relations Practices	5	5	6	6	11	11
Research & Engineering	60	59	25	26	85	85
Facilities Engineering	66	67	20	19	86	86
Power & General Maintenance	44	44	226	225	270	269
Production	6	6	4	4	10	10
Special Separation Processing and Auxiliaries	48	48	218	218	266	266
Purex	49	50	206	206	255	256
Finished Products	<u>53</u>	<u>52</u>	<u>210</u>	<u>210</u>	<u>263</u>	<u>262</u>
Total	<u>354</u>	<u>354</u>	<u>927</u>	<u>926</u>	<u>1 281</u>	<u>1 280</u>

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There were no personnel changes during the month of February.

C. TRIPS

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To other G.E. Components</u>		
W. H. Koontz M. L. Short	G.E. Manufacturing Lab. Schenectady, New York	Equipment design and decontami- nation (3/11/60)
W. N. Mobley	G.E. AMC - Crotonville Ossining, New York	Advanced Management Course (3/14-5/22/60)
M. L. Short	A.N.P.D. Cincinnati, Ohio	Equipment design and decontami- nation (3/18/60)
<u>To AEC and other AEC Operational Contractors</u>		
W. H. Koontz M. L. Short	Du Pont, Savannah River Aiken, South Carolina	Equipment design and decontami- nation (3/8-9/60)
W. N. Mobley	Cincinnati, Ohio	AEC Combined Operations meeting (3/9-10/60)
G. E. Wilbur	L.A.S.L. Los Alamos, New Mexico	Nondestructive testing methods (3/14-18/60)
R. J. Kofoed	Dow Chemical Rocky Flats, Nevada	X-ray fluorescence analysis (3/22/60)
R. J. Kofoed	L.A.S.L. Los Alamos, New Mexico	Methods evaluation seminar on plutonium chemistry (3/23-24/60)
C. A. Colvin R. J. Kofoed	Argonne National Lab. Lemont, Illinois	Mass spectrometry and emission spectrometry (3/28-29/60)
C. A. Colvin R. J. Kofoed	O.R.N.L. Oak Ridge, Tennessee	Analytical problems (3/30/60)
E. F. Kurtz R. E. Smith	Dow Chemical Rocky Flats, Nevada	Shipping containers for equipment parts (3/31-4/1/60)
<u>To General Industry</u>		
W. P. Ingalls	Groton Machine Company Racine, Wisconsin	Delivery schedules and engineering problems for ordered equipment (3/1-4/60)
W. P. Ingalls	F. J. Stoker Corp. Madison, Wisconsin	Delivery schedules and engineering problems for ordered equipment (3/1-4/60)

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
W. H. Koontz M. L. Short	Dow Chemical Co. Tulsa, Oklahoma	Equipment design and decontami- nation (3/7/60)
W. H. Koontz M. L. Short	Wells Saw Co. Three Rivers, Michigan	Equipment design and decontami- nation (3/16/60)
W. H. Koontz M. L. Short	Wachs Saw Co. Chicago, Illinois	Equipment design and decontami- nation (3/17/60)
W. H. Koontz	Griscom-Russell Co. Massillon, Ohio	Equipment design (3/14/60)
W. H. Koontz	Process Equipment Co. Tipp City, Ohio	Equipment design (3/15/60)
M. L. Short	Wyandotte Chem. Corp. Wyandotte, Michigan	Chemicals for decontamination purposes (3/14-15/60)
D. A. Snyder	Process Equipment Co. Tipp City, Ohio	Acceptance testing of jumper cutter (3/28/60)
D. A. Snyder	Gougler Machine Co. Kent, Ohio	Process connector fabrication problems (3/29/60)

To Universities and Colleges

W. W. Kinney	Oregon State College Corvallis, Oregon	Panel discussion - engineering graduates in industry (3/1/60)
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To other Government Agencies

M. H. Curtis	U.S. Bureau of Mines Albany, Oregon	Technology of molybdenum, tungsten and tantalum (3/30/60)
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To Conventions and General Meetings

B. E. Clark	Blue Mountain Safety meeting LaGrande, Oregon	Safety address
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D. VISITORS

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From other G.E. Components</u>		
F. G. Boyle W. Pryor	A.N.P.D. Cincinnati, Ohio	Critical mass control systems (3/15/60)
<u>From AEC and other AEC Operational Contractors</u>		
V. R. Wood	AEC Washington, D.C.	Tour Purex plant (3/2/60)

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<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
M. E. Harris W. F. Arnold	Lawrence Radiation Lab. Livermore, California	Fabrication work (3/15-16/60)
F. W. Empson	U.C.N.C. - O.R.N.L. Oak Ridge, Tennessee	Waste disposal methods (3/15/60)
J. E. Evans	Du Pont Wilmington, Delaware	Waste disposal methods and recycle (3/22-23/60)
W. Davis, Jr.	U.C.N.C. - O.R.N.L. Oak Ridge, Tennessee	Solvent extraction technology (3/28/60)
<u>From General Industry</u>		
J. Burch F. L. Parmalee	Pratt & Whitney Co. Hartford, Connecticut	Set up equipment and discuss temperature control problems (3/17/60)
<u>From other Government Agencies</u>		
Roger Bonniand Claude Sombret	French AEC Saclay, France	Waste disposal (3/28/60)

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IV. SAFETY AND SECURITY

Operation	Facil. Eng.	Finan.	Fin. Prod.	P&GM	Purex	SSP&A	Prod.	Rel. Prac.	Res. & Eng.	Total CPD	Year to Date
Disabling Injuries											1
Serious Accidents				2*		1*				3	5
Medical Treatment											
Injuries	1		11	18	7	7	1		1	46	111
Tech. Overexposure											
Incidents											
Radiation Occur.			9		5	6			2	22	48
Contam. Wounds			1*							1	2
Pu Depositions											3
Fires			1								3
Security Violations									1	1	1

*A Power and General Maintenance millwright sustained contusions and abrasions of the right hand when struck by the tail chain of a one-ton chain hoist. The chain hoist load shaft failed in normal use during removal of a boiler feed water heat exchanger in 284-W Building.

*A Power and General Maintenance machinist was struck on the chest and mouth by a forged aluminum billet at the start of machining. The tool bit gouged into the billet, forcing the billet out of the lathe chuck, striking the machine operator.

*A Redox utility operator received nitric acid burns to the face and neck during pump start up in 202-S Building, third AMJ Level. Acid spurted through a vent which was left unplugged following pump maintenance.

*#A Finished Products millwright received a puncture wound to the left middle finger while working in a 234-5 Building hood. Low level contamination was readily removed; a positive internal deposition may be confirmed.

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V. REPORTS

A. PREPARED AND ISSUED

- HW-62847, Secret, "CGC-830 - Plant Modifications for Reprocessing of Non-Production Fuels - Design Criteria for the Mechanical Processing Cell", R. A. Kennedy and G. H. Salzano
- HW-62949, Secret, "Chemical Processing Department Plant Improvement Programs", dated March 15, 1960, W. K. MacGready
- HW-63415, Unclassified, "Project Proposal, Purex 216-A-6 Crib Replacement", dated March 7, 1960, L. W. Finch
- HW-63675 REV, Confidential, "Budget for FY 1962 and Revised Budget for FY 1961 - Proposal for Research and Development 2724 Activity", dated March 10, 1960, V. R. Cooper
- HW-63676 REV, Confidential, "Budget for FY 1962 and Revised Budget for FY 1961 - Proposal for Research and Development 2725 Activity", dated March 10, 1960, V. R. Cooper
- HW-63677 REV, Confidential, "Budget for FY 1962 and Revised Budget for FY 1961 - Proposal for Research and Development 2790 Activity", dated March 10, 1960, V. R. Cooper
- HW-63744, Secret, "Continuity of Operations Program, Separations and Uranium Conversion Facilities", dated March 10, 1960, L. L. Zahn
- HW-63958, Secret, "CPD Waste Management Plant Improvement Program", dated March 10, 1960, E. R. Irish
- HW-64074 REV, Secret, "Budget for FY 1962 and Revision of Budget for FY 1961 - Proposal for Research and Development General Weapons", dated March 14, 1960, V. R. Cooper and A. E. Smith
- HW-64105, Secret, "Hanford Fission Product Program, Plant Improvement Program", dated March 10, 1960, B. F. Judson
- HW-64173 RD, Secret, "Redox Plant Production Schedule - March, 1960", dated March 4, 1960, D. McDonald
- HW-64174 RD, Secret, "Purex Plant Production Schedule - March, 1960", dated March 4, 1960, D. McDonald

A. PREPARED AND ISSUED (Continued)

- HW-64175 RD, Secret, "UO₃ Plant Production Schedule - March, 1960",
dated March 7, 1960, D. McDonald
- HW-64176 RD, Secret, "234-5 Plant Production Schedule - March, 1960",
dated March 8, 1960, D. McDonald
- HW-64258, Unclassified, "Glove Box Integrity Study", dated March 8, 1960,
R. A. Ciccarelli
- HW-64261, Unclassified, "Plant Improvement Program No. 22, Administrative
Facilities and Utilities, Chemical Processing Department",
dated March 23, 1960, E. L. Reed
- HW-64278, Secret, "Budget for FY 1962 and Revision of Budget for FY 1961,
Plant Acquisition and Construction", dated March 21, 1960,
D. R. Gustavson
- HW-64295, Secret, "Recuplex - Cost and Product Mix Factors", dated March 14,
1960, C. M. Thomas and J. E. McDonald
- HW-64298, Secret, "Essential Materials Consumption - Purex, February, 1960",
dated March 17, 1960, J. E. Lentz
- HW-64373, Secret, "CPD Waste Status Summary - February, 1960", dated March
17, 1960, J. E. Lentz
- HW-64450, Secret, "Purex Plant Flowsheet for High Capacity Study", dated
March 28, 1960, R. G. Geier and J. P. Duckworth

B. PREPARED FOR SIGNATURE AND ISSUANCE

- HW-64090, Secret, "Production, February 1960", dated March 1, 1960,
W. E. Johnson

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VI. PATENT SUMMARY

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

TITLE

NONE

General Manager
Chemical Processing Department

**DATE
FILMED
01/21/93**