1230987
[0080180H]

HW 65935 - [redacted]

This document consists of
55 pages.

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
FOR

JUNE, 1960

Compiled By
OPERATION MANAGERS

July 21, 1960

HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON

Work performed under Contract No. AT(45-1)-1350 between
the Atomic Energy Commission and General Electric Company.

[redacted]

Route To:	P.R. No.	Location	Files Route Date	Signature and Date
J E Travis	REC-1400			

[redacted]

[redacted]

DISTRIBUTION

Copy Number

1	W. E. Johnson
2	H. M. Parker
3	H. D. Tibbals
4	J. H. Warren
5	V. R. Cooper
6	K. G. Grimm
7	C. T. Groswith
8	T. G. LaFollette
9	P. R. McMurray
10	W. N. Mobley
11	H. P. Shaw
12	C. R. Bergdahl
13	M. G. Mass
14	General Electric Company, Palo Alto, California Attention: F. E. Crever, Manager Advance Planning Operation
15, 16, 17	Atomic Energy Commission, Hanford Operations Office Attention: J. E. Travis, Manager
18, 19, 20	Atomic Energy Commission, Washington 25, D. C. Attention: G. F. Quinn, Director Division of Production
21	Extra
22	300 Files
23	Record File

TABLE OF CONTENTS

DECLASSIFIED

[redacted]

HW-65935 DEL

STAFF

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

[redacted]

[redacted]

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JUNE, 1960

I. SUMMARY

A. RESPONSIBILITY

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

B. PRODUCTION

The production of plutonium nitrate from the separations plants during the month was below that forecasted, both for June and Fiscal Year 1960.

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

Although unfabricated plutonium metal production was below that forecasted for June and the fiscal year, all shipments were made on schedule. The Recuplex facility (plutonium recovery) established a new production record when June output exceeded that of any previous month by 22 percent.

C. ENGINEERING

Shortly after Purex resumed normal processing on June 21, following an unsuccessful neptunium recovery run, a flow restriction developed in the organic line from the first cycle decontamination column (HA). When a subsequent inspection of the column cartridge revealed severe damage to the polyethylene plates, both the first cycle decontamination and first cycle scrub columns were replaced.

Removal of the residual uranium from the damaged B-2 multipurpose dissolver at Redox was completed and decontamination of the unit was started. A total of 11.0 tons of uranium was recovered.

Three test batches of enriched uranium, associated with E-N loading in the reactor operations, were processed in the Redox dissolvers. The sample from one of the batches was insufficient to obtain the desired information and another batch is being processed.

Cost and schedule estimates on Redox neptunium recovery were obtained following completion of the preliminary engineering feasibility study. The total cost of continuous neptunium recovery facilities at Redox was estimated to be $350,000.

An engineering flow sketch, building arrangement, and rough cost estimate were prepared for a facility to recover plutonium from wastes, presently being cribbed from the button line and the existing Recuplex facility in the 234-5 Building. The facility would entail an ion exchange column for sump wastes and a solvent extraction column for Recuplex CAW (solvent extraction waste) with associated vessels, piping, instrumentation, and service. The project proposal has been initiated.

The 1MEV X-ray room in the Inspection Facility for Finished Products was completed on June 17 in accordance with contract requirements.

Revision 3 of the project proposal for NPF Reprocessing (Project CGC-830), which requests design authorization only, is being circulated for approvals by General Electric Company. The estimated total project work cost, based on 85 percent scope completion and 17 percent detail design completion, is $5,400,000. Design work has been started on the Mechanical Processing Cell and the Solution Storage Facilities.

D. GENERAL

Portions of the 200 East Area became contaminated following the burial of some contaminated equipment on June 10. No personnel contamination was involved and control procedures were instituted promptly. Details of the incident are contained in CPD Radiation Exposure Occurrence 60-1.

W. K. Woodruff

General Manager
Chemical Processing Department

[redacted]

HW-65935 DEL

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JUNE, 1960

II. ACHIEVEMENTS

A. PRODUCTION OPERATION

1. Production Statistics

	June	May
a. Purex		
Plutonium nitrate produced (Kgs)	139.4	162.3
Uranium nitrate produced (tons)	251.9	300.5
Average production rate during operation (T/D)	24.9	20.9
Total waste loss (%)		
Plutonium	1.83	0.28
Uranium	0.28	0.29
On-line efficiency	32.6	69.4
b. Redox		
Plutonium nitrate produced (Kgs)	71.9	5.6
Uranium nitrate produced (tons)	(36.2 E (115.7 N	26.3
Average production rate during operation (T/D)	8.0	5.9
Total waste loss (%)		
Plutonium	0.32	0.45
Uranium	0.13	0.10
On-line efficiency	75.0	21.1
c. Uranium Reduction		
Normal UO_3 loaded (tons)	292.7	560.6
Enriched UO_3 loaded (tons)	43.6	23.7
Normal UO_3 approved for shipment (tons)	297.0	601.4
Enriched UO_3 approved for shipment (tons)	97.1	0
Normal UO_3 shipped (tons)	396.4	652.3
Enriched UO_3 shipped (tons)	99.6	0
Normal UNH backlog (tons U)	117.4	40.5
Enriched UNH backlog (tons U)	4.3	12.6

d. Plutonium Metal Processing

	June	May
Input to Task I (batches)	199	192
Reduction yield (%)	96.7	98.3
Plutonium metal buttons produced (% of commitment)	46.0	79.9
Product recovery output (% of schedule)	144.8	57.5
Product recovery backlog (Kgs)	190.2	179.4
Waste disposal (grams)	394	365

e. Plutonium Metal Fabrication

f. Waste Storage

Redox salt waste reserve (tons U)	2,871	3 021
Purex salt waste reserve (tons U)	26 487	26 742
Redox coating waste reserve (tons U)	22 679	22 829
Purex coating waste reserve (tons U)	33 249	33 504

g. Power

	200 East	200 West
Raw water pumped (gpm)	8 590	5 435
Filtered water pumped (gpm)	907	942
Maximum steam generated (lbs./hr.)	212 000	108 000
Average steam generated (lbs./hr.)	122 486	80 225
Total steam generated (M lbs.)	86 688	57 726
Coal consumed (est. tons)	4 489	3 092

R. E. Tomlinson

Acting Manager - Production

[redacted] HW-65935 DEL

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JUNE, 1960

II. ACHIEVEMENTS (Continued)

B. PUREX OPERATION

1. Operating Continuity

Normal processing commenced on May 27 and continued until 1040 on June 10. Two days, May 29 and May 30, were spent in recycling cold uranium as a result of a severe gamma burst. Production rates varied between 2.4 and 2.88 CF. Both products were out of specification for the entire period.

After replacing the Final Uranium Cycle stripping column (2E) normal processing was resumed on June 21 at 1440. A restriction in the product line from HA to HS column forced a shutdown after only ten hours of operation. An inspection of the HA column cartridge revealed severe deterioration of the plastic plates. Both the HA and HS columns were replaced.

Processing was again started on June 30 at 0530 on a 2.4 CF. Operation was satisfactory at month end.

Waste losses were abnormally high, 1.4 percent for plutonium and 0.22 percent for uranium, due to the large amount of flushing that took place and the small monthly production.

2. Processing Operation

Prior to the June 10 shutdown, Mistron (talc) was introduced into the HAF, HSR, and HSS on separate occasions to determine its effect upon decontamination performance. No definite improvement was noted.

The run period June 1 through June 10 was marred by instability of several of the columns (1BX, 1BS, 2A, and 2E) which limited rates and required frequent flowsheet adjustments.

Failure of the J5 pump, along with Birch refluxing in the HA-HS system, contributed to the unsuccessful recovery run. The Birch in the HA-HS system, along with that separated in the 2A-2B system, was combined with the backcycle waste and sent to E5 for future recovery.

During the shutdown the 3WB system and the No. 1 Organic System were given numerous chemical flushes.

The startup on June 30 was made using fresh nitric acid throughout the process and with fresh acid being substituted for the 3WB flow.

The silica-gel facility processed 184 tons of uranium during the period to produce specification product. An additional 205 tons was shipped to Redox for silica-gel treatment.

3. Mechanical Experience

The following work was performed during the period:

a. The Final Uranium Stripping Column (2E) was replaced with the original First Cycle Uranium Stripping Column (1C) which had been modified to provide a remotely replaceable cartridge of increased capacity. A pulser was installed with the stroke increased from 1-3/8 to 2-3/4 inches.

b. An inspection of the scrub cartridge in the MA column revealed all of the plastic plates were badly broken. On the basis of this inspection it was concluded that the plastic plates in the MS column were also disintegrated since they had been in service since June 1958. Both columns were replaced because the MS column was not equipped with a remotable cartridge and the MA column was suspected of having a faulty extraction cartridge which was not remotable. A new MAF jumper and MA interface float jumper were installed in the new column.

c. Four canyon pumps, J5, M1, G2, and G7-1, failed and were replaced.

d. The float in the G2 column float jumper was replaced after the original developed a leak and sunk. The replacement failed also before the month end.

e. A new jumper designed to recirculate part of the 1OF flow back through the packed section of G1 tank was installed as a means of increasing the dF of the No. 1 Organic System.

f. The DOV in the MA column jet-out jumper failed and was replaced.

g. The F7 to F11 pump DOV jumper developed a restriction after the June 30 startup and was replaced without having to shut down.

h. A pressure test of the final plutonium stripper (L3) tube bundle revealed a bad leak. It is scheduled for replacement during the next shutdown.

[redacted]

4. Radiation Experience

The total radio-iodine 131 emission for the month was 9.35 curies with a daily average of 0.31 curies.

Two process steam tube bundles (F11 and H4) were buried on June 10. The maximum personnel dose rate was 5 r/hr. at 100 feet. The collapse of the burial box during backfilling operations resulted in general contamination of 10 to 60 mrads/hr. at the burial site and lesser contamination to other 200 East Area facilities in a southeasterly direction from the burial trench. Control efforts were initiated and are continuing.

Two Radiation Occurrences were experienced during the month. A total of five cases of skin contamination were detected and reduced to less than detectable. Thirty-four cases of contaminated personal effects were revealed. These included 28 cases of shoe contamination resulting from the contamination spread from the June 10 burial.

5. Analytical Experience

Hydrazine analytical methods were established and made ready for use.

The effects of chromium in the plus three valence state on Birch analytical procedures were studied extensively. Chromium concentrations normally found in Purex plant samples have no effect upon Birch analytical procedures.

A DK-2 Beckman recording spectrophotometer was received and placed in operation on June 21. Calibration work is in progress.

6. Events Influencing Costs

Costs continued to be abnormally high in June due to process difficulties and extensive equipment replacements. Manpower was enlisted from Power and General Maintenance Operation and the other monitoring groups in CPD and HLO to help in controlling the spread of contamination from the burial garden.

P R McMurray
Manager-Purex

PR McMurray:EAF:gt

[redacted]

[redacted]

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
JUNE, 1960

II ACHIEVEMENTS (Continued)

C. SPECIAL SEPARATION PROCESSING AND AUXILIARIES OPERATION

1. Operating Continuity

To compensate for the reduced production at the Purex Plant, the Redox Plant was diverted from E-metal to normal uranium processing on June 13, 1960 and placed on seven-day per week operation. Just prior to the diversion, enriched uranium from three E-N loading test batches was dissolved and sampled. Analytical results on these special batches has been requested as a prerequisite to AEC approval for a full pile test E-N loading.

2. Processing Operation

Processing operations were diverted from E-metal to normal uranium feed in mid-month. Normal uranium metal dissolving was started on 6-13-60 and metal solution reached the extraction columns on 6-18-60. Operations continued as scheduled for the balance of the month. The monthly production commitments for both E-metal and normal uranium were exceeded by 5 and 14% respectively, while operating 75% of the total hours available for column operation.

To provide greater capacity while on normal uranium production, the Redox Plant changed from a three shift five-day week operation to a four shift seven-day week operation on 6-13-60. The additional personnel required to build four complete operating crews was borrowed from the Purex and Finished Products Operations.

Three 300-400 pound test batches of enriched uranium, associated with E-N loading in the reactor operations, were charged to the dissolvers just prior to the diversion to normal uranium processing. Special dissolver samples were taken which are to be analyzed for Pu-U ratio, isotope content, etc., to provide the basis for decision on the E-N loading program.

Approximately 209 tons of UNH, with a high gamma ratio, were received from the Purex Plant and reprocessed through the silica gel system to reduce the gamma content to within shipping specifications. The material was shipped to the UO_3 Plant for final processing.

Removal of the residual uranium from the failed B-2 multipurpose dissolver was completed this month. A total of 11.0 tons of uranium was recovered. At month-end equipment and procedures for

decontaminating the dissolver proper, prior to its removal and transfer to the 221-T Equipment Reclamation Facility, were underway.

3. Mechanical Experience

The mechanical efficiency for the month was 100 percent, there being no downtime or production curtailment attributable to malfunctioning or failure of the operating equipment.

Maintenance work was directed primarily toward restoration of the B-2 multipurpose dissolver cell. To facilitate decontamination of the dissolver pot, a new lid with a built-in recirculating jet jumper was fabricated and installed on 6-22-60. Stainless steel piping was also installed in the north pipe gallery so that the cell equipment can be sprayed through the wall nozzles with dilute nitric acid.

On 6-23-60 the left hand optic head on the 202-S canyon crane was replaced because of faulty power changing. This is the first replacement due to this type of failure since the double solenoid system was installed over a year ago.

The silver reactor on the C-2 dissolver was replaced with a reclaimed unit on 6-9-60, when it failed due to plugging. The failed unit had been in service during the dissolution of 406 tons of uranium metal. Electrical difficulties were also experienced with the silver reactor heater and a new unit was installed on 6-10-60. The failed unit had been in service since 9-21-57.

4. Waste Handling and Decontamination

The transfer of office equipment and Redox Waste Handling and Decontamination Operation personnel from the 221-U to the 221-T Building was completed on 6-8-60. Only intermittent supervisory coverage at U-Plant is contemplated until work in the canyon proper is completed.

Equipment valued at $50,500 was received from the processing plants for decontamination and/or repair during the month. Equipment valued at $45,000 was decontaminated (at a cost of $2,800), repaired, and released to customers during the month. The major portion of the work involved the decontamination and repair of two 8,000 gallon tanks for the Irradiation Processing Department.

A total of 538 man-hours was charged to the decontamination and/or repair of railroad, automotive, and heavy equipment. The following is a breakdown of the major items decontaminated.

Item	Operation Charged
Locomotive No. 29	Transportation
Well Car. No. 38	Transportation
Well Cars No. 37, 40, 41, 45	Production
Weed Sprayer & Tractor No. 78-19045	P&GM
2 Ton Truck No. 68-B-907	"
Farm Tractor No. 62-2818	"
Lima Crane	"
Lowboy & Tractor No. HO-68-3633	"
Lowboy & Tractor No. MC-64-999	Minor Construction
Panel Truck No. 1D-451	HLO
Sedan No. 1A-5847	Purex
Carry-all No. 1D-795	Purex
UNH Tractor	Purex
Sedan No. 1A-884	Patrol
Pickup Truck No. 1C-219	Transportation

5. Radiation Experience

Particulate fission product emissions from the 291-S ventilation stack were detected on 6-2-60 and 6-22-60. As on previous occasions, the activity was associated with the emission of ammonium nitrate crystals. Small amounts of strontium-90, zirconium-niobium-95, and ruthenium-103-106 were detected by the analytical laboratory, but the crystals were essentially identified as 100% ammonium nitrate. The emission on 6-2-60 occurred when the pressure on the dissolver air jets fell below the steam trip-on point several times, causing the jets to oscillate from air to steam. The particulate emission on 6-22-60 occurred following a 291-S stack flush. In both cases the maximum particle reading was 127 mrads/hr. All contamination was confined to the Redox Exclusion Area and was easily removed by water flushing and physical pick-up of the larger ammonium nitrate crystals.

Monitoring instruments were installed on the Redox Plant sand filter inlet strip sampler and put into operation on 6-8-60. This installation was made to provide early detection and possible correction of unusual levels of radioactivity going to the sand filter from the 202-S Building ventilation and vessel vent systems.

6. Analytical Experience

To provide analytical coverage for the revised production schedule of the Redox Plant the 222-S Analytical Laboratory changed from a five-day week operation to a seven-day week operation on 6-13-60.

Analytical service to the Process Chemistry and Development and Corrosion Chemistry Groups was temporarily suspended, and personnel engaged in these activities utilized on shifts to provide the necessary coverage.

Chas. B. Smith

Manager - Special Separation
Processing and Auxiliaries

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JUNE, 1960

II. ACHIEVEMENTS (Continued)

D. FINISHED PRODUCTS OPERATION

1. Operating Continuity

All Finished Products' shipping commitments were met. No formalized plutonium fabrication was scheduled but a limited number of the new model 85 parts were produced. Six of these test pieces were shipped to the customer and one proved acceptable. The output of unfabricated plutonium was low again this month due to feed shortages. Recovery operations performed at record rates and contributed a significant amount of feed to the button line. Uranium Oxide met schedule but in doing so exhausted the inventory of uranium feed material.

2. Processing Operations

a. Plutonium Fabrication

Limited fabrication of the Model 85 was conducted again this month and continued to provide experience in casting, machining and inspection. Only six percent (6%) of the parts produced were acceptable. Reject percentages were as follows:

Handling	11%
Radiographic	33%
Machining	26%
Chemical Assay	9%
Corrosion	15%

Of six parts sent to the customer on June 13, five were rejected due mainly to defects related to handling (discolored, corroded, scratched, nicked, dented) and to hole size. Within specifications were edges, surface finish, plane flatness, height, wall thickness and radiography.

During the month contracts for graphite molds were let with Speer-Carbon. These molds will continue to be fabricated on site until deliveries from this vendor start in October or November.

b. Plutonium Processing

The production of unfabricated plutonium was hampered again this month by shortages of feed. Neither the forecast or schedule were met. At the end of the month net production was further reduced by the rejection of 14% of the buttons for high metallic impurities, principally iron. An investigation to determine the source of the iron is in progress.

A new total output record was achieved by the Recuplex (recovery) operation when this month's production exceeded that of any previous month by 22%. This new record was made possible by the processing of over 100 Kg of off-standard plutonium nitrate. The recovery equipment performed well and a satisfactory amount of normal recovery material was also processed.

c. Uranium Reduction

The Uranium Reduction plant operated well during the month, but at reduced rates due to limited feed supply. Production schedules were achieved and the plant was shut down for scheduled vacation outage on June 27. Shipping commitments will be met during the outage from finished product inventories currently on hand.

3. Mechanical Experience

Equipment experience in all Finished Products' areas was satisfactory during the month. Maintenance was routine except in regards to the Task III reduction furnaces in Z Plant where the dismantling and overhaul of two units was required following a minor fire caused by ignition of oil leaking from an air-operated valve. Investigation of the system following this incident showed no further hazard. Also, leakage of high temperature nitric fumes on the off-gas piping of "L" continuous calciner in U Plant caused lagging to smoulder with slight damage to the lagging only.

Vendors' representatives who were on plant during the month assisted in training electrical maintenance personnel on the Sheffield gauge and the G. E. million volt X-ray apparatus.

4. Radiation Experience

Radiation and contamination experience statistics indicate that overall control was satisfactory in June.

A potentially serious injury occurred when a fabrication operator cut his finger on a weapon shape rotating in the lathe chuck. The wound was excised and elimination therapy (DTPA) was employed to minimize the amount of plutonium deposition. Evaluation is in progress.

[redacted] DECLASSIFIED WITH DELETIONS

5. Analytical and Final Inspection Experience

	June	May
Number of Samples Received	1049	1192
Number of Determinations	8510	11701
Average Button Impurity	2255 ppm	1478 ppm
Button Rejections	14.2%	3.8%
		--
		--

DECLASSIFIED WITH DELETIONS

Manager - Finished Products

DECLASSIFIED WITH DELETIONS

UNCLASSIFIED

HW-65935
DEL

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

June 1960

II. ACHIEVEMENTS (continued)

E. POWER AND GENERAL MAINTENANCE OPERATION

1. Operating Continuity

Steam, water, and emergency electrical services were supplied the prime production facilities in a manner sufficient to sustain continuity of operations for the entire period covered by this report.

2. Inspection, Maintenance and Repair

Construction of the high-level cave in the sample gallery at the Purex facility is approximately 95 per cent complete. Included in the installed equipment are two mechanical manipulators and other facilities designed for handling high-radiation-level process samples. The remaining work consists of minor internal piping and installation of the leaded glass shielding which has a promised delivery date of mid July.

A U-6 reboiler for the vacuum fractionator in the Purex facility's 206-A Building was withdrawn from spare parts and made ready for service. The unit will be installed as a replacement for the in-service reboiler which is leaking in the tubes and head gaskets. Examination and tests of the vendor-fabricated spare disclosed two pin-hole leaks in the tube-to-tube sheet welding. The condition was corrected and the vessel placed in standby status.

Made ready on a crash basis for installation at the Purex facility were two pulse columns, and the necessary pipe jumpers, required as replacements for columns which had become plugged by parts of polyethylene sieve plates which disintegrated under radiation. Involved were an HA decontamination column and an HS scrub column. An additional chemical feed point was provided the HA decontamination column by the installation of a distributor ring in the lower extraction section. In connection with this same crisis, a pulse generator for the HA column was made ready for service; however, it was not required in that the in-service unit was successfully re-installed.

Fabrication of a spare ruthenium oxidizer vessel (H-4) for the Redox facility was 98 per cent complete at month end.

UNCLASSIFIED

A revised cover was fabricated for the failed Redox multipurpose dissolver which would facilitate dissolution of the remaining metal and expedite removal of the damaged vessel. Design of the new cover incorporated five nozzles which allowed for recirculation of acid within the vessel by means of an interconnected jet-jumper and provided entry for temperature-sensing instrumentation and water-spray equipment.

Complete at month end was the fabrication of 75 shipping containers and birdcages required for new models in the weapons program. The radiographic inspection hood for this program is also complete; however, installation of the conveyor system is awaiting delivery of parts purchased off-site.

Installation of the Sheffield rotary contour gauge and related equipment in the addition to the 234-5 Building is 45 per cent complete. This prototypal installation is part of a program under the direction of Research and Engineering, and is for the development of improved methods in the measurement of finished plutonium fabrications.

Fabrication is complete on 40 of the 160 containers required for shipment of experimental fuel elements from Hanford Laboratories Operation's 231-Z facility to Savannah River.

An aluminum box, designed to shield out background radiation, was fabricated for the Purex facility's use in monitoring the plutonium and fission product content of waste cartons. The unit is of double walled construction and completely water shielded on all sides including the door, with entry ports for radiation counters.

Six plexiglass panels were installed on process glove boxes as replacements to improve visibility which had been impaired by acid etching and discoloration of the existing panels. Four of these panels were installed in the Recuplex section of the Finished Products Operation and two on the anion exchange hood at the Purex plant.

A total of 28 cell pipe jumpers were fabricated as required for the continued operation of the Purex and Redox canyons.

A conventional agricultural type sprinkler system consisting of 1,200 feet of four inch irrigation pipe was installed in the 200 East Area in an effort to stabilize ground contamination. Rye seed is also sown over the affected area to form a root mat for the prevention of wind erosion. The spread of contamination occurred during a recent burial of contaminated process equipment.

UNCLASSIFIED

[redacted]

Installed in the 2101-M Building, 200 East Area, was approximately 130 feet of Hauserman partitions for the creation of eight individual office spaces as required by the Production Purchasing Operation.

No. 4 boiler, 200 East Power House, developed a leak in a water wall tube which required its removal from service on June 1. Repairs were accomplished and the unit returned to service on June 3.

The addition of filming-amine feed to the steam supply, 200 East Area, was discontinued June 6 at the request of Purex management. Feeding will not be resumed until a determination can be made as to the effects the filming amines are having on the process.

Services rendered other departments included the inspection of 1,107 high-efficiency air filters received for use in the Irradiation Processing Department's Confinement Program (Project CG-1-791). Of the total number inspected, 485 were rejected for deformed gaskets, oversize, or failure to pass DOP (Dioctyl Phthalate) tests. The rejects will be returned at the manufacturer's expense.

T. S. La Fauci

Manager-Power and General Maintenance

JFL:wb

UNCLASSIFIED

[redacted]

[redacted] HW-65935 DEL

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
JUNE, 1960

II. ACHIEVEMENTS (continued)

F. FACILITIES ENGINEERING OPERATION

1. Purex

a. Process Design and Development Engineering

Palm Recovery and Purification - Purex

The Title I design of Purex purification facilities was completed. The Title I documents pertaining to both Purex Palm extraction and purification were forwarded to the Commission on June 7, 1960. The scope designs for both facilities were approved by the Commission on June 23, 1960.

Waste Carton Monitor for Pu

Fabrication work has been completed on the moderator box and the electronic equipment. The counter is being set up in the 271-T Building laboratory for tests and adjustments before installation in Purex.

Purex 4.0 Capacity Factor Expansion

The hydraulic review of Purex process streams has been essentially completed. Specifications are now being prepared on new items of control instrumentation for 4.0 capacity factor. Flow sketches depicting over-all process routings and new equipment requirements for the 4.0 C.F. flowsheet are well underway.

Engineering reviews of the extraction , "G" cell solvent treatment system, and aqueous makeup equipment have been completed. The 1BX, the 2E, and the 2A columns will require cartridge modifications. The "G" cell organic centrifuges will require jumper changes. Additional tanks for sulfuric acid storage, formalydehyde storage, and a third anion unit for water demineralization will be required.

Treatment of Purex Wastes

A sludge sample of simulated Purex 1WW wastes after self-

concentration was pulverized, and small samples were then heated for four hours at temperatures ranging from 70°F to 1200°F to determine if the sludges had a melt point which could be a limiting factor in establishing design temperature criteria for storage tanks. At temperatures of 500°F and above, the heating had a cindering effect, and a hard clinker formed at 1200°F. No indication of a melting point was obtained, therefore this approach to defining storage tank design temperature criteria was abandoned.

b. Project Engineering

CGC-821, Project Palm - Purex

Scope documents were issued in early June and approved by the Commission. Detail design was initiated June 27, with start of work on a scale model of the "J" cell package structure. Other detail design work is scheduled to start in early July.

CGC-872, Palmolive Fabrication & Reprocessing Facilities-200-E

By Directive HW-496, Modification 1, on June 17, 1960, the authorized funds were reduced from $72,000 to $26,000 and the project was abandoned.

CGC-897, Fission Product Concentrates Storage System-200-E

This project proposal requested preliminary engineering funds in the amount of $21,000 for work associated with providing a storage system for fission products from Purex. It was authorized by Directive HW-513 on June 6, 1960.

c. Manufacturing Engineering

Jumper Cutter

The cutter was received June 22 and is being checked out in the local shop before going into service in the Purex canyon. A storage rack is being designed and fabricated and will be transferred with the cutter to Purex.

HA Column

Design and drawings were completed for addition of a sodium nitrate feed ring. This will permit additional solutions to be fed to the column during operation.

2. Special Separation Processing

a. Process Design and Development Engineering

Redox Recycle Tank Replacement

The nuclear safety characteristics of L-16 Recycle Tank in Building 233-S are being considered. L-16 is the only vessel in plutonium service in 233-S with a non-safe geometry. Two alternate nuclear safe design concepts were submitted for the replacement recycle tank: 1) a multi-barrelled tank with several barrels, each 6" in diameter; and 2) an annular tank about 3' OD x 1.8" thick annulus. Although the annular tank provides about twice the storage volume for the same over-all tank height, the multi-barrelled tank design is preferred on the basis of easier fabrication and lower over-all costs.

Ventilation Air Monitor

Monitoring of the Redox ventilation air before it enters the sand-filter inlet has been done by a strip monitor sampler from which the samples were read manually. In order to provide immediate readout, the sampler was modified by addition of a beta-gamma scintillation detector with shielding. The radiation level is indicated and recorded in the 202-S Building. Since this installation was made with borrowed equipment, the necessary components will be either fabricated or purchased for permanent installation.

b. Project Engineering

NPR Processing Facilities

Preparation of the project proposal for NPR Processing

Facilities in Redox has been suspended until the Redox B-Cell incident has been resolved.

c. Manufacturing Engineering

Redox Multi-purpose Dissolver

A new jumper was designed to be used for recycling and decontamination within the vessel during removal of material left undissolved after the April incident. Also, the cover was modified to allow installation of five 2-inch nozzles. The TV camera has been enclosed in its special case and is scheduled for use on July 5 to examine the interior of the dissolver.

3. Finished Products Operation

a. Process Design and Development Engineering

Radiation Studies

By use of a 200-channel gamma energy analyzer, previous studies of Z Plant radiation were extended, with emphasis on the requirements of lead and water as a shield for Recuplex radiation. It was determined that a foot thickness of water in addition to an inch of lead would provide adequate protection. The 200-channel gamma energy analyzer was needed also to examine contaminated process equipment. The characteristic Pu spectrum was observed but not measured.

Waste Treatment Facility

An engineering flow sketch, building arrangement, and rough cost estimate were prepared for a facility to recover plutonium from wastes, presently being cribbed from button line and the existing Recuplex Facility. The facility would entail an ion exchange column for sump wastes and a solvent extraction column for Recuplex CAW solvent extraction waste with associated vessels, piping, instrumentation, and services. The project proposal has been initiated.

b. Project Engineering

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

Except for minor items in the Hood 9B , the line was

completed. Hot feed startup is expected to occur on July 14. Because of slow deliveries of lead glass, about 40 percent of the shielding windows remain to be installed. Deliveries are expected to be complete by July 8, 1960.

CG-789, Additional Fire Protection - 234-5 Building

The automatic sprinkler system was placed in service on June 15. Installation of the detector system was scheduled to begin approximately July 15, 1960, depending on issuance of security clearances. The directive completion date has been extended to March 31, 1961.

CGC-811, Additional Plutonium Fabrication Facilities - 234-5 Building

The procurement of engineered material and equipment is approximately 96 percent complete. This consists of 200 orders and five open requisitions. A shipment has been made on the Gorton Lathe order, one of the outstanding trouble spots; and the Stokes Casting Furnace order is complete with the exception of some broken bell jars.

Job 0095 - Inspection Facility - 234-5 Building

The 1MEV X-ray room in the 234-5 addition was completed in accordance with contract requirements June 17. The X-ray equipment has been tested and was ready for use on June 29. The fixed price contractor is estimated to be 87 percent complete (slightly ahead of schedule), and it appears that he will meet his second partial completion date of July 17, 1960.

c. Manufacturing Engineering

Analysis by Motion Pictures

Motion picture analysis films were taken and reviewed of two machining operations in Fabrication. These films encompass companion operations to the initial Gorton film study, for hand exposure measurements and methods analysis.

A primary motion picture analysis program was developed and approved by Finished Products management. This program covers the major operations, performed in 234-5 and UO_3, which lend themselves to detailed study of hand exposure and methods.

Plutonium Scrap Recovery

In conjunction with Financial, a price list of Pu recovery from off-site material is being prepared for use within the AEC complex. This study encompasses the costs incurred through the incinerator, proposed Pu Reclamation Facility, and conversion to the button state of various material sources.

4. General

a. Process Design and Development Engineering

Leak Detection - Active Tanks

Using the new 90° bend of 4-inch tubing, the electrically-powered scintillation probe has travelled 200 feet horizontally under mock-up conditions. In an actual field test the drive mechanism failed, through loss of a connecting roll-pin, at a point where the new bend was installed. Further testing is scheduled.

Contamination Control

Development effort concerning hermetically-sealed equipment, double sleeve flange seals, and localized shielding, is being directed toward presentation of an alternate scope for the Plutonium Reclamation Facility, Project CAC-880.

Development of an improved plastic tunnel suit has now been concluded in connection with the demonstration hood cell. The new model includes many new features which emphasize comfort and maneuverability, as well as its normal safety features. One suit of this new model was made and sent upon request to Oak Ridge for display purposes.

b. Project Engineering

Project Cost Information as of June 19, 1960:

Total Authorized Funds - 14 active projects	$ 8,020,000
Total Cost-to-date	4,500,000
Commitments and Open Work Releases	1,281,000
Unencumbered Balance	2,239,000
Costs Charged to Above Projects 5/15/60 to 6/19/60	634,677

Project CGC-850 was dropped from active status during this period:

Authorized Funds: $63,000 Total Cost: $54,354

CGC-830 - NPF Project

Final comments on drawings and specifications for the Receiving and Storage Facilities were returned to Vitro early this month. Work has started on both the Mechanical Processing Cell and the Solution Storage Facility design.

Revision 3 of the project proposal is circulating within the General Electric Company for signatures. This revision updates the scope of work in line with AEC communications, and requests design authorization only. The estimated total project cost, based on 85 percent scope completion and 17 percent detail design completion, is $5,400,000.

The design criteria for the U-Plant fuel dissolution systems and associated service facilities was issued for comment on June 9, 1960.

Engineering Inspection

CG-731 - Critical Mass Laboratory (HLO)

The lump sum contract portion of this project is complete. J. A. Jones forces and Plant forces will install all of the remaining equipment. Punch list items are complete and as-built drawings are being prepared.

J. B. Fecht, Acting Manager
Facilities Engineering Operation
CHEMICAL PROCESSING DEPARTMENT

JB Fecht/WW Chamberlain/alr

[redacted] HW-65935 DEL

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JUNE, 1960

DECLASSIFIED

II. ACHIEVEMENTS (Continued)

G. RESEARCH AND ENGINEERING OPERATION

1. Purex Process Technology - [redacted]

a. Head End

Further investigations into uranium dissolution utilizing the procedure whereby the metal is completely covered with nitric acid before the dissolver acid is heated, has indicated the actual time required for dissolution is only five to ten per cent longer than that required by the previous method. As a result, it appears feasible to expect the dissolvers to attain a dissolution rate of CF = 4.0, if the dissolvers are charged with twelve tons of metal (vice nine at the present time) which is removed in two six-ton cuts.

b. Solvent Extraction

Because recovery from the large gamma activity burst experienced at startup was extremely slow and because the plutonium product continued to exceed gamma specifications, recycle of cold uranium was initiated for two days in order to reduce the gamma activity levels throughout the plant. Although the 2BP, which had been ten-fold above normal, was reduced sufficiently to process it through the Plutonium Ion Exchange, the ion exchange decontamination factor of four was not sufficient to produce specification product. At the same time all uranium product produced ranged from ten to twelve times gamma activity specification.

Peculiar process and equipment behavior e.g. no response to HA Column organic phase uranium saturation, flooding tendencies in the 2A, 2E and IHX Columns, no decontamination factor improvement after a complete change from Purex recovered to UO_3 recovered acid in the solvent extraction system all seemed to indicate an extensive plant flush was in order; consequently, the decision was made to use an oxidizing (sodium dichromate) neptunium recovery run to flush the plant and treat the solvent as well as recover neptunium. Past data indicated periods of good decontamination performance followed previous oxidizing neptunium runs.

[redacted] DECLASSIFIED

On the basis of cold semiworks studies which indicated the purging effect of a talc additive to the HA Column, Mistron (finally divided magnesium silicate) was added independently to the HA Column feed (HAF), the HS Column Recycle to the HA Column (HSR) and the HS Column Scrub (HSS) in concentrations up to 50 ppm just prior to shutdown. The following observations were recorded:

(1) Mistron reduces the aqueous holdup and column efficiency below the addition point. The aqueous holdup and some efficiency can be restored by increasing the pulse frequency.

(2) Mistron addition to the HAF only had no significant effect on the HA and HS Column decontamination performance. Addition to the HSR or the HSS streams produced a temporary sharp increase in decontamination performance that was not maintained during continued operation.

(3) Mistron additions to the HSR or the HSS at 50 ppm had to be reduced to 25 ppm in order to prevent burst of gamma activity in the organic overflow from the HS Column (HSP).

(4) For twenty-four hours after the Mistron addition ceased, no increase in aqueous holdup was noted in the HA and HS Columns.

Operation on recycled uranium just before shutdown (after the use of Mistron) was characterized by a phenomenal drop in the gamma activity of the solvent phase coming from the HS Column (HSP). Whereas at the beginning of the run period, two days of operation on recycled uranium reduced the gamma activity in the HSP only very slowly; operation on recycled uranium after the addition of Mistron produced a ten-fold reduction in less than one hour. The dramatic change has been tentatively attributed to the use of Mistron, but as yet the mechanism is unknown.

Startup subsequent to the neptunium isolation run was interrupted by a restriction in the organic line between the HA and HS Columns. Inspection of the HA Column Scrub section cartridge showed the polyethylene plates were badly buckled and cracked after being in the column only since November 4, 1959. A decision was made to install both the spare HA and HS Columns prior to another startup attempt. The HS Column was the one originally installed in June 1958 but had been out of service for several months for decontamination and repair. At month end, startup is again in progress.

c. Neptunium Recovery

Despite a variety of operating and flowsheet conditions, neptunium losses from the HA Column remained essentially normal during the uranium processing period. However, the neptunium losses to the uranium product were erratic and temporarily increased up to fifty

per cent of the neptunium in the virgin feed (ten-fold above normal losses). A neptunium inventory of approximately 900 grams existed in the system at the start of the neptunium isolation run.

An oxidizing (sodium dichromate) flowsheet which required the use of all the solvent extraction equipment was used for the isolation run, but because of process, equipment and laboratory difficulties plus the lack of time, no neptunium was isolated. Despite the successful use of the flowsheet in January 1959, a high neptunium reflux, which had not been observed previously, occurred in the HA and HS Columns. As a result, seventy-five per cent of the inventory was found in these columns at the conclusion of the run. The neptunium inventory still remains in the system for future recovery.

d. Plutonium Concentration

In an attempt to obtain additional scrubbing and possibly elimination of channeling, the plutonium ion exchange scrub stream (XAS) was introduced into the top of the downcomer via the XA Column vent line. No significant improvement in the normal decontamination factor of four was noted. In both the solvent extraction plutonium product (2BP) and the ion exchange product (XCP) the gamma activity is composed of 60 - 70 per cent zirconium and 40 - 30 per cent niobium.

e. Solvent Treatment

Normal solvent gamma activity of 3000 - 4000 microcuries per gallon was maintained during the period of uranium processing. Neither the addition of Mistron to the HA Column nor switching the IO Column scrub from 0.05 molar nitric acid to 2.5 per cent sodium carbonate had any effect on the solvent treatment system. Recycle of solvent after the hot feed for the neptunium isolation run had been processed reduced the gamma activity of the solvent to 900 microcuries per gallon.

Repeated flushing of the Solvent-Wash Tank, (TK-G1) with 5 per cent oxalic acid - 2 per cent nitric acid, 5 per cent sodium hydroxide - 2 per cent tartaric acid and 30 per cent nitric acid reduced the tank holdup of solids (which were thought to be principally MnO_2) from about 500 to approximately 50 gallons.

[redacted]

2. Redox Process Technology -

a. Dissolving

To assist in meeting CPD commitments, depleted natural metal was dissolved and processed during the latter half of the month. In this period, the remaining 30 to 40 per cent of the initial load of 11 tons of E metal removed from the damaged Multi-purpose dissolver was mixed and processed with the depleted metal.

Removal of the contents of the damaged Multi-purpose dissolver (cf. this report for April and May, 1960) was completed this month. Removal with cold, dilute acid became progressively more difficult as the composition of the contents approached all uranium metal. The dissolving technique was correspondingly altered in the direction of progressively more concentrated nitric acid until hot (70 C) 60 per cent acid was used to remove the final ton of uranium.

To prevent the possibility of uranium overheating and ignition, the practice of cooling the dissolver contents before acid addition by flooding with water was continued until removal was complete.

The dissolver solution transfer jets became operable again after approximately one-half of the dissolver load had been removed, indicating that at least that quantity of uranium existed after the incident as finely divided UO_2. However, the dissolving continued to be highly reactive until approximately two-thirds of the load had been removed. The final one-third reacted much as uranium metal reacts; dissolving rate and temperature were controlled by use of the air sparger.

Final decontamination of the damaged dissolver was completed at the end of the month after facilities were provided to recirculate the decontaminating agents over the dissolver interior by means of a stationary spray nozzle inside the dissolver lid. The decontaminating agents used were aqueous solutions of 50 per cent sodium hydroxide, 5 per cent sodium hydroxide, 1.5 per cent potassium permanganate, 60 per cent nitric acid, and 5 per cent oxalic acid.

The former iodine removal scrubber in the 293-S Acid Recovery and Iodine Removal Building was reconverted in March to a scrubber to provide complete separation of ammonia from the oxides of nitrogen downstream from 293-S. This was done to prevent low level contamination of the plant environs from Redox plant stack effluents containing ammonium nitrate contaminated with fission products. The method was successful while only the Multi-purpose dissolver was operated. With the failure of the Multi-purpose dissolver, however, the two standard dissolvers were re-activated resulting in periods when both ammonia and oxides of nitrogen were concurrently routed to the scrubber. During these periods, ammonium nitrate crystals of very small size were formed in

[redacted]

the vapor phase and were not efficiently scrubbed out, resulting in crystalline ammonium nitrate being emitted from the stack. No increase in environs contamination was noted as a result, but alternate schemes of off-gas treatment and routing were investigated and have been recommended.

b. Feed Preparation

At the beginning of the month's processing, high instantaneous plutonium losses (approximately 2 per cent) were found in the salt waste (HAW) due to inextractable tetravalent plutonium polymer from the Multi-purpose dissolver cleanout. The normal instantaneous loss in the HAW stream is approximately 0.1 per cent. The boil-up period for sodium dichromate oxidation of the feed solutions was therefore increased from the standard ten minutes to two hours and successfully prevented recurrence of the high losses for the remainder of the month.

c. Solvent Extraction

A test of dibasic aluminum nitrate (DIBAN) was made at the beginning of the month. DIBAN was used in place of sodium hydroxide for obtaining the desired acid-deficiency in the third uranium cycle. The use of DIBAN eliminates the possibility of precipitating uranium or plutonium hydroxides in the process vessels. Prevention of precipitation is basic to present critical mass control methods. The neutralization of nitric acid in the 2DF stream with DIBAN produced aluminum nitrate in sufficient quantity to allow the elimination of the fresh aluminum nitrate in the 2DS stream. The 2DS stream was therefore changed to a dilute solution of ferrous ammonium sulfate (0.006 M Fe) and sulfamic acid for final clean-up of trace amounts of plutonium accompanying the uranium through the partition cycle. The 2DF acidity was successfully controlled and all uranium product met specifications during the test. As an added benefit, the sodium content of the uranium product was reduced from an average of 50 parts per million parts of uranium to below the analytical detection limit of 15 parts per million parts of uranium. Due to its cost, the routine use of DIBAN is not being considered at this time, but will be adopted when reprocessing of fuels enriched to greater than 1.0 per cent equivalent U-235 is begun in the Redox plant.

At the end of the E-metal processing and concurrent with rework of salt waste, the 1AFS (Partitioning Cycle Feed) acidity rose from its normal value of -0.6 M to 0.2 M causing both sodium dichromate and neptunium to be extracted in the 1A column. The sodium dichromate oxidized the ferrous ion to ferric ion in the 1B column drastically reducing partitioning efficiency and causing large amounts of plutonium to leave the column with the uranium. The neptunium, however, was separated from the uranium in the 1B column and left in the plutonium stream. The current inventory of plutonium in the crossover oxidizer (1BP solution) and uranium in the 2DF Concentrator and 2DF feed tank

(1CU) produced during this time was therefore returned to the 1AFS Concentrator for reprocessing.

d. Tail-End Treatment

During processing of irradiated natural uranium, production rates were higher (and metal cooling times were lower) than those during E-metal processing. This reduced the time available for tail-end ozone treatment of the final uranium product, and as a result gamma ratios on the final uranium product after ozonation consistently exceeded specifications by a factor of from 1.5 to 3. Therefore, to improve the fission product decontamination in the tail-end, two changes were made: 1) the final uranium concentration was increased from 2.0 M to 2.4 M to give additional time for treatment, and 2) one-third of the liquid phase oxidant, periodic acid, was added to the uranium stream in the final uranium concentrator (E-10) to give additional reaction time before the start of ozone treatment in the ozone sparge vessel (E-13). The remainder of the periodic acid was added in E-13 as usual. The combination of these two steps produced an approximate 50 per cent increase in total "tail-end" contact time, and resulted in an additional arithmetic decontamination factor of 2 to 3, bringing the uranium product well into specifications.

e. Neptunium Recovery

Accumulation and internal recycle on the "standard" interim flowsheet was continued throughout the month. At the time the 1AFS became acidic as described under Solvent Extraction, above, the plutonium stream was reworked and it was believed that no neptunium was lost to the finalplutonium product. However, since the incident, the neptunium accumulation in the system as shown by laboratory analysis has been found to be approximately 150 grams less than the calculated value. The loss was not seen in the salt waste stream. It could not have gone with the final uranium product, and so must have gone with the plutonium undetected just before or after the loss of acid control in the 1A column was discovered. The total accumulation was approximately 500 grams at the time of the loss of acid control and at month end was approximately 550 grams compared to the calculated 700.

3. Finished Products Technology -

a. Uranium Reduction Operation

1. Concentration and Calcination

Contamination of the depleted product stream with corrosion products continued at a slightly reduced rate after (1) flushing the concentration and molten UNH storage systems with a passivating solution (hot 30 percent nitric acid), (2) rerouting solutions collected in the mist separator to recycle rather than product storage, and (3) reducing the acidity of Purex UNH from 0.41 M nitric acid (May average) to 0.27 M (June average). The iron content of feed to the calciners averaged 175 ppm before these modifications (May) and 120 ppm following (June). The average iron content during the period of January to June, 1959 was 55 ppm. Investigation of the high corrosion rates is continuing.

Inspection of the mist separator (the obsolete acid fractionator) revealed extensive corrosion of the bubble caps and risers on the lower plates. It is planned to remove all the caps and risers since the vapor velocity is sufficiently low for good deentrainment.

Carter rotary actuators were installed on the main three-port plug valves (feed or steam selection) of each calciner. This phase of the automation program permits routine start-up and shut-down operations from the panel board but requires manual attention to the feed and furnace controls.

2. Powder Handling

A test rubber coated spool piece failed after less than three weeks service in the unmilled powder conveying line. The test piece was submitted by the Rockwell Valve Co. as a possible material of construction for a diverter valve.

b. Metal Finished Operation

1. Recuplex

The surface of a Teflon lined dissolver pot, supplied by the Resistoflex Corp., was found to be unaffected after boiling 13 M HNO_3 - 0.25 M HF for 120 hours. It is planned to test this pot in plutonium service as a replacement for the continuous metal dissolver when the present pot fails.

[redacted]

b. Metal Finished Operation (Continued)

2. Task I and II

Condensation inside the stainless steel dip tube of the recently installed calciner off-gas scrubber caused frequent pluggage. Replacement of the dip tube with one of Teflon has resulted in three days of trouble free operation with no indication of plugging at month end. The previously installed condenser plugged after about two hours of operation, resulting in frequent periods when the calciner dust was blown into the hood.

A rough measurement revealed that air in leakage through the hydrofluorinator discharge valve is about equal to the volume of process gas. Reducing the air flow by (1) installing a gasket between the powder pan and the discharge valve flange, (2) discarding defective powder pans, and (3) more frequently maintaining a powder seal in the discharge valve when the powder pan is not in position, has decreased dust entrainment significantly. The operating period for a reasonable pressure drop across the off-gas filter has been extended to over 50 hours from 8-12 hours. A double ball valve powder seal has been mocked-up full size and is currently under test, with cold materials, as a replacement for the present "banjo valves". Positive gas seals at both inlet and outlet locations is expected to increase reaction rates by eliminating the dilution effect of air in-leakage, as well as to further decrease filter dust loading due to lower gas velocities.

The calciner temperatures were increased to 350 C, 400 C and 400 C (external shell temperatures, inlet to outlet) from 300 C, 300 C, 250 C, during May, 1960. "Burning" of the oxide in the hydrofluorinator has been eliminated and conversion to the PuF_4 has been consistently higher. During the six week period prior to the increase in calcination temperature approximately six percent of the PuF_4 produced was recycled through hydrofluorination due to incomplete conversion while no material required recycling during a subsequent similar period. The higher quality PuF_4 has also resulted in increased reduction yields and has allowed Recuplex to charge an average of 6.8 crucibles per dissolver, an increase of 15 percent over that of the preceding period.

[redacted]

b. Metal Finished Operation (Continued)

2. Task I and II (Continued)

Investigation of hydrofluorination conditions revealed that operation with the standard discharge temperature of 400 - 450 C resulted in a glowing red hot spot in the tube (estimated 750 to 800 C) and that cake formed at this location. The cake impeded the flow of powder and when broken up, frequently plugged the discharge valve. The hot spot was eliminated by reducing the indicated temperature to 375 C. Qualitatively, the frequency of lumps in the discharged powder has been significantly reduced.

4. Process Chemistry - K. M. Harmon

a. Purex Process Assistance

1. Phosphate Addition to First Cycle Feed

As a result of previous work which showed that phosphate ion has a beneficial effect on first cycle (HA column) decontamination, laboratory studies were initiated to define safe operating limits for a planned plant test using phosphate. HA column feed point contacts were made at phosphate ion concentrations up to 0.1 M in first cycle feed. The synthetic feed (HAFS) which contained plutonium(IV) at full level (0.2 g/l) was contacted with solvent (HAX) previously equilibrated to 40% of saturation with uranium. Analyses of the aqueous phase before and after centrifugation showed no evidence of plutonium precipitation up to a phosphate concentration of 0.1 M in the feed. The plutonium distribution coefficient, E_a^o, was decreased slightly at 0.05 M phosphate and by a factor of four at 0.1 M phosphate in the HAFS. Work to define the effect of phosphate ion on the plutonium distribution coefficient under the various conditions encountered throughout the rest of the column is currently in progress.

2. Solvent Studies

Laboratory solvent treatment tests aimed at improving first cycle decontamination were continued. To date, these experiments have brought out the following points of significance:

a. Additional contacts on recovered plant solvent, with a wide number of reagents, were found to improve solvent quality. Thus far, the most effective reagents tested were 3% Na_2CO_3 - 0.02 M $KMnO_4$, 0.05 M H_3PO_4 - 2 g/l $H_2C_2O_4$, and 3% Na_2CO_3. Oxalate ion, although an effective reagent, was found to extract in the solvent and must be removed prior to use.

b. For unwashed plant solvent (1CW), a 1 M HNO_3 - 0.05 M $Fe(SO_3NH_2)_2$ wash following the standard 3% Na_2CO_3 - 0.02 M $KMnO_4$ contact was found especially effective for improving first cycle decontamination.

b. Redox Process Assistance

1. Ammonium Nitrate Build-Up in the Stack

From a health hazard standpoint, the build-up of ammonium nitrate crystals in the Redox stack has been a chronic source of concern. The deposited crystals accumulate radioactivity and, in effect, become high level radiation sources. If dislodged and carried out the stack, the crystals could contaminate the immediate environment.

Under the present routing system, the dissolver off-gases are routed through a recirculating water scrubber just prior to discharge to the stack. Both the oxides of nitrogen escaping the nitric acid absorber and also the ammonia evolved during coating removal are presently routed through the scrubber. The nitric oxides are in excess of the ammonia so that in sustained operation the nitric acid concentration (also the ammonium nitrate concentration) of the scrubber solution increases. Examination of the scrubber system in the laboratory revealed that the amount of ammonium nitrate discharged to the stack is directly proportional to the nitric acid concentration of the scrubber solution. It was found that the amount of ammonium nitrate discharged may be minimized by keeping the nitric acid concentration of the scrubber solution below 1 M HNO_3.

c. Neptunium Purification

Fourteen hundred and forty grams of virgin neptunium from Purex Plant, 340 grams of neptunium in reject elements, and 440 grams of neptunium as oxide near equilibrium with its daughter Pa-233 were purified in three runs in the anion exchange facility. The amount of neptunium loaded on the resin for each run was 850, 750, and 770 grams, or 28.3, 25.0, and 25.7 grams of neptunium per liter of total available resin. About 5 per cent of the total neptunium was found in the column effluents during the pretreatment and the precut steps. This material was recycled. Less than 1 per cent of the total was found in the measured discards to waste. The reject elements were dissolved in two cuts with 9 M HNO_3 catalyzed with 0.02 M $Hg(NO_3)_2$. The time cycle for each cut was approximately six hours. The wash used for the plutonium removal step was changed from 20 column volumes of 6 M HNO_3 reducing solution to 10 column volumes of 5.5 M HNO_3 reducing solution. No increase in neptunium loss was observed as a result of these changes. The lower acid plutonium wash is recommended for the plant use where all of the wastes are recycled. These and other recent runs indicate that the volume of the fission product removal wash can also be reduced from 20 column volumes to 13 column volumes and still produce product with low fission product content. Neptunium eluted from the anion exchange column to a concentration of 22 g/l and a HNO_3 concentration of 1 M was found to remain as Np(IV) for over 14 days with no holding reductant present. This stability indicates that it may not be necessary to oxidize Np(IV) to Np(V) for safe shipment.

d. Quality Control and Standards

Weekly trial runs using the 709 IBM machine for statistical computations of Quality Control data have been quite satisfactory. It is expected that reliable weekly, monthly, and quarterly Quality Control reports will soon be available as print-outs from the machine.

[redacted] HW-65935 DEL

5. 234-5 Development

a. Continuous Direct Calcination Of Plutonium Nitrate

Additional runs were completed in the three-inch diameter calciner during the month. Oxide bed temperature was controlled at 275 C during the tests. The feed rate was one liter per hour of 200 g/l Pu in 4 M HNO_3. Agitator speed was maintained at 150 rpm. Some improvement was noted this month in the off-gas system. The off-gas line and filter operated without plugging. However, the cyclone plugged repeatedly at the small (1/2" diameter) powder drain tap. A new cyclone with a one-inch diameter powder drain has been installed in an attempt to eliminate the plug formation.

The tapped density of the PuO_2 bed formed in the calciner was found to be 6 g PuO_2/cc. This material is of considerably greater density than the PuO_2 formed in the oxalate calcination process (2 g PuO_2/cc). The higher density of plutonium oxide in the calciner (12.5 $in.^2$ cross-section x 12 in. length) removes the equipment from the "geometrically safe" category, and the calciner must now be operated by "batch control" administration.

b. Pump Test

An Ecco "Gearchem" pump with Teflon gears and packing has been tested in pumping plutonium nitrate solution (232 g/l Pu in 4 M HNO_3) at room temperature. Internal parts of the pump have been exposed to the solution for 48 days. The pump has been operated for 968 hours in that period. The packing gland has been adjusted three times during the test period, but no other maintenance has been required.

c. Electrolytic Reduction Of Plutonium Trichloride

Two runs demonstrated considerably improved equipment performance and corrosion resistance.

A nickel-coated zirconia cell showed little attack following Run #32, which lasted over four hours, and gave an efficiency of 12.5 percent. The chief difficulty encountered was due to the lack of control over the powder flow during feed addition.

Both a cell and vent tube of magnesia-10% titania showed little corrosion after Run #33. This run lasted five and one-half hours, at an observed 22 percent efficiency. The run was terminated due to off-gas scrubber difficulty. The cell was nickel-jacketed, which simplified heating and control of thermal gradients. Use of nickel-jacketing has greatly reduced the tendency for cell failure due to thermal shock.

A new arrangement for measuring temperatures external to the cells

is now under test; if successful, corrosion of thermocouple wells by melts will not be a problem.

In recent runs, tantalum wire has been used to connect the molten product metal pool to the cathode lead. No corrosion trouble has been experienced with this arrangement. Separating the cathode and vent tube problems thus is reducing a source of previous troubles.

d. Plutonium Trichloride Reduction

It was shown that 95 percent chlorination is adequate for good reductions, whereas 90 percent chlorination is inadequate.

Two reductions were made on a 500-gram scale. In one test five percent plutonium dioxide was added to plutonium trichloride of about 99 percent purity. Reduction with calcium yielded a button containing 97 percent of the plutonium charge. Button density was 19.2 g/cc. The metallic impurities totaled 796 ppm.

The second test was on plutonium trichloride containing 10 percent water-insoluble material (apparently PuO_2). In this case, the button contained 67 percent of the plutonium. Button density was 19.1 g/cc. The total metallic impurities were 733 ppm.

e. Recuplex Continuous Dissolver Testing

Tests have been completed on the second unit for the Recuplex continuous dissolver. This vessel was Teflon-lined by Resistoflex Company. There was no apparent deterioration after 123 hours of refluxing 13 M HNO_3 - 0.25 M HF in the vessel. Outside vessel temperatures ranged from 110 to 170 C and the strip heaters used to heat the vessel were checked at temperatures up to 230 C.

f. Ceramic Development

Further development of titania-magnesia ceramics tested a procedure in which uncalcined, fluffy titania was added to milled magnesia without any coarse magnesia being added. Daxad 23 was used as a deflocculant up to nearly two percent. Shrinkage was around 17 percent instead of 10 percent with calcined titania and combined milled and coarse magnesia. Crucibles and cells produced had a smooth, impervious interior glaze, and were all water-tight.

E. R. Irish

Acting Manager
Research and Engineering

[redacted] HW-65935 DEL

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JUNE, 1960

II. ACHIEVEMENTS (continued)

UNCLASSIFIED

H. Financial Operation

1. Production Cost

Year end closing activity included an analysis of various accrual and reserve balances outstanding at May 31 and establishment of the proper balance sheet classification and value for these items in both the equipment and cost categories at June 30. Consideration was given to items in transit at year end, as well as other known or contingent liabilities. A year end CPD contingent liability, as estimated by our HAPO Counsel, was established in connection with HAMTC's recent suit, in which they alleged breach of the Ratio Agreement for Chemical Worker classifications.

Operating report formats were revised for use in FY 1961, taking into account line item controls found necessary, together with sundry improvements and simplifications pointing toward easier interpretation and use of reports by operating management.

A statistical study was completed detailing the changes in CPD manpower by major work classifications from December, 1956, to the present. A portion of this study was forwarded to Contract Accounting for use in a HAPO-wide manpower budgetary study requested by the HAPO General Manager.

A study is in process to determine estimated costs, billing, accountability and bookkeeping arrangements for processing off-site plutonium through the new Plutonium Reclamation Facility. We attended three meetings, one of which was to discuss with AEC, Contract Accounting, Nuclear Materials Management, and CPD production and engineering personnel the significance of the Washington AEC advice that off-site service would be handled by product transfer rather than by billing service charges. This data is being developed to assist Hanford personnel in discussion with other sites to determine the economics of processing off-site scrap plutonium and for use in connection with project write-ups.

The following studies were completed: (1) An improved means for measurement of IME performance; (2) coding of landlord costs CPD-wide to enable clear comparisons of such costs with General Services Administration standards.

We observed the physical inventory of Essential Materials taken at the 234-5 Building on June 30. The methods used appeared to be adequate.

[redacted] UNCLASSIFIED

The Department's net investment in inventories continued a downward trend. The Essential Materials turnover rate was 3.7 in May and 2.5 fiscal year to date compared to 2.0 for FY 1959. The Spare Parts turnover rate was 1.15 in May and .42 fiscal year to date compared to .32 for FY 1959. Inventory balances at June 30 are not expected to be materially different from May 31 balances in any category.

2. Singular Cost Studies

A study was made to establish departmental on-site and off-site fixed and variable costs for universal use at HAPO in optimization and planning. A secret document was issued.

3. Personnel Accounting

A meeting was attended with supervisors and representatives of Union Relations to discuss the basis on which the Overtime Hours Paid report is used in determining average overtime hours worked. While it was revealed that no written instructions have been provided by Union Relations, a matter of practice and policy requires development of average overtime hours on the basis of overtime worked and/or refused by employees of a particular craft in a particular facility.

4. General Accounting

AEC Directives were received altering the status of three projects as follows: (1) The source of funds for CGC-821, Project Palm - Purex, was revised changing it from an Equipment to a Construction Project; (2) Funds for CGC-872, Palmolive Fabrication and Reprocessing Facilities - 200-E Area, were reduced from $44,000 to $26,000 and the project was abandoned; and (3) CGC-897, Fission Product Concentrates Storage System - 200-E Area, was authorized with funds of $21,000 for Preliminary Design.

AEC has approved CPD's request to change the status of the RMA Line of the 234-5 Building from "In Service" to "Not Used Nor Currently Useful".

Project CA-513, Expansion 200 Area - Purex, was unitized during the month and the report will be issued during the first part of July.

5. Auditing

Field work was completed and a formal audit report was issued in connection with an audit of the Adequacy of Documentation Supporting Payrolls. In our opinion the activities audited were satisfactory.

The CPD 1960 audit schedule was reviewed with the Chief, Audit Branch, HOO-AEC. It appears that our performance will meet AEC audit requirements.

[redacted] HW-65935 DEL

UNCLASSIFIED

6. Measurements and Procedures

W. J. Burnside, Analyst, Procedures, accepted a promotional transfer to Contract and Accounting Operation as a Systems Specialist. J. A. Langley, a new Business Training Recruit, was assigned to Measurements and Procedures and will assume some of the responsibilities formerly assigned to Mr. Burnside.

Manager - Finance

UNCLASSIFIED

DECLASSIFIED

[redacted]

[redacted]

HW-65935 DEL

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JUNE--1960

UNCLASSIFIED

II. ACHIEVEMENTS (continued)

I. RELATIONS PRACTICES OPERATION

1. Salary Administration

A two percent upward shift in ranges of the exempt salary structure was approved and placed in effect June 1, 1960. Changes in the structure are made to keep pace with national economic factors that influence salaries. With the revised structure communication to management, additional information regarding weekly and monthly salary structures was presented.

Two exempt positions were established for use in the production plants. A HAPO reconciliation of level relationship for an exempt position was completed with findings and recommendations reported. Two position audits were made and recommendation results given to managers.

2. Personnel Placement

Interviews were conducted this month with four Manufacturing Training Program graduates for permanent placement. Joint offers for positions in Irradiation Processing Department, Chemical Processing Department, and Fuels Preparation Department were extended to three of these people with two rejections received to date.

Offers were extended to three people on the HAPO Technical Graduate Program this month and were accepted. One person will report to Research and Engineering, one to Finished Products, and one to Special Separation Processing and Auxiliaries.

Two former Utility Operators were transferred from Fuels Preparation Department to Finished Products Operation at month end, and acceptances have been received from two former Utility Operators no longer on HAPO rolls. It is expected that the requirement of six Utility Operators by Finished Products will be satisfied by the end of July or early in August.

The Department's first trainees on the Manufacturing Training Program reported in this month. One man has been assigned to Power and General Maintenance, and the other to Facilities Engineering.

[redacted]

UNCLASSIFIED

UNCLASSIFIED

[redacted]

HW-65935 DEL

[redacted]

3. Health, Safety, and Radiation

A Task Force was established to formulate action plans to implement serious accident and injury report recommendations. Results were prepared in OPG draft form for review.

A summary of whole body gamma exposure was prepared for concerned managers showing exposure status in four Chemical Processing Department job classifications as compared to the same job classifications in Irradiation Processing Department for the first twenty weeks of 1960.

4. Wage and Benefits

A new Personal Accident Insurance Plan was offered on a Company-wide basis in the latter part of the month. Enrollment of Chemical Processing Department employees reached 57.6 per cent at month end. Average coverage for all enrolled Department employees is $26,273 with 18.8 percent at $50,000 or more.

Suggestion Plan Activity

	June	May
Received	29	46
Adopted	14	11
Awards	$220	$365
Savings	$751	$2842

5. Communication

Communication in connection with the contamination spread in 200 East Area was handled through a priority message followed by a release to the local newspapers.

The Atomic Energy Commission has been provided with a list of the buildings to be visited, a map of the tour routes and some additional specific details with regard to Chemical Processing Department's participation in the HAPO Open House.

Initial arrangements for the next PBM classes, scheduled to start this fall, have been started.

A survey of feedback forms resulting from some twenty-one Management Information Meetings conducted during the past year indicate this is a highly effective communication technique. No major modifications in the present program are planned.

UNCLASSIFIED R B Britton
Manager, Relations Practices

RB Britton:lj

[redacted]

[redacted]

UNCLASSIFIED

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JUNE, 1960

III. PERSONNEL ACTIVITIES

A. FORCE SUMMARY

Operation	Monthly Salaried 5-31-60	Monthly Salaried 6-30-60	Weekly Salaried 5-31-60	Weekly Salaried 6-30-60	Total 5-31-60	Total 6-30-60
General Manager's Group	10	10	1	1	11	11
Financial	13	13	11	13	24	26
Relations Practices	5	5	6	6	11	11
Research & Engineering	60	61	27	27	87	88
Facilities Engineering	65	65	21	25	86	90
Power & General Maintenance	41	41	227	231	268	272
Production	6	6	4	3	10	9
Special Separation Processing and Auxiliaries	47	47	218	214	265	261
Purex	49	47	205	207	254	254
Finished Products	51	51	208	212	259	263
Total	347	346	928	939	1 275	1 285

[redacted]

B. PERSONNEL CHANGES

UNCLASSIFIED

There were no personnel changes during the month of June.

C. TRIPS

Visitor	To	Nature of Discussion
To other G.E. Components		
H. E. York	Metallurgical Products Detroit, Michigan	Carbide grade development (6/24/60)
R. B. Britton	Relations Services New York, New York	Leaders Training Session (6/27-30/60)
To AEC and other AEC Operational Contractors		
B. F. Judson	National Lead Company of Ohio Fernald Plant	Combined Operations special production study (6/3/60)
A. J. Waligura M. H. Campbell	du Pont (SRP) Aiken, South Carolina	Purex analytical methods (6/6-7/60)
A. J. Waligura M. H. Campbell	UCNC - ORNL Oak Ridge, Tennessee	Purex analytical methods (6/8-10/60)
R. E. Tomlinson	Commonwealth Edison Chicago, Illinois	Contract negotiations for processing power fuels (6/14/60)
R. E. Tomlinson	Northern States Power Co. Minneapolis, Minnesota	Contract negotiations for processing power fuels (6/16/60)
W. N. Mobley	Nuclear Materials & Equip. Appollo, Pennsylvania	Evaluate License Agreement for AEC (6/21-22/60)
W. N. Mobley	AEC Division of Licensing Germantown, Maryland	Evaluate License Agreement for AEC (6/23/60)
D. McDonald	AEC Office (ALO) Albuquerque, New Mexico	Scheduling meeting (6/27-28/60)
To General Industry		
R. C. Hollingshead	Gorton Machine Company Racine, Wisconsin	Witness test of lathes (6/6-7/60)
R. C. Hollingshead	Star Machine Company Seattle, Washington	Witness test of lathes (6/8/60)
H. F. Bagemihl	Coleman Instrument Company Chicago, Illinois	Equipment problems (6/22/60)

[redacted]

DECLASSIFIED

Visitor	To	Nature of Discussion
H. F. Bagemihl	Radiation Instrument Lab. Co. Chicago, Illinois	Equipment problems (6/22/60)
A. E. Smith H. E. York	Bendix Corporation Kansas City, Missouri	Super-Accuracy Committee and Numerical Control Group meetings (6/20-24/60)
H. E. York	Ex-Cell-O Corp. Detroit, Michigan	New machine concept development (6/23/60)
H. E. York	Cleereman Machine Co. Green Bay, Wisconsin	Demonstration of new milling machine (6/27/60)
R. E. Van der Cook	Thayer Scale Corp. Pembroke, Massachusetts	Thayer Scale acceptance tests (6/27-30/60)
To Conventions and General Meetings		
R. A. Schneider	Columbus, Ohio	Institute of Nuclear Materials Management (6/20-21/60)
R. A. Schneider	Columbus, Ohio	AEC-Contractors' Materials Management (6/22-23/60)

D. VISITORS

Visitor	From	Nature of Discussion
From other G.E. Components		
G. T. Pashade	X-Ray Corp. San Francisco, California	Supervising installation of 1 MEV X-Ray machine (6/13-30/60)
E. W. Milburn	X-Ray Corp. San Francisco, California	Installation of 1 MEV X-Ray Machine (6/22/60)
From AEC and other AEC Operational Contractors		
R. Elder N. R. Erickson P. C. Friend R. C. Hughson R. C. Brown W. J. Dittrick A. A. Kelton L. D. Williams	AEC Radiological Physics Fellowship Program	Orientation tour of Redox Plant and Equipment Reclamation Facility (6/17/60)
J. E. Behrend	AEC Division of Production Washington, D.C.	Combined Operations special production study (6/27-28/60)

UNCLASSIFIED

[redacted]

Visitor	From	Nature of Discussion
J. E. Evans V. Thayer	du Pont Company Wilmington, Delaware	Combined Operations special production study (6/27-28/60)
G. Garrett	Union Carbide Nuclear Co. Oak Ridge, Tennessee	"
From General Industry		
C. M. Grulick	Sheffield Corp. Dayton, Ohio	Installation of Sheffield gage (6/13-23/60)
V. L. Anderson	EPCO Protective Coatings San Bruno, California	Protective Coatings in Process Plants (6/15/60)
F. Morris	Turco Chemical Company Wilmington, California	Application of decontamination agents (6/21/60)
W. B. Tarpley	Aeroprojects Inc. West Chester, Pennsylvania	Ultrasonic applications (6/22/60)
W. J. Chase	Hill & Ingman Seattle, Washington	Remote photography (6/27/60)
W. H. Taylor	Electric Storage Battery Co. Spokane, Washington	Maintenance procedures on plant battery equipment (6/30/60)
From other Government Agencies		
W. Walford	United Kingdom	Critical mass fuel preparation (6/21-22/60)

OFFICIAL USE ONLY
CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

June - 1960

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										0	0
Serious Accidents				2*					1*	3	13
Medical Treatment Injuries	1		11	23	7	5		1		48	239
Radiation Occur.			7		2	4			3	16	101
Contam. Wounds			1*#							1	3
Pu Depositions			1*#							1	7
Fires			2	1						3	9
Security Violations								1		1	3

*Serious Accident CPD 60-11, June 10, 1960 - A panel truck was driven into the rear end of a work bus at the railroad crossing near 200 East Power House. Total damage to both vehicles amounted to $750. Driver of the panel truck sustained contusions to the muscles of the chest wall. X-rays indicated no broken bones.

*Serious Accident 60-12, June 17, 1960 - A metal ladder on a caustic trailer was damaged when the coupling between the truck and trailer separated because the fifth wheel pin was not securely locked. Damage amounted to $20.

*Serious Accident 60-13, June 21, 1960 - A stainless steel canopy fell to the floor in Room 1-GB, 222-S Lab several hours after removal of the hood below the canopy. Initial design did not provide adequate canopy support. There were no injuries. Damage to the hood was slight.

A Power and General Maintenance machinist sustained contusions and abrasions of abdomen when struck by fragments of a bayflex abrasive disc which failed on June 3, 1960, while abrading a steel plate in 272-W Building. The accident was investigated and publicized but not classified as a Serious Accident

[redacted] K-1

UNCLASSIFIED

UNCLASSIFIED

HW-65935 DEL

On June 10, 1960, a burial box containing two Purex tube bundles (F-11, H4) collapsed during backfill in 200 East Area. The burial site was generally contaminated from 10 to 60 mr/hr; winds carried contamination southeast across the 200 East Area to mile post 7 on highway 4-S. There was no personnel contamination; several private and government vehicles were decontaminated. Investigated and reported as Radiation Exposure Occurrence Type C, CPD 60-1.

*#On June 23, 1960, a Finished Products operator sustained an injury to the right index finger while attempting to remove turnings with a pair of tweezers during a machining operation in Hood 2H B, 234-5 Building. A significant internal plutonium deposition is indicated from bioassay and whole body monitor data. Several excisions were made to reduce contamination. The incident was investigated as Radiation Exposure Occurrence Type C, CPD 60-2.

Total loss from two fires in Finished Products and one in Power and General Maintenance was $10.

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JUNE, 1960

V. REPORTS

A. PREPARED AND ISSUED

HW-65200, Pt.2, Secret, "Project CGC-821, Title I Design - Purex Palm Extraction," dated May 20, 1960, L. R. Michels.

HW-65200, Pt.3, Secret, "Project CGC-821, Title Design - Purex Palm Purification," dated May 20, 1960, L. R. LaRiviere and R. J. Pence.

HW-65565, Secret, "Essential Materials Consumption - Purex, May 1960, dated June 8, 1960, J. E. Lentz.

HW-65624, Secret, "Trip Report - Fernald Site, Cincinnati, Ohio," dated June 13, 1960, B. F. Judson.

HW-65643, Secret, " CPD Waste Status Summary, May 1960," dated June 14, 1960, J. E. Lentz.

HW-65644, Secret, "Primary Separations Plant Incremental and Full Cost Values," dated June 20, 1960, K. G. Grimm.

HW-65730, Secret, "CPD Unit Cost and Goal Performance - 5 Months Actual Plus 7 Months Estimate - CY 1960," dated June 17, 1960, F. A. Fieser.

HW-65745, Secret, "Scheduled Shutdown - UO_3 Plant," dated June 20, 1960, J. H. Warren.

HW-65812, Unclassified - "Material Handling Study - For Purex 4.0 Capacity Factor Scope Design," dated June 1, 1960, A. C. Morgenthaler.

HW-65952 RD, Secret, "Redox Plant Production Schedule, June, 1960," dated June 7, 1960, D. McDonald.

HW-65953 RD, Secret, "Purex Plant Production Schedule, June, 1960," dated June 7, 1960, D. McDonald.

HW-65954 RD, Secret, "UO_3 Plant Production Schedule, June, 1960," dated June 7, 1960, D. McDonald.

HW-65955 RD, Secret, "234-5 Plant Production Schedule, June, 1960," dated June 7, 1960, D. McDonald.

A. PREPARED AND ISSUED (Continued)

HWS-7864, Unclassified, "Specification for High Efficiency Particulate Air Filters With Combustible Type Media," dated June 20, 1960, J. H. Palmer and D. A. Snyder.

B. PREPARED FOR SIGNATURE AND ISSUANCE

HW-65164, Secret, "Production, May, 1960," dated June 1, 1960, W. E. Johnson.

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JUNE, 1960

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	

W. K. MacCready

General Manager
Chemical Processing Department