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**CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
FOR**

HW--73193

MARCH, 1962

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April 20
~~MARCH 21~~, 1962

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By J. Tang 8-18-92

HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON

DJ Knead 8/20/92

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

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J. E. Travis, R. W. Hill

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

MARCH, 1962

I. SUMMARY

Production through March, as compared with the January 25, 1962 HAPO Production Forecast (HW-72354), is summarized below:

	<u>Percent of Forecast Achieved</u>	
	<u>March</u>	<u>Fiscal Year To Date</u>
Separated plutonium nitrate	89.3	92.5
Separated uranium nitrate	81.4	92.4
Uranium oxide	50.1	92.2
Plutonium metal buttons	80.8	109.3
Fabricated parts	102.0	99.3

With the exception of fabricated parts, the production of other products was below that forecasted for March. Mechanical difficulties in the Purex plant, which extended the neptunium run and subsequently delayed startup, were primarily responsible for the low production.

Several changes were made during the month as vigorous attempts to improve performance of the Purex final uranium cycle continued. First, the all stainless steel scrub cartridge in the final uranium extraction column (2D) was replaced with a new zebra cartridge, containing alternate pairs of stainless steel and linear polyethylene sieve plates. Second, both columns, the 2D extraction column and 2E stripping column, were flushed thoroughly. Third, the cation and anion water demineralizer resins were replaced. At month-end, no appreciable improvement was apparent.

Two casks of purified strontium-90 were released to the Atomic Energy Commission for shipment. The HAPO-II-1 Cask, which was loaded with 110 kilocuries last month, was released on March 2, 1962. The HAPO-II-2 Cask was loaded with 140 kilocuries and was released on March 26, 1962.

The loss of strontium sulfate cake during metathesis, reported last month, was traced to excessively high iron content. The high iron concentration led to the formation of ferric tartrate which dissolved the cake during metathesis. The problem was corrected by reducing the pH to within a range of 0.7 to 1.5 during the sulfate strike to prevent precipitation of the tartrate.

A routine nitric acid flush of Redox processing equipment yielded approximately 1500 grams of plutonium, of which approximately 1100 grams were recovered from the 1A first cycle extraction column. Deposition was suspected when abnormal plutonium losses were noted. In an attempt to reduce deposition, acidity of the 1A column hexone was increased by doubling the 1A column scrub flow. The effectiveness of these measures is being closely followed.

Final design for the 241-AX Tank Farm include the following:

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1. Tanks will be 580,000 gallon size, with suspended bottoms, and will contain six centrally located 30-inch diameter circulators.
2. Tank liners will be carbon steel ASTM A201 Grade A.
3. Tank domes will be lined with one-fourth inch carbon steel.

AEC Directive No. 201 authorized \$19,000 for Project CAC-950, "Cesium Load-Out Facility, 241-C Tank Farm."

Work was stopped on March 20 on Project CGC-948, "Strontium Storage and Waste Disposal, Hot Semiworks," because recent cost estimates exceeded the directive. An intensive review is being made to determine what action will be required to stay within authorized funds.

General Manager
Chemical Processing Department

CHEMICAL PROCESSING DEPARTMENT
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MARCH 1962

II. ACHIEVEMENTS

A. PRODUCTION OPERATION

1. Production Statistics

a. Percent of Forecast⁽¹⁾ Achieved

	<u>March</u>	<u>Fiscal Year to Date</u>
Separated plutonium nitrate	89.3	92.5
Separated uranium nitrate	81.4	92.4
Uranium oxide	50.1	92.2
Plutonium metal buttons	80.8	109.3
Fabricated parts	102.0	99.3

b. Purex

	<u>March</u>	<u>February</u>
Uranium nitrate produced (tons)	305.00	144.79
Average production rate during operation (T/D)	15.5	14.6
Total waste loss (%)		
Plutonium	.20	.57
Uranium	.16	.61
On-line efficiency (%)	63.6	35.4

c. Redox

Uranium nitrate produced (tons)	81.61	137.56
Average production rate during operation (T/D)		9.0
Total waste loss (%)		
Plutonium		.26
Uranium		.17
On-line efficiency (%)		79.6

d. Uranium Reduction (tons)

Normal UO ₃ loaded		205.98
Enriched UO ₃ loaded		128.74
Normal UO ₃ approved for shipment	202.09	247.69
Enriched UO ₃ approved for shipment	95.30	142.72
Normal UO ₃ shipped	302.67	297.93
Enriched UO ₃ shipped	98.19	187.32
Normal UNH backlog		153
Enriched UNH backlog		118

(1) HW-72354, HAPO PRODUCTION FORECAST, dated 1-25-62

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e. Plutonium Metal Processing

	<u>March</u>	<u>February</u>
Input to Task I		173
Reduction yield (%)		95.6
Product recovery output (Kgs)		109.44
Product recovery backlog (Kgs)	113.80	720.46
Waste disposal (grams)	880	1 099

f. Power

	<u>200-East</u>	<u>200-West</u>
Raw water pumped (gpm)	6 218	3 743
Filtered water pumped (gpm)	901	758
Maximum steam generated (lbs./hr.)	270 000	128 000
Average steam generated (lbs./hr.)	120 815	73 851
Total steam generated (M lbs.)	162 000	99 262
Coal consumed (tons)	6 610	4 184

With the exception of fabricated parts, the production of other products was below that forecasted for March. Mechanical difficulties in the Purex Plant, which extended the neptunium run and subsequently delayed startup, were primarily responsible for the low production.

Manager - Production

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

B. PUREX OPERATION

1. Operating Continuity

The plant operated at a rate of 22.4 tons per day until March 9, 1962, when it was shut down for scheduled maintenance and a neptunium recovery run. The neptunium run was completed on March 22, 1962, and processing of non-representative metal began on March 25, 1962. Operation continued through the end of the month at a rate of 25.0 tons per day.

Uranium losses continued higher than normal due to poor performance in the Final Uranium Decontamination Cycle (K Cell). These losses have been minimized by performing a special water extraction in the second Organic Waste System (Tk R-1). The uranium recovered in this extraction is being returned to the waste backcycle system. All other losses were normal.

2. Processing Operation

The neptunium recovery run was interrupted several times when the 2BP to J5 transfer jet failed and when leaks developed in the L Cell concentration equipment. The material which leaked from this equipment was collected for processing during the next recovery run.

The stainless steel scrub cartridge in the Final Uranium Decontamination Column (2D) was replaced with a new zebra cartridge as part of an attempt to restore the operating capability of this equipment. The new cartridge, with alternate pairs of stainless steel and linear polyethylene sieve plates, was installed during the neptunium run. There has been no noticeable improvement in column performance since this cartridge change.

Two casks of purified strontium were released to the Atomic Energy Commission during the month. The HAPO II-1 Cask, which was loaded with 110 kilocuries last month, was released on March 2, 1962. The HAPO II-2 Cask was loaded with 140 kilocuries and was released for shipment on March 26, 1962. After this material was loaded, Hot Semiworks personnel began flushing equipment and transferring stored material in preparation for purification activities.

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The strontium recovery runs were conducted in the 202-A Building and the semi-refined strontium product was transferred to the 003 CR Vault. Approximately 140 kilocuries were recovered in the first two runs. Analytical data from the final run is incomplete.

3. Mechanical Experience

The B-3 dissolver silver reactor was regenerated after processing 566 tons.

The left-hand tube bundle of the F-11 Waste Concentrator developed leaks after fifteen months service. It was replaced with a new unit.

Three stainless steel, all welded pipe assemblies were installed in trap pit #2. These replaced carbon steel, steam trap lines carrying condensate from F-11 and F-6 Waste Concentrator tube bundles.

A new, flanged sampler jumper with three Jamesbury type ball valves was installed on F-18 sampler. This replaced a jumper using diaphragm type valves which have proven unreliable. Six other replacement jumpers were fabricated and installed.

Two filter units were installed underground on the vessel vent system in the Hot Semiworks.

Two 100 gpm deep-well pumps and nine new jumpers were installed in pump pits and diversion boxes for moving coating waste from 241-C to 241-EX tank farm. One 100 gpm deep-well pump was installed on 109-C tank to transfer material to 109 EY tank to make storage space available for Hot Semiworks waste.

4. Radiation Experience

A backflow of material in the F-11 Waste Concentrator and HSR jet steam lines caused some contamination and higher than normal radiation levels in the R&O gallery. Control was restored by decontamination and shielding.

Total radio-iodine 131 emission was 0.4 curies during this period, with maximum seven-day emission of 0.12 curies. There were seven cases of skin contamination.

5. Analytical Experience

The neptunium content of concentrated Purex waste was checked by a new method during February and March. The new method, Thenoyltrifluoroacetone-Tri-iso-octyl-amine (TIOA-TTA), proved superior to the TTA extraction method previously used and was adopted for routine use.

PR Mc Murray

Manager - Purex

PR McMurray:RDP:mm

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

C. SPECIAL SEPARATION PROCESSING AND AUXILIARIES OPERATION

1. Operating Continuity

The scheduled monthly production for the Redox Plant was achieved on March 20. By this date the backlog of aged enriched material had also been reduced to almost zero, and the plant was shutdown to make major equipment installations associated with the continuous neptunium recovery project (CGC-913). Operations are not expected to be resumed until about May 1, 1962.

2. Processing Operations

E-metal processing was resumed on 3-5-62 and conducted as planned, with only minor exceptions, until the month's production run was completed on 3-10-62. Since the backlog of aged metal feed was again reduced to near zero, an extended shutdown was taken to await build-up of a backlog of aged feed, and to perform major equipment installations related to continuous facilities for the separation of neptunium. Present plans are to resume operations on or about May 1 with facilities intact for parallel neptunium processing.

Gamma decontamination performance on the uranium product stream continued to be erratic this month and when operations were discontinued on 3-21-60, approximately 40,000 gallons of high gamma UNH was being held in storage. However, advantage was taken of the plant shutdown and by month-end all but 12,000 gallons of this material had been reduced to shipping specifications by reozonation.

Ten batches of salt waste from the D-9 waste accumulation tank were reworked this month because of high plutonium and neptunium content. The cause of these high wastes was attributed to flooding conditions in the first cycle extraction column (1A) during startup operations and a slight pressurization of the E-2 ozonator which allowed plutonium to escape to the waste tank via the vent system.

A shipment of scrap irradiated uranium from Argonne National Laboratory was received at Hanford on 3-2-62, charged to the Redox dissolver on March 6, and subsequently processed with the regular Redox streams to recover the uranium and plutonium. The material was received in a special cask and was sealed in an aluminum can.

Advantage was taken of the plant shutdown to begin processing eight (8) buckets of "fringe" material (depleted uranium) from the 100-H reactor. By month-end this material, in eight separate chargings, had been processed through the Redox dissolver and was being held

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in storage pending resumption of plant operations.

As a criticality control measure and to clean out the equipment in preparation for canyon cell maintenance work, a 60 percent nitric acid flush was processed through the extraction columns and associated equipment after the month's production was completed. Approximately 1500 grams of plutonium was recovered.

3. Mechanical Experience

The mechanical efficiency for the period of scheduled operation was 92 percent, there being only 18 hours of downtime resulting from process equipment failures. Sixteen hours of this time resulted from pump failures in the metal solution feed tank (F-7). On 3-17-62, the F-7 pump developed excessive leakage at the throttle bushing and it was replaced with a similar reclaimed pump. However, after only nine hours of operation this pump also failed. On 3-20-62, a new type pump was installed in the F-7 position. The new pump has a HAP0 type discharge head, which is located about four feet down inside the tank and designed to avoid leakage at the throttle bushing. If this new type pump (which can be used in most canyon pump positions) lives up to expected performance, the operating life of Redox pumps should be at least doubled.

Most of the maintenance activity during the early part of the month was directed toward preparatory work related to the continuous neptunium recovery project. As planned, final equipment installations and tie-ins were not started until after the plant shutdown on 3-21-62. To date the work has progressed as planned. Extensive greenhouse equipment installations were started in the 233-S Concentration Building on 3-26-62. Plutonium contamination has been confined by entrance and exit air locks constructed specifically for this purpose. Although personnel have worked in areas contaminated with curie amounts of plutonium, the special plastic suits, designed and fabricated for this work, have precluded any skin contamination to date. Work in the 202-S Canyon Building has progressed with only minor difficulties and by month-end this phase of the work was nearing completion.

4. Waste Handling and Decontamination

The Hayden Well Drilling Company has completed drilling of 46 of the 49 vertical monitoring wells within the SX Tank Farm. Soil contamination encountered to date has been negligible. Preparations have started for drilling and installing one demonstration lateral under the 110-SX tank from the existing caisson at the 113-SX tank. This work is being done by the Boring and Tunneling Company of America, Inc. of Houston, Texas.

A savings of approximately \$39,000 over the cost of new replacement equipment, was realized on equipment processed through the Equipment Reclamation Facility this month. Approximately \$22,000 was realized on CPD processing equipment and \$15,000 on equipment reclaimed for

[REDACTED]

CPD Project No. 897. In addition, primary pump parts for the Plutonium Recycle Test Reactor were decontaminated at a savings of approximately \$2,000.

A total of 269 manhours was charged to the decontamination of railroad, automotive and heavy equipment. The following is a breakdown of the major items decontaminated:

<u>Item</u>	<u>Operation Charged</u>
Gondola Cars No. 3652 & 4610	Purex
Flat Cars No. 3612, 3618 & 19806	Purex
Evacuation Bus No. 1B-6878	Transportation
Truck No. 1C-3981	P&GM
Truck No. 68-B8967	Minor Construction
Load Luger	FPD
Air Compressor No. 13-16285	P&GM
Truck 1C-180	Purex
Argonne Shipping Cask	HOO-ACC

5. Radiation Experience

The total I-131 emission from the 291-S stack during the period March 1 thru March 30 was 6.2 curies, or an average of 1.5 curies per week. Essentially all of the I-131 was emitted during the first twenty days of the month, relatively little being emitted during the latter part of the month when the plant was shutdown and dissolving activity was confined to the dissolution of long aged material.

Two skin contamination cases (maximum 2,000 d/m) and four radiation occurrences were recorded during the month. All skin contamination was readily reduced to non-detectable. One of the radiation occurrences was significant although no personnel exposure was involved. On a routine radiation monitoring traverse of the south pipe gallery in the 202-S Canyon Building on 3-11-62, a 15 mr/hr dose rate was detected coming through the floor at the west end of the south pipe gallery. A follow-up survey revealed that some process solution had escaped from the 1SW sample port riser in the sample gallery. A dose rate of 500 rads/hr including 200 r/hr at a distance of eight inches from the sample port dictated remote decontamination of the sample port. However, complete decontamination was unsuccessful, and it was necessary to replace the sample hood before normal operating conditions were restored.

6. Analytical Experience

A detailed evaluation was started this month in relation to the added analytical requirements resulting from the installation of continuous neptunium processing facilities in the Redox Plant. In conjunction with the Redox Technology Operation, efforts are being made to arrive at a minimum of analytical needs for start-up and establish the laboratory's ability to meet the increased work load.

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Analytical assistance was provided to the Development and Corrosion Chemistry Operation in the development of dissolution procedures for the future processing of zircalloy clad fuels from the Plutonium Recycle Test Reactor. Samples of decladding waste containing zirconium and ammonium fluoride were submitted for plutonium analysis. By first using a preliminary treatment for precipitating the zirconium and complexing the fluoride ion from any further chemical action, the use of a routine analytical procedure has proved to be feasible.

On request, Process Chemistry has provided analytical procedures for the determination of nitric acid by ion-exchange techniques and for the determination of promethium¹⁴⁷, cerium¹⁴⁴, and technetium⁹⁹ by solvent extraction. At present, these procedures will be used only for providing analytical service on research projects now being conducted by the Development and Corrosion Chemistry Operation on Purex waste solutions. However, they will have future applications by the Purex Laboratory on a routine basis for the fission product recovery process.

Manager - Special Separation
Processing and Auxiliaries

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

D. FINISHED PRODUCTS OPERATION

1. Operating Continuity

Continuity of operation in the fabrication facilities was interrupted by a combination of insufficient feed and mechanical difficulties in the foundry operations. The production of unfabricated plutonium was limited by shortages of feed. Recovery operations were severely curtailed by the necessity to process the accumulation of hood floor wastes and to repair several major leakage sources. Uranium oxide production was curtailed by a lack of acceptable feed for normal material and a lack of shipping containers for enriched material.

2. Processing Operations

a. Plutonium Fabrication

Information on plutonium fabrication is presented in Document HW-73416 entitled "Chemical Processing Department, Finished Products Operation, Z Plant Monthly Report, March, 1962," which is classified "Secret, Atomic Weapon Data, Production Rate and Stockpile Quantity Information."

b. Plutonium Processing

Production of unfabricated plutonium was sporadic during the month. The supply of normal plutonium nitrate feed was very limited; other feed was available from recovery, both from the normal process and directly from the metal dissolvers; still other feed was composed of unclassified plutonium nitrate. Of particular significance is the fact that 92 kgs of plutonium were successfully processed directly from plutonium scrap metal dissolvers (glass vessels) to the button line.

Early in the month, forty liters of plutonium nitrate solution were drawn up into the vacuum header from the product feed system in Hood 6. All material was promptly recovered by acid flushing of the header. A positive vacuum breaker was installed in the feed storage system to prevent recurrence.

Recovery operations were severely curtailed in order to permit the correction of numerous severe leaks; the processing of large accumulations of hood floor wastes; the repair of structural members within the solvent extraction hood; and the replacement of two major hood panels.

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b. Plutonium Processing (Continued)

Operation of the incinerator continued on a day-shift basis with general performance satisfactory and plutonium accountability good.

c. Uranium Reduction

The processing of uranyl nitrate was complicated this month by the presence of organic material in the feed. Several cars of UO_3 which were produced from material processed at 30 psi steam pressure on the concentrators approached the upper limit for impurities. Arrangements have been made for the primary plant to reprocess the present inventory of UNH prior to delivery to U Plant.

Also, a short standpipe has been installed in the UNH feed tank at 224-U to trap any "red oil" which may form in the feed solution prior to its entering the concentrators.

3. Mechanical Performance

The equipment in plutonium fabrication, plutonium preparation and uranium reduction required only routine maintenance and minor repairs.

Extensive repairs were made to the plutonium recovery equipment. Two major hood panels were replaced; a number of the severely corroded structural members in the solvent extraction hood were repaired; the corrosion-failed lines to the organic treatment tanks were replaced using 316 type S/S heavy tubing as a substitute for the 304 type S/S tubing originally specified. The above major items were in addition to the usual high incidence of leaks, plugged lines, failed valves, and failed pumps.

In the incinerator, it was necessary to replace the feed belt and the shredder blades.

4. Radiation Experience

Radiation and contamination control statistics showed increases during March. The significant items contributing to the increases were: a contamination spread occurred in 234-5 Building, Zone I, while Minor Construction personnel were removing a part of the old Task I equipment to burial; another contamination spread occurred when the condenser on a plutonium oxide dissolver plugged; two operators received plutonium deposition (less than 10% MPL) due to improper use of masks; and two craftsmen grossly contaminated their hands while rodding plugged plutonium transfer lines. Appropriate, operation-wide publicity and action has been taken in an effort to reduce recurrence.

5. Analytical Experience

	<u>February</u>	<u>March</u>
Number of Samples Received	1,710	1,684
Number of Determinations	12,794	15,406
Total Metallic Impurities, Buttons	1,131 ppm	1,480 ppm
Total Carbon Content, Buttons	585 ppm	370 ppm
Buttons Rejected	7.8%	7.5%
Pu 240, NRF (by neutron count)	----	7.88%
Pu 240, Regular (by neutron count)	6.12%	6.18%

J. R. Thompson

Manager
Finished Products

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

E. POWER AND GENERAL MAINTENANCE OPERATION

1. Operating Continuity

Steam, water and emergency electrical services were in ample supply for maintaining continuity of operations of production facilities during the entire period covered by this report.

2. Inspection, Maintenance and Repair

Testing of welds and checking dimensions of the Purex Spare Concentrator continued throughout the month. Tests have disclosed the welds have a high ferrite content (up to 20%), and that corrosion of the base metals at the welds exceeds specification. Extensive corrective measures are being planned; however, action has been deferred pending an agreement with the vendor to accept repair charges.

Completed during the month was the fabrication of two hoods for installation in the production lines at the Finished Products Operation. One hood was designed to house the Flo-Turn Lathe used in development work connected with the spinning of plutonium shapes. The other was part of Project CGC-953 (Storage Hood Personnel Shield) and is a modified replacement for an existing mold hood.

Initial development work is in progress on the Flo-Turn Lathe for the Finished Products Operation. Considerable manpower is being expended on modification to the machine and in supplying the aluminum blanks which are currently being spun. The work is being done under direction of a factory representative and personnel from Facilities Engineering Operation.

Fabrication of a stainless steel heat exchanger (G-62) for the Finished Products Operation was completed during the month. The unit is designed to condense and recycle the supernate from the Button Line back to the Recuplex Facility.

A new stainless steel hopper was installed on the secondary UO₃ depleted powder filter system at the metal conversion plant, 224-U, as a replacement for the original installation. Failure of the existing hopper was attributed to the repeated pounding required to dislodge the powder during routine operations.

Thirty-four process pipe jumpers were fabricated to meet plant requirements as listed below:

Palm Project, CGC-821	9 Jumpers
Birch Project, CGC-913	6 Jumpers
Reliability Project, CGC-895	3 Jumpers

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Purex Replacements	9 Jumpers
Purex Tank Farms	6 Jumpers
Redox Replacements	1 Jumper
Total	<u>34</u>

Work on the Purex Palm Project continued during the month. The aqueous make-up portion was an estimated 95% complete at month end. The Sample, Pipe and Operating Gallery phase was approximately 85% complete; however, the electrical and instrumentation work has been considerably delayed due to the slow delivery of Project procured materials.

Installation of the fifth Stokes Vacuum Casting Furnace is in progress at the Finished Products Operation. The hoods, pumps, and motor-generator set are in position, and the pipe and mechanical installation work is on schedule. The electrical work, however, is being delayed due to slow delivery of materials coming from off-site. The tentatively established completion date of May 25 is contingent upon delivery of the required electrical materials. This work is being done for the department's Research and Engineering Operation.

Three new 75 gpm pumps were installed in 102 and 103-C underground tanks as required for transferring coating waste to the BXR Tank Farm.

Other work required in the movement of Purex waste included installation of nine process pipe jumpers in the 151-BXR, 152-BXR and 152-CR Diversion Boxes, and the 102 and 103 pump pits at Purex.

New stainless steel pipe jumpers and other associated piping assemblies were installed in the Purex No. 2 Trap Pit under extremely adverse conditions. The existing original installation was of black iron and had deteriorated to such a degree that it was no longer serviceable. A 72-hour flushing period notwithstanding, radiation dose rates encountered ranged from 300 mr at the rim to 10 rad at the bottom of the pit. To adequately protect personnel entering the pit, the floor area was covered with 1/4 lead shielding, and specially designed steel shielding was positioned around the area in which installation work was to be done. Other limitations imposed by high-radiation levels included the necessity of lowering craftsmen into the pit in a shielded basket. Considerable difficulty was experienced in staffing the job on an around-the-clock basis due to burn-out. Approximately 800 manhours of overtime were expended in completing the work of which an excess of 300 manhours were loaned labor from other departments. One incident occurred during the flushing operation when the priming mechanism on a truck mounted pump ruptured, spraying 10% caustic solution on three CPD employees. The incident was promptly investigated and reported in a "Special Safety Investigation Report" dated March 13, 1962.

A burial box of precast concrete slab design was assembled on a railroad flat car to be used in connection with the movement of contaminated process equipment to and from the Waste Handling and Decontamination Facility.

Third-party inspections were performed on No. 1 boiler in 200 West Area Power House, and No. 2 boiler in 200 East Area. The inspector's report indicated both units were in good condition. Smoke tests, however, disclosed excessive air leaks in the boiler settings. Repairs were in progress at month end.

Automatic control equipment is being installed in the raw-water inlet houses in the 200 East and West Areas that will automate the cone valves to the reservoir. The equipment is designed to respond by closing the valve when export line pressure drops below predetermined limits. The work is being done on Reactor Project CGL-905 (improved coolant backup).

T. S. LaFollette

Manager
Power and General Maintenance

TGL:ta

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (continued)

F. FACILITIES ENGINEERING OPERATION

1. Purex

a. Process Design Engineering

241-AX Waste Tank Farm

Major decision points were reached in the final process design phases of the 241-AX Waste Tank Farm. There were:

- 1) The basic tank design recommended is a 580,000 gallon net volume, suspended bottom of one-to-one slope, with six 30-inch diameter circulators mounted in the central zone.

Testing by means of mock-up has shown that the recommended geometries will handle Purex waste at a volume less than 100 gallons per ton and still maintain the solids in suspension.

- 2) ASTM A 201 Grade A carbon steel with a carbon range of 0.18 to 0.22 percent is specified for the tank liner. The liner will be spot radiographed for inspection of welds. The vendor has verified the practicality of stress relieving the tank in place.
- 3) A one quarter-inch carbon steel dome liner is being specified to protect the concrete dome from deterioration through contact with waste tank vapors.

2DW Photometer

Installation of an uranium photometer was completed in the K-2 Sampler for the 2D Column process waste stream. The instrument's operation is satisfactory in the early evaluation of results.

Hot Semiworks Improvements

Process design work covering ventilation improvements at the Hot Semiworks, a new air compressor, and monitoring equipment for process condensate and cooling water discharge streams was completed.

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E-Cell Sump

Process design work was completed covering the installation of fixed poison within the C-Cell sump for assured nuclear safety. Boron in the form of pyrex glass raschig rings will be added to the sump.

200-E Area Underground Lines

As-built drawings have been prepared to show all underground facilities from Purex to the A Tank Farm battery limits. These drawings are the first sequence of a drawing series which will encompass the entire 200-East Area. They will provide a reliable basis upon which to plan and construct the outer area facilities needed in future waste management fission product work.

b. Project Engineering

CGC-821 - Project Palm - Purex

The fixed-price contractor has placed all the heavy aggregate concrete for the purification phase. Test samples showed density of 240 pounds per cubic foot, and compressive strength of 64,000 psig compared with specification for 220 and 3000 respectively. Piping work in the load-out room is essentially complete. Concrete surfaces are being prepared for Amercoat paint.

CGC-948 - Strontium Storage and Waste Disposal - Hot-Semiworks

The work was stopped on March 29 because cost estimates based on complete design exceeded the directive. A review is being made to determine what can be deleted or altered in order to stay within the authorized funds.

CAC-950 - Cesium Load-Out Facility

Directive AEC-201 was issued on March 27 for total funds of \$19,000. Equipment design was essentially completed.

2. Special Separations Processing

a. Process Design Engineering

E-13 Radiation Monitor

Design was started on a jumper installation of an ionization chamber to measure the gamma radiation intensity in the E-13 ozonator vessel.

D-4 Tower Conversion

Detailed design was completed and comment drawings issued for conversion of the D-4 tower to D-12 service. The D-4 tower in spare parts inventory is no longer required. Conversion to D-12 spare will provide an effective and economic utilization of equipment.

b. Project Engineering

CGC-913 - Project Birch - Redox

Redox was shut down March 23 for installation of Birch equipment and tie-ins. All jumpers are complete except one that is awaiting a design change.

3. Finished Products

a. Process Design Engineering

Computer Test

A decision has been made to return the GE 312 computer, spare parts, and accessories used in the Z Plant tests, to Phoenix, since there are no current or future plans in the Chemical Processing Department which would justify purchase at this time.

Nitrogen Generation

An engineering study was made concerning nitrogen generation facilities in Z Plant. Nitrogen can be produced in Z Plant facilities within a cost range of 4.8 cents to 20.2 cents, compared to the present purchase price of 69 cents per 100 standard cubic feet. The pay out time for the required capital investment of \$80,000 to \$353,000 ranges from 6.4 to 32.2 months respectively. The study was based on a contemplated usage rate of two million standard cubic feet per month.

CGC-912, Rev. 2 - Waste Treatment Facility - Z Plant

A project proposal revision requesting a four month extension of the project completion date was transmitted to the Commission on March 19, 1962. Over four months delay was imposed on this project when work was postponed on Project CAC-880, Plutonium Reclamation Facility, at a time when the two projects were inter-tied in a contract bid package.

4. General

a. Process Design Engineering

200-West Burial Garden

A contract has been awarded for excavation of a new burial trench to be completed in April, 1962.

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b. Project Engineering

Project Cost Information as of 3-18-62:

Total Authorized Funds - 15 active projects	\$11,398,000
Total Cost-to-Date	7,199,000
Commitments and Open Work Releases	1,237,000
Unencumbered Balance	2,962,000
Cost Charged to Above Projects - 2-18-62 to 3-18-62	289,121

c. Manufacturing Engineering

Utilities and Administrative Facilities

The Plant Improvement Program on this subject was issued March 20, 1962.

Reroofing of 272-W Building

The contractor has completed the reroofing of the 272-W Building with the exception of the final reflective coating which is being delayed for warmer weather.

d. Safety

The Facilities Engineering Operation completed 1,000,000 man-hours of work on March 9, 1962, extending from September 1, 1956, without incurring a disabling injury. This feat was recognized at a special ceremony on March 30, in which the Million Man Hour Plaque was turned over to Facilities Engineering Operation by a representative of S.A.P.&A.O. the component which was the most recent previous winner of this honor.

H. P. Shaw
by C. R. Bergan
Manager - Facilities Engineering

HP Shaw:olc

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

G. RESEARCH AND ENGINEERING OPERATION

1. Purex Process Technology - B. F. Judson

a. Solvent Extraction

Plant performance changed very little as the February operating period continued for the first week of March. Performance of the Final Uranium Cycle continued to be marginal. Operation of the 2D Column at lower-than-normal pulse frequencies was required to prevent flooding and thus reduced the scrubbing efficiency. Uranium losses to the 2E Column organic (2EW) ranged from 10 to 100 times the normal 0.002 per cent despite adjustments in column operation intended to reduce the losses. In addition the off-standard operation of the 2E Column increased the amount of organic carryover in the aqueous uranium solution (2EU) to the point where solvent was found as a separate phase in the uranium storage tanks. Performance of the First Cycle was excellent with gamma activities of both the plutonium and uranium products remaining low; generally 1×10^{-11} Zr-Nb/AT and 2 - 3 gamma ratio, respectively.

Shutdown activities designed to improve performance of the Final Uranium Cycle included the following:

- (a) Replacement of both cation and anion resins in the water demineralizer beds.
- (b) Replacement of the six per cent, graded, stainless steel, nozzle-plate, scrub cartridge in the 2D Column with a "Zebra" cartridge composed of alternate pairs of plastic and stainless steel, sieve plates.
- (c) Flushing of the 2D and 2E Columns with hot five per cent sodium carbonate and hot twenty per cent nitric acid solutions, respectively.

Startup of the solvent extraction equipment on March 24 was characterized by extreme instability and poor scrubbing efficiency in the 2D Column and continued high losses to the 2EW. A 20 cycle/min. reduction in pulse frequency below the operating frequency of the steel nozzle-plate cartridge was required to stabilize the operation of the 2D Column. However, once the column with the "Zebra" cartridge was flooded, it was much more easily stabilized than with a stainless steel scrub

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cartridge. At month end a gradual improvement in 2D Column scrubbing and 2E Column losses was noted. Performance of the First and Final Plutonium Cycles was excellent with both good decontamination and low waste losses.

b. Neptunium Recovery

A neptunium isolation and decontamination run was conducted during March, but was plagued by numerous equipment difficulties. As a result, more than the normal amount of neptunium was lost via waste stream; however, this material was returned to the system for reprocessing during the next recovery run. Overall recovery efficiency for the isolation run was 60 per cent while 80 per cent of the neptunium introduced during normal uranium processing was accumulated in the system.

c. Solvent Treatment

In order to reduce the amount of uranium which would otherwise be discarded from the No. 2 Solvent System as a result of normal operation, the 2EW was water washed prior to washing with sodium carbonate solution. Despite this treatment, which included reprocessing the water, the carbonate solution contained sufficient uranium to warrant its segregation for future rework.

d. Waste Treatment and Acid Recovery

The Zr-Nb-95 gamma activity of the Purex recovered acid was reduced by a factor of ten by introducing 2 gpm water to the fourth of seven bubble cap trays in the No. 2 Waste Concentrator.

The prototype equipment for denitration of Purex high activity waste (IWW) by formaldehyde treatment was operated for four days during the first week in March. Although operation was relatively smooth, the tower above the reaction vessel exhibited a high pressure drop and thus maintained a slight pressure in the reaction pot. Test runs under different operating conditions are scheduled in order to establish satisfactory operation of the unit.

e. Fission Product Recovery

Loss of the sulfate cake during the metathesis step, as previously reported, was traced to a factor of two higher-than-normal iron content in the IWW. The mechanism involved precipitation of iron tartrate which solubilized the sulfate cake during the metathesis step. A reduction in the pH from 1.5 - 2.5 to 0.7 - 1.5 during the sulfate strike now prevents ferric tartrate precipitation and processing behavior has returned to normal. The source of the high iron concentration in the IWW is being investigated.

Strontium product solution stored at the Hot Semiworks was found to contain copious quantities of brown solids at a pH of 9.0 (probably from radiolysis of citrate). The solution was acidified with nitric acid, which caused foaming and gel formation, but did not dissolve the solids. At month end the tank solution was being treated with 2.5 M HNO_3 and 2.5% H_2O_2 after laboratory tests showed this would dissolve the solids.

2. Redox Process Technology - M. K. Harmon

a. Solvent Extraction

Plutonium deposition in the First Cycle Extraction Column (1A) was indicated during February and March by abnormal product losses (approximately 1.4 percent) in the 1AW stream which were not alleviated by the usual corrective measures including caustic washing of the hexone. Dilute (10%) nitric acid flushes of the 1A Column on five successive week-ends removed a total of 900 grams of plutonium, thus limiting the amount collected in the equipment. A 57 percent nitric acid flush of the extraction columns, overflow lines, and associated vessels completed during March recovered 1280 grams of plutonium, of which 1115 grams (87 percent) were recovered from the 1A Column. The recovery of 1115 grams of plutonium from the 1A Column confirmed organic phase reduction of plutonium and subsequent deposition in the disengaging section and organic overflow line to the 1B Column (plutonium-uranium partition column). The table below indicates that plutonium deposition is an erratic phenomenon, but that it has been limited by flushing the equipment with strong nitric acid.

<u>Date of Flush</u>	<u>Grams of Plutonium Recovered from 1A</u>
September, 1960	7690
January, 1961	100
May, 1961	43
October, 1961	588
January, 1962	254
March, 1962	1115

The 1A Column flowsheet had not been changed during the preceding six months, so there were no obvious causes for the deposition. Furthermore, laboratory evaluation of samples of the organic effluent from the 1A Column (1AP) did not provide the usual confirmation of the deposition. Earlier laboratory studies showed the organic phase acidity to be a major factor in controlling deposition and indicated the rate of organic phase reduction of plutonium to be inversely proportional to the acid concentration. Therefore, the flow ratio of the 1A Scrub Stream (0.4 M HNO_3 -1.3 M ANN) was doubled during the last week of the operating period to increase the acid concentration of the organic phase. Due to the short period of the test, the results were inconclusive in determining if the plutonium deposition had been reduced or eliminated. Further laboratory and plant evaluation will be required to determine the factors which contributed to the deposition.

b. I-131 Control

Losses of I-131 from the 293-S acid absorber to the ventilation stack have occurred on several occasions in recent years, for a variety of reasons. An activated charcoal bed to prevent such escape has been designed for installation in the 293-S acid absorber off-gas line as

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a back-up I-131 removal facility. However, the installation has been delayed to permit evaluation of the maximum temperature increase that could occur due to catalytic oxidation of nitric oxide on the charcoal. If the charcoal should burn, the trapped I-131 would be released from the back-up facility. The catalytic oxidation of nitric oxide on activated charcoal is exothermic, releasing 850 BTU per pound of nitric oxide oxidized; however, the gas must be dry for significant oxidation to occur. Since the absorber off-gases are water saturated at approximately 25 C, it was estimated that the rate of oxidation of nitric oxide would be very low and that the temperature of the gas leaving the charcoal bed would be far below the ignition temperature. To check this estimate, a test unit, consisting of a 4-inch-deep by 2-inch-diameter bed of 6-8 mesh activated charcoal with thermocouples to measure the influent and effluent gas stream temperatures, was installed in an absorber off-gas sample line. The velocity of the gas stream was 45 feet per minute. During approximately six weeks of operation the maximum temperature rise was only 25 C (25 C inlet and 50 C outlet). The maximum temperature rise was measured approximately one hour after installation of the unit, at the peak off-gas flow during a dissolution cut. Subsequent temperature increases were less than 10 C. Reaction of the absorber off-gases in the charcoal bed appear to be negligible based on the temperature measured. Further tests will evaluate the effects on the unit of dissolver off-gases containing appreciably higher concentrations of nitric oxide.

c. Waste Storage

A total of 623,000 gallons of dilute non-boiling salt waste has been pumped from the 102-SX tank to the 109-, 110-, 112-, and 115-SX tanks since December, 1961, in the continuing program for using boiling waste to concentrate dilute non-boiling waste in the 241-SX tank farm. Since the inception of this program in 1959, a total of 2,400,000 gallons of dilute non-boiling waste has been concentrated by a factor of two, making available 1,200,000 gallons of storage space. Approximately 825,000 gallons of dilute non-boiling waste, present in the 105-SX tank, remain to be concentrated by this program, which should be completed during 1962. Additional non-boiling dilute wastes, suitable for concentration by this program, are present in the 241-S tank farm; however, transfer facilities will be required if the program is to continue.

3. Finished Products Chemical Technology - L. M. Meeker

a. Metal Finishing Operation

1. Button Line

A test was started to process selected dissolved plutonium scrap of relatively high purity directly to Task I as feed material for the button line. Initial processing of test solutions, produced in the glass laboratory dissolvers and the teflon-lined dissolver, and blended in several combinations with various feeds, resulted in acceptable buttons being produced. Additional tests are planned to obtain sufficient data to determine flowsheet conditions for direct recycle of selected plutonium scrap solutions.

2. Incinerator

The incinerator was operated for 39 hours, burning contaminated cardboard, plastic, and rags. Rubber gloves and noncombustibles were processed through the leaching hood. A total of 22 waste boxes were handled.

The incinerator off-gas scrubber solution, containing approximately 5.7 percent of the plutonium processed through the incinerator, was discarded during the month.

Recovery of plutonium, based on the input valves, has continued to be excellent. To date, approximately 53 percent of the total recovery is obtained in the leaching hood. Studies are underway to determine the actual amount of plutonium contained in the incinerator ash. Laboratory analysis, neutron count, and gamma scan results are being compared with amounts actually recovered from HNO_3 -HF dissolution of the ash.

3. Recuplex

Recuplex processing during the month was directed primarily to recovery of floor material in effecting a clean-up of the Recuplex hoods. Several processing innovations were made in order to handle the slurry solutions on the hood floors. A document, HW-73066, summarizes the difficulties in processing the "neoprene glove" slurries.

A test teflon-lined dissolver for dissolution of PuO_2 failed after approximately 2-1/2 months service. Just prior to failure, test dissolutions involving a six-hour heat cycle (normal processing heat cycle of three hours) were started. Inspection of the dissolver indicated that the extra heat cycle probably permitted the skin temperature to exceed the allowable temperature for teflon service, thus permitting the liner to warp and fail.

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4. Process Chemistry - O. F. Beaulieu

a. Purex Process Assistance

Considerable effort was made to find reasons for the poor process performance of the 2D-2E system in the Purex plant. Although no concrete answers are as yet available, the following information has been developed in the laboratory.

1. Plant 2EW uranium strips readily into Plant 2EX. Two batch contacts reduced the uranium by a factor of 100 (6×10^{-5} #/gal).
2. Plant 2DU uranium content was reduced from 0.7 to 0.0023 #/gal by four contacts with plant 2EX.
3. Samples of 2DF sent to the 300 Area were extracted with cyclohexone and CCl_4 and run on the chromatograph without disclosing extraneous organics.
4. Wet chemical analyses of centrifuged 2DF, 2EU, and P-4 showed less than 10 ppm phosphorus which usually would indicate minor TBP degradation.
5. One sample of Purex R-7 organic did show an undesirably high plutonium retention which could mean high concentrations of DBP were not washed from this particular batch of organic.
6. Rate studies disclosed that the rate of transfer of uranium from plant 2DU to plant 2EX is slower than with synthetic 2DU to plant 2EX.
7. Disengaging and dispersion times appear to be normal.

A sample of the sludge removed by the second core drilling of sludge in Tk 103-A has been received. Water and HCl extracts have been made and results appear to be paralleling the results of the first sample.

b. Redox - URO Process Assistance

Subsequent to poor 1A column experience in Redox in which high waste losses and some possible deposition of plutonium was experienced, the laboratory investigated the role that the various reductants might have in contributing to the problem. The problem was concerned with the products of the reductants which are back-cycled to the 1A feed. During the investigation, the following results were obtained, none of which indicate that the exclusion of sulfamic acid from the process caused any trouble.

1. Prolonged gassing of the 1A feed solution is observed when nitrous acid is destroyed by sulfamate rather than sulfamic acid. However, the sulfamide and nitrous acid content of 1AFS is nil.

2. The use of ferrous sulfamate yields more sulfamate ion for the destruction of nitrous acid than did the old procedure using ferrous ammonium sulfate containing one mol sulfamic acid per mol of ferrous iron.
3. Lab tests on waste losses showed no difference between the use of (1) ferrous sulfamate, (2) ferrous sulfamate and sulfamic acid, or (3) ferrous ammonium sulfate and sulfamic acid.

c. Hot Semi-Works and Neptunium Process Assistance

A sample of brown precipitate from the strontium purification run was investigated and found to be soluble in hot 2 M HNO_3 - 0.2 M H_2O_2 .

A neptunium recovery run on a Purex batch of neptunium was completed yielding 780 units out of a total of ~1000 in time for shipment on 4/2/62. Ascorbic acid and hydrazine were used to adjust the feed with ferrous sulfamate and hydrazine used for the plutonium removal wash solutions.

d. Laboratory Assistance

1. A method was developed for use on the X-ray spectrometer for uranium in the 1-50 microgram range. The method is a direct analysis of an aliquot pipetted on filter paper and dried before exposure.
2. Progress was made toward adapting the X-ray unit to the analysis of the lighter elements, namely Al, Si, and Cl. The limitations are being investigated.
3. An analytical method for technetium in Purex 1WW was developed which yields 92% recovery in about 45 minutes. The method consists of extraction into TBP from a H_2SO_4 , NaF, H_2O_2 solution, followed by washing and stripping into water before counting.
4. An analytical method for promethium analysis yielding 81% recovery and a time requirement of 1.25 hours was developed. The method uses D2EHPA as extractant with TTA used to separate the cerium.
5. Plutonium dioxide samples from Z plant were run on the thermo-balance. Reactivity of samples containing sulfate were higher than those without sulfate yielding essentially 100% chlorinated product to 77% chlorinated product, respectively.

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

a. Oxalate Calcination Studies

Traces of fluoride in the oxalate cake will not cause serious corrosion.

The direct recycle of dissolved metal to Task I is presently being evaluated. Dissolved metal solution contains fluoride ions which are usually complexed with aluminum ions prior to Task I precipitation. Laboratory tests were made to estimate the corrosion effect if aluminum is not added.

Plutonium oxalate was prepared from dissolved metal via a continuous Task I precipitation. The precipitate contained up to two percent fluoride. The oxalate was calcined with a 1/4" x 1/4" x 1/4" 304L stainless steel coupon in a Pyrex beaker at 400 C. Short-term corrosion rates determined from the weight loss of the coupon or the metallic impurities in the powder showed a range of zero to nine mils per month. Metallic contaminants in the oxide were low.

Catastrophic corrosion will not occur as the result of calcining plutonium oxalate prepared from uncomplexed solution. Consequently, plant tests may be made to estimate product quality.

b. Continuous Electrowinning Plutonium

Use of barium chloride as a melt component results in improved current efficiency.

Use of barium chloride has been questioned in the past on theoretical grounds. It could be a contributor to ceramic corrosion. Run 72 utilized no barium chloride; this was replaced with potassium chloride. The run was characterized by excessive salt sublimation and lower-than-usual current efficiency. No significant difference in corrosion was observed. Consequently, barium chloride is a desirable component.

In Run 71, the hydrogen sweep was eliminated. This change resulted in severe corrosion to overhead hardware.

c. Electrorefining

Conditions permitting continuous operation are currently under test.

Five runs were performed to determine the cure for the solids problem which causes plugs. The answer involves use of higher temperature and fluoride in the melt. Magnesia from cell material is not a contributor.

The solids form early in the run. Thus Run 25 (a continuous run) was performed with a trap to remove the solids and permit metal to

leave the cell. This was successful.

The major problem remaining is efficiency. Increased PuCl_3 concentration and revised current density will be tested.

d. Dissolution Of Plutonium Metal

Use of hydrazine results in improved dissolution rates.

The use of hydrazine-nitric acid mixtures as dissolvent results in a dissolution process under non-oxidizing conditions. This permits increased dissolution rates and still results in a nitrate system. Experimentally, it is found that some fluoride is still necessary to attain the high rates.

Initial penetration rate data are complete and rates under steady-state conditions are being determined. Thus in a solution 0.05 M HF, 4 M HNO_3 , 0.5 M N_2H_5^+ , 122 g/l Pu, the penetration rate is 56 mg/min/cm². The product solution contains trivalent plutonium.

e. Incinerator Support

Filtration tests are in process to define a filtering system for scrubber solution.

A "cold" sample of incinerator scrubber solution was filtered through a sample of polypropylene filter cloth identical to that in the Granger Reversible Filter. Essentially all of the carbonaceous solids (50 percent < 3 microns) passed through the material. The cloth will be tested in scrubber solution mixed with pulp filter aid.

A. S. Frank

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 requested supporting schedules for the FY 1963 and FY 1964 budgets were completed and forwarded to Contract and Accounting Operation for use in budget submissions to the Commission.

O3 Program budget details shown on March reports will reflect the adjusted Financial Plan (No. 11) recently received from the Commission.

A number of special estimates regarding future costs of CPD functions were prepared in response to the Commission's request for assistance with industrial participation studies.

An analysis of CPD maintenance performance was issued this month, using maintenance efficiency ratios employed by the Ballast Department, General Electric Company and formulae developed by Financial Operation. This analysis indicates that there has been an efficiency gain of about 4% per year for the last several years in the performance of maintenance work.

CPD's investment in inventories at February 28, 1962 compared with budgeted balances at that date is shown as follows:

	<u>Balance 2-28-62</u>	<u>Control Allocation</u>	<u>Surplus (Deficit)</u>
<u>Inventories</u>			
Essential Materials	\$ 785	\$ 880	\$ 95
Spare Parts and Standby	2 040	1 778	(262)
Special Materials	<u>269</u>	<u>268</u>	<u>(1)</u>
Gross Inventories	<u>3 094</u>	<u>2 926</u>	<u>(168)</u>
<u>Reserves</u>			
Essential Materials	56	58	(2)
Spare Parts & Standby	450	440	10
Special Materials	<u>150</u>	<u>153</u>	<u>(3)</u>
Total Reserves	<u>656</u>	<u>651</u>	<u>5</u>
<u>Net Investment</u>	<u>\$2 438</u>	<u>\$2 275</u>	<u>\$(163)</u>

2. Singular Cost Studies

As an integrated effort involving personnel from the three product departments on a crash basis, operating cost data was developed at Commission request for alternate FY 1964 budget assumptions.

3. General Accounting

As of February 28, 1962, fifteen active projects had incurred costs of \$6,979,404 against authorized funds of \$11,398,400. Outstanding commitments totaled \$966,533.

During March, directive No. AEC-204 was received from the AEC, for project CAC-945 - Design of New Waste Storage Tanks - Purex, for a total authorization of \$175,000.

Eight appropriation requests totaling \$60,816 were approved in March, as follows:

26038	Contour Saw	P&GM	\$ 8 800
26041	Radius Gage	R&EO	6 000
26044	400 Channel Analyzer	R&EO	20 000
26045	Alpha Proportional Counter	R&EO	3 500
26046	Infrared Spectrophotometer	R&EO	8 000
26047	Hewlett Printer	Purex	2 200
26048	Light Changing Machine	Redox	4 000
26050	Limit Torque Valves	P&GM	<u>8 316</u>
Total			<u>\$60 816</u>

A physical inventory is being taken of 2101 Building and associated service equipment. Upon completion of the inventory the capital assets involved will be transferred from CE&UO to CPD.

The annual review of tank farm depreciation methods and rates has been completed and recommendations submitted to the Commission for concurrence.

Project CGC-813 - Plutonium Recovery from Contaminated Material 234-5 Building (\$570,926) was unitized and transferred from Construction Work in Progress to Completed Plant Accounts.

Prototypical portions of the 234-5 casting furnace were capitalized in the amount of \$43,800.

4. Personnel Accounting

The Income Extension Aid Plan was invoked by a CPD non-unit employee who was removed from the payroll several months ago for lack of work. Rather than take a lump sum amount, he has

requested weekly payments to begin following exhaustion of his unemployment compensation benefits.

During the month one employee died having had 15 years of credited service, thus insuring payment of pension payments to his wife for at least five years. Another employee resigned and vested his rights under the pension plan rather than accept a pension refund.

5. Measurements and Procedures

Subsequent to review of CPD's Record Management Program recently by the Commission, action has been continued for complete implementation of the program instituted prior to AEC review. Record flow schedules have now been provided every employee in the department having responsibility for records and an educational program has been established for informing these employees of CPD's record management program. Files are being relieved of inactive material and are being transferred to components within the department having need for additional files.

Manager - Finance

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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>2-28-62</u>	<u>3-31-62</u>	<u>2-28-62</u>	<u>3-31-62</u>	<u>2-28-62</u>	<u>3-31-62</u>
General Manager's Group	10	10	1	1	11	11
Financial	14	14	15	15	29	29
Research & Engineering	68	66	27	27	95	93
Facilities Engineering	63	63	20	20	83	83
Power & General Maintenance	39	39	240	240	279	279
Production	5	5	4	4	9	9
SSP&AO	47	47	206	205	253	252
Purex	65	65	242	242	307	307
Finished Products	<u>54</u>	<u>54</u>	<u>263</u>	<u>263</u>	<u>317</u>	<u>317</u>
Total	<u>365</u>	<u>363</u>	<u>1 018</u>	<u>1 017</u>	<u>1 383</u>	<u>1 380</u>

B. PERSONNEL CHANGES

No personnel changes during March.

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C. TRIPS

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<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To Other G.E. Components</u>		
F. S. Stong	APED, San Jose, Calif.	Gamma monitor development. (3/20-21/62)
P. R. Kelly	Syracuse, N.Y.	Semiconductor applications. (3/30/62)
<u>To AEC and Other AEC Contractors</u>		
W. J. Gartin	Atomic Energy Com.	Attend meeting on weapons
W. S. Frank	Albuquerque Operations	complex plans. (3/6/62).
A. E. Smith	Office, Albuquerque,	
L. M. Meeker	New Mexico	
R. E. Tomlinson	The Dow Chemical Co.	Plutonium Information Meet-
O. F. Beaulieu	Rocky Flats Plant	ing. (3/20-22/62).
A. E. Smith	Denver, Colorado	
A. E. Smith	Union Carbide Nuclear Co., Y-12 Plant, Oak Ridge, Tennessee	Consultation on isostatic pressing. (3/22-23/62)
	AEC - AOO, Sandia Corporation Albuquerque, N.M.	To attend environmental testing meeting. (3/27-28/62)
M. K. Harmon	Atomic Energy Commission, Germantown, Md.	General technical discussions. (3/26-27/62).
	Oak Ridge Nat. Lab. Oak Ridge, Tenn.	Discuss chemical plant safety and ion exchange. (3/29-30/62)
R. C. Hollingshead	Bendix Corp. Kansas City, Mo.	IMOG Subcommittee meeting (3/26-27/62)
	The Dow Chem. Co. Rocky Flats Plant Denver, Colo.	Plutonium fabrication. (3/28/62)
M. H. Campbell	Argonne National Lab. Lemont, Illinois	To discuss analytical techniques for fission products. (3/29-30/62).

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To General Industry</u>		
L. R. Michels	Otto H. York Co. West Orange, N.J.	Entrainment Separators. (3/1/62)
	Schuyler Mfg. Co. Chicago, Ill.	Entrainment Separators. (3-3-62)
C. E. King M. B. Swartz	Perine Machine Co. Hallidie Machine Co. Seattle, Wash.	Shop equipment. (3/8-9/62)
H. W. Stivers	Chicago Bridge & Iron Chicago, Ill.	Stress relief annealing of tank liners. (3/18-20/62)
	U.S. Corps of Engineers Troutdale, Oregon	Concrete testing and use of strain gauges. (3-23-62)
R. E. Isaacson D. D. Wodrich	Wah Chang Corp. Albany, Oregon	Isostatic pressing equipment. (3/19/62)
	Willamette Iron & Steel Portland, Oregon	Isostatic pressing equipment. (3/19/62)
	Boeing Airplane Co. Seattle, Washington	Isostatic pressing equipment. (3/20/62)
P. R. Kelly	Lionel Electronics Lab. and Eon Corp. Brooklyn, N.Y.	Application of semi- conductors. (3-30-62)
<u>To Conventions and General Meetings</u>		
M. H. Campbell M. K. Harmon	American Chemical Society Convention, Washington, D.C.	M. H. Campbell presented paper. (3/20-28/62) M. K. Harmon attended. (3/23-25 and 28/62)
P. R. Kelly	New York City, N.Y.	Attend conference of Insti- tute of Radio Engineers. (3/25-30/62)
<u>To Colleges and Universities</u>		
W. Watson	University of Texas Rice Texas A&M Oklahoma University Oklahoma State	Recruiting. (3/12-22/62)

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D. VISITORS

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>From AEC and Other AEC Operational Contractors</u>		
Orville Burton Ralph Miller John Samson W. D. Stump	The Dow Chemical Co. Rocky Flats Plant Denver, Colo.	Consultation on inspection. (3/13/62)
K. C. MacMillan E. A. Stisser	Lawrence Radiation Lab. Livermore, Calif.	Consultation on inspection. (3/13-14/62)
<u>From General Industry</u>		
Paul Berner	Star Machinery Co. Seattle, Wash.	Equipment. (3/6/62).
S. S. Moore	SS Moore & Associates Portland, Oregon	Equipment. (3/29/62).
W. Spallinger	Mobile Oil Co. San Francisco, Calif.	Lubrication of Purex centrifuge. (3/21/62)
<u>From Colleges and Universities</u>		
E. M. Kinderman	Stanford Research Institute, Palo Alto, Calif.	Nuclear Materials Management. (3/9/62).

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IV. SAFETY AND SECURITY

<u>Operation</u>	<u>Facil.</u> <u>Eng.</u>	<u>Finance</u>	<u>Fin.</u> <u>Prod.</u>	<u>P&GM</u>	<u>Purex</u>	<u>SSP&AO</u>	<u>Prod.</u>	<u>Rel. Prac.</u>	<u>Res. & Eng.</u>	<u>Total CPD</u>	<u>Yr. To Date</u>
Disabling Injuries				1*						1	2
Serious Accidents											1
Medical Treatment											
Injuries	1		14	18	21	5		1		60	60
Radiation Occur.			**		7	4				11?	53?
Contam. Wounds											
Pu Depositions											
Fires										1	3
Security Violations						1***					2

* In the course of travel from the 2101-M Building to 271-B Building, about one-half mile distance, the semi-trailer separated from the tractor's fifth wheel near the 271-B Building. The trailer slid about 30 feet and came to a stop in the opposite lane of travel without further mishap.

** Due to the criticality incident in Finished Products Operation, we have no record of the radiation occurrences for the month of March. This will be brought up to date on the next report.

*** Welder was using a cutting torch to remove stainless steel tray which sat on floor and extended from side of a cage similar to a hood. Sparks from cutting ignited paint, lint, rags, and possibly some masking tape inside of cage. Damage - \$10.00.

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V. REPORTS

A. PREPARED AND ISSUED

- HW-71639 5, Secret AWD, "Plutonium Monthly Report - February 1962", dated March 13, 1962, by A. E. Smith.
- HW-72200 C, Unclassified, "Serious Radiation Event CPD, Current Capabilities and Action Plan", dated January 26, 1962, by R. W. Harvey.
- HW-72244 Secret, "Dissolution of Plutonium Metal in Nitric - Hydrofluoric Acids", dated March 15, 1962, by R. S. Kingsley
- HW-72754 Official Use Only, "Project Proposal, Rev #2, "Waste Treatment Facility - "Z" Plant, Project CGC-912", dated March 2, 1962 by L. W. Finch.
- HW-72814 Secret AWD, "Progress Report - Finished Products Fabrication Technology Operation - February 1962", dated February 26, 1962, by Members of the Finished Products Fabrication Technology Operation, Research and Engineering Operation.
- HW-72904 RD, Secret, "Interim Report - 216-Z-9 Crib Core Sampling" dated March 7, 1962, by D. T. Crawley.
- HW-72909 Unclassified, "Process Engineering for Additional Ventilation and other Improvements - Hot Semiworks", dated March 23, 1962, by H. L. Caudill.
- HW-72911 RD Secret, "Purex Plant Production Schedule - March 1962", dated March 8, 1962, by D. McDonald.
- HW-72912 RD Secret, "Redox Plant Production Schedule - March 1962", dated March 8, 1962, by D. McDonald.
- HW-72913 RD Secret "UO₃ Plant Production Schedule - March 1962", dated March 8, 1962.
- HW-72914 RD, Secret, "234-5 Plant Production Schedule - March 1962", dated March 8, 1962, by D. McDonald.
- HW-72920 Secret, "Plutonium Trichloride Process Flow Sheet", dated March 1, 1962, by H. H. Hopkins, Jr. and M. J. Rasmussen.
- HW-72928 Unclassified, "Trip Report: Plutonium Purification and Recovery Methods", dated March 15, 1962, by H. W. Crocker.

- HW-72929 Confidential, "Trip Report: Plutonium Pyrochemical Processing", dated March 15, 1962, by M. H. Curtis.
- HW-72936 Official Use Only, "Plant Improvement Program, Category C - Plant Services Chemical Processing Department", dated March 20, 1962, by D. W. McKee.
- HW-72979 Secret, "Budget for FY 1964 and Revised Budget for FY 1963, Separations Research and Development Program (02-53-04)", dated March 15, 1962, by W. S. Frank.
- HW-72980 Secret, "Budget for FY 1964 and Revised Budget for FY 1963, Plutonium Processing Research and Development Program (02-53-05)", dated March 15, 1962, by W. S. Frank.
- HW-73006 Secret AWD, "Budget for FY 1964 and Revision of Budget for FY 1963 Plant Acquisition and Construction", dated March 21, 1962, by L. W. Finch.
- HW-73008 Secret AWD, "Budget for FY 1964 and Revision of Budget for FY 1963 Proposal for Research and Development - General Weapons Development - 03-16-04", dated March 15, 1962, by W. S. Frank.
- HW-73070 Secret AWD, "Budget for FY 1964 and Revision of Budget for FY 1963 Proposal for Research and Development General Weapons Development - 03-16-04 Details", dated March 20, 1962, by W. S. Frank and A. E. Smith.
- HW-73080 Unclassified, "Engineering Study, Nitrogen Generation Facilities - "Z" Plant", dated March 23, 1962, by D. E. Braden.
- HW-73099 Secret AWD, "Proposed Inspection Method for Certification of MC-1251 Parts while confined in the Machining Fixture", dated March 26, 1962, by A. E. Smith.
- HW-73118 Secret AWD, "Statistical Statements and Associated Data for 234-5 Building Final Product Shipped During the Fourth Quarter of Calendar Year 1961", dated March 23, 1962, by A. E. Smith.
- HW-73128 RD, Secret, "Trip Report - Savannah River Plant - February 26 - 28, 1962", dated March 26, 1962, by B. F. Judson.
- HW-73131 Secret, Atomic Weapon Data, "Radiographic Procedures for Parts 8105, 06, 07, 08, and 09", dated March 23, 1962, by G. E. Wilbur.
- HW-73132 Secret, Atomic Weapon Data, "Radiographic Procedures for Parts U-205 and U-206", dated March 23, 1962, by G. E. Wilbur.

B. PREPARED FOR SIGNATURE AND ISSUANCE

- HW-72865 Secret, "Production - February, 1962", dated March 1, 1962, by 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.

<u>INVENTOR</u>	<u>TITLE</u>
A. W. Hildebrandt, Finished Products Operation	Algebraic Integrator.
Roy Melvin Fowler, Power and General Maintenance Operation	The Adaptation of Helium Welding Equipment To The Use of a Mixture of Helium and Argon Gases For Cutting Stainless Steel.

P. H. Linker

General Manager
Chemical Processing Department

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**DATE
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4 / 13 / 93