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HW 76443

This document consists of
47 pages.

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
FOR

HW--76443

JANUARY, 1963

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Compiled By
OPERATION MANAGERS

February 21, 1963

HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON

Work performed under Contract No. AT(45-1)-1350 between
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CHEMICAL PROCESSING DEPARTMENT
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JANUARY, 1963

I. SUMMARY

Production through January, as compared with the January 31, 1963 HAPO Production Forecast (HW-76221), is summarized below:

	<u>Percent of Forecast Achieved</u>	<u>Fiscal Year</u>
	<u>January</u>	<u>To Date</u>
Separated plutonium nitrate	121.6	100.3
Separated uranium nitrate	124.5	97.5
Uranium oxide	98.9	96.2
Plutonium metal buttons	112.9	103.7
Fabricated parts	104.5	101.3

January production equaled or exceeded forecasted quantities for all products. Processing performance was satisfactory in all plants except Purex, which was shut down for the entire month because of a lack of sufficiently aged metal feed and for maintenance.

During the Purex shutdown, which extended from December 29 through January, activities at this plant were devoted to fission product recoveries and extensive maintenance repairs. In addition to the purification of about 1.0 megacurie of strontium-90, the HAPO II-1 cask was loaded with approximately 170,000 curies of strontium-90; an estimated 700,000 curies of cerium-144 were recovered for loading into the HAPO-1B-2 cask.

With the help of additional personnel from Purex, the Redox plant went from a five-day-week to a seven-day-week operating schedule for the month of January. E-metal processing was highly satisfactory, with unscheduled shutdowns totaling less than forty hours.

The routine use of reclaimed sodium nitrate, recovered from the underground waste storage tanks, was started in the Redox B-2 dissolver. Replacing commercial sodium nitrate as an effective hydrogen suppressant during removal of the aluminum jackets from feed metal slugs, the indicated cost savings will be about \$30 per ton of uranium processed.

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In the 234-5 Building, the six glass dissolvers performed exceptionally well during January. Over six kilograms of oxidized plutonium skulls were processed per day.

It was demonstrated in the laboratory that plutonium dioxide, prepared by direct calcination from the nitrate, was as reactive to hydrofluorination as the current plant product, prepared from the oxalate. Testing of the reactivity of direct-calcined oxide is continuing.

During the replacement of bellows on the 234-5 Building incinerator, fractures were discovered in the welds of the burning chambers. Since the condition would create a contamination hazard if the equipment were operated, it will remain shut down until the problem can be resolved. An intensive study was continuing at month end.

P. H. Leinker

General Manager
Chemical Processing Department

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS

A. PRODUCTION OPERATION

1. Production Statistics

January

Fiscal Year
to Date

a. Percent of Forecast⁽¹⁾ Achieved

Separated plutonium nitrate	121.6	100.3
Separated uranium nitrate	124.5	97.5
Uranium oxide	98.9	96.2
Plutonium metal buttons	112.9	108.3
Fabricated parts	104.5	101.3

b. Purex

January

December

Uranium nitrate produced (tons)	9.36	784.51
Average production rate during operation (T/D)	0	27.1
Total waste loss (%)		
Plutonium	0	0.45
Uranium	0.04	0.31
On-line efficiency (%)	0	93.5

c. Redox

Uranium nitrate produced (tons)	214.78	43.32
Average production rate during operation (T/D)	7.3	7.1
Total waste loss (%)		
Plutonium	0.37	0.42
Uranium	0.23	0.34
On-line efficiency (%)	94.9	34.0

d. Uranium Reduction (tons)

Normal UO ₃ loaded	586.88	631.43
Enriched UO ₃ loaded	150.51	85.10
Normal UO ₃ approved for shipment	443.82	630.89
Enriched UO ₃ approved for shipment	100.32	50.46
Normal UO ₃ shipped	542.70	678.74
Enriched UO ₃ shipped	101.25	50.52
Normal UNH backlog	242	818
Enriched UNH backlog	52	8

(1) HW-76221, HAPC PRODUCTION FORECAST, dated 1/31/63.

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e. Plutonium Metal Processing

	<u>January</u>	<u>December</u>
Reduction yield (%)	99.1	98.5
Product recovery output (Kgs)	202.98	173.54
Product recovery backlog (Kgs)	1327.98	1380.96
Waste disposal (grams)	650	662

f. Power

	<u>200-East</u>	<u>200-West</u>
Raw water pumped (gpm)	5,418	4,830
Filtered water pumped (gpm)	686	1,004
Maximum steam generated (lbs./hr.)	114,000	178,000
Average steam generated (Lbs./hr.)	88,860	151,818
Total steam generated (M lbs.)	66,113	112,953
Coal consumed (tons)	3,456	5,979

January production equaled or exceeded forecasted quantities for all products. Processing performance was satisfactory in all plants except Purex, which was shut down for the entire month because of a lack of sufficiently aged metal feed and for maintenance.

J. H. Warner
Manager, Production

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2. FISSION PRODUCT DATA

	<u>PUREX*</u> <u>INVENTORY</u>	<u>244-CR*</u> <u>INVENTORY</u>	<u>B CANYON*</u> <u>INVENTORY</u>	<u>SEMIWORKS</u> <u>PRODUCTION</u>	<u>PRODUCT</u> <u>INVENTORY</u>	<u>PRODUCT</u> <u>IN CASK</u>	<u>PRODUCT</u> <u>SHIPPED</u>	<u>CUSTOMER</u>	<u>REMARKS</u>
Sr-90 (Kilocuries)	75	1206	-	1074 (1)	1797	640	-	-	-
Cs-137 (Kilocuries)	-	-	-	-	-	-	-	-	-
Ce-144 (Kilocuries)	700	-	-	-	-	-	-	-	-

(1) Does not include 90,000 curies of rework material to be recycled.

*Estimated figures based on Cs calculations.

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II. ACHIEVEMENTS (Continued)

B. PUREX OPERATION

1. Operating Continuity

The scheduled plant outage initiated in December extended through January, as planned. During this period, the Second Cycle Uranium System was operated for four days.

2. Processing Operation

Seventeen (17) tons of off-standard uranium were reworked to specifications.

Strontium recovery series #55 was completed. The third strontium purification run at Strontium Semiworks was completed; approximately 1.07 megacuries of Sr-90 were purified. The HAPO II-1 Cask was loaded with approximately 170,000 curies of Sr-90.

Cerium run #55 was completed. Approximately 700,000 curies of Ce-144 are ready for loading into the HAPO-IB-2 Cask.

3. Mechanical Experience

Two titanium tube bundles were installed in the F-6 waste concentrator to replace leaking stainless steel bundles.

The HA Column pulse generator was replaced because of excessive leakage at the lower head of the process cylinder.

Two 5,000 gallon metal solution feed tanks (D3 and D4) were replaced with a 16,000 gallon tank.

A multi-route jumper equipped with four electrically operated valves was installed in the 152A Diversion Box to allow Purex organic wash waste to be diverted to either the 101-A, 102-A, 104-A, or 106-A tanks.

Three jumpers in the 151-A Diversion Box containing bolted-flange connections were replaced with jumpers of all-welded construction to minimize the possibility of leaks.

Installation and tie-in of secondary filters in the three dissolver off-gas systems were completed.

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4. Radiation Experience

The total Iodine-131 emission for the month was 0.39 curies. The maximum seven-day emission was 0.20 curies.

Two boxes containing miscellaneous jumpers and the D-2 cooling waste tank were successfully buried.

5. Analytical Experience

A method was developed for the determination of antimony-125 in aged waste supernate samples.

6. Events Influencing Cost

Strontium storage and waste disposal facilities provided at Strontium Semi-works on Project CGC-948 were accepted January 23.

Manager - Purex

PR McMurray/JMB/sc

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II. ACHIEVEMENTS (Continued)

C. REDOX OPERATION

1. Operating Continuity

The Redox Plant performed well throughout the month and the scheduled E-metal production was exceeded by nineteen percent.

The Uranium Oxide Plant operated at satisfactory rates throughout the month and the production schedule for both depleted and enriched uranium was met.

2. Processing Operations

a. Redox Processing

The Redox Plant went from a five to a seven-day-per-week operating schedule on 12-31-62 and continued on this schedule through the month of January. The additional personnel required to build four complete operating crews was provided by the Purex Plant which was scheduled for an extended shutdown.

E-metal processing was continuous throughout the month except for four short shutdown periods totaling approximately thirty-eight hours for: 1) nitric acid flushing of the 1-A precycle extraction column to correct flooding conditions; 2) replacement of the F-7 feed pump which failed on 1-22-63. The scheduled production for the month was exceeded by 19 percent while operating 95 percent of the total hours available. Good performance was maintained in all areas of the process.

The routine use of reclaimed sodium nitrate recovered from the Redox 241-SX salt waste storage tanks, was started in the B-2 dissolver this month. To date no operating problems have been encountered and the reclaimed sodium nitrate has been effective as a hydrogen suppressant during removal of the aluminum jackets from feed metal slugs. The reclaimed sodium nitrate replaces commercial sodium nitrate and will result in a savings of approximately \$30 per ton of uranium processed.

Approximately 870 grams of neptunium were successfully recovered from the neptunium accumulation system this month. Although this is only about one-third of the total amount present in the system, it represents nearly 100 percent recovery of the neptunium fed to the 1S column, a significant improvement over previous

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recovery runs.

b. Uranium Oxide Processing

The M-cell depleted uranium calciner was shutdown on 1-16-63 when a temperature rise above operating limits was observed. Subsequent investigation revealed that the agitator control circuit and audible alarm had failed because of a blown fuse with the result that feed was supplied for a time to the calciner without agitation. The powder bed in the calciner set up into a hard, granular mass, most of which has now been removed. Normal operation of the calciner is not expected before the week of February 11.

Calcination of depleted uranium was discontinued during the period 1-29-63 through 2-1-63 to permit the annual overhaul of the UA Scales, which are used for loading depleted uranium oxide product into shipping containers. This work cannot be done while the calciners are operating. Sufficient uranium oxide was produced prior to the shutdown to permit uninterrupted conformance to the shipping schedule.

3. Mechanical Experience

Processing equipment in the Redox Plant performed very well throughout the month and the mechanical efficiency was 99 percent. Only eight hours of processing time were lost due to equipment failure. This occurred on 1-22-63 when the F-7 precycle feed pump failed and was subsequently replaced.

4. Waste Handling and Decontamination

Equipment valued at \$88,000 was received from the processing plants for decontamination, repair, inspection or burial during the month. Equipment valued at approximately \$29,000 was returned to customers, representing a savings of approximately \$19,000 over the cost of new equipment.

5. Radiation Experience

Two radiation occurrences and two skin contamination cases were recorded during the month. The radiation occurrences were not significant and all skin contamination was readily reduced to non-detectable.

Two contaminated equipment burials were made this month from the Redox canyon. The maximum dose rate encountered was 100 mr/hr at 20 feet from the burial box. Both burials were completed without incident.

NK Harrison
Manager - Redox

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II. ACHIEVEMENTS (Continued)

D. WEAPONS MANUFACTURING OPERATION

1. Operating Continuity

There were no significant interruptions to the operating activities except in the case of the incinerator operation where fractures in the welds of the burning chambers have required shutdown of this equipment. All Weapons Manufacturing delivery schedules were met or exceeded.

2. Processing Operations

a. Plutonium Fabrication

Information on plutonium fabrication is presented in Document HW-76543 entitled "Chemical Processing Department, Weapons Manufacturing Operation, Z Plant Monthly Report, January, 1963" which is classified "Secret, Atomic Weapon Data, Production Rate and Stockpile Quantity Information."

b. Plutonium Processing

Operation of the plutonium processing line was satisfactory with good production rates being attained while using relatively dilute feed. Over half of the production was prepared from dissolved skull oxide and from miscellaneous solutions treated in the ion exchange unit. Schedules were exceeded by nine per cent and product quality was high in spite of the shortage of fresh feed.

The laboratory dissolvers performed well and the backlog of skull oxides was reduced by approximately thirty-five per cent.

The ion exchange unit performed well during the month. Improved filtering has permitted the cleanup and treatment of leach and miscellaneous solutions in conjunction with regular production. As a result of this, it was not necessary to send any Z Plant solutions to the primary plants for processing during January. Also, it was possible to remove from service 150 of the emergency-type PR containers and place them in storage in the 224-T Building.

3. Mechanical Performance

Fabrication equipment operated well except for the failure of one of the bearings on a Gorton lathe in Hood HC 43 ML. Repairs were completed, and the lathe was returned to service by month end.

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DECLASSIFIED3. Mechanical Performance (Continued)

Plutonium processing line equipment performed satisfactorily with only minor repairs required.

The resin beds of the ion exchange unit were replaced with a coarser material in order to correct the compaction problem.

The incinerator facility required replacement of the bellows between the incinerator proper and the E-4 ventilation system. During the latter part of the month, the investigation of a contaminated condition revealed that there were fractures of the welds on the vertical flues connecting the two burning chambers of the incinerator. An intensive investigation is in progress at month end.

The renovation of Hood 9-A was continued during the month.

4. Radiation Experience

Radiation and contamination control statistics showed rates slightly above average for January.

There were four contaminated minor injuries (three of which required excision) and three cases of positive nasal smears. In all cases, the initial results on the above indicate there will be either no deposition or only extremely low level deposition to the individuals involved.

5. Analytical Experience

	<u>December</u>	<u>January</u>
Number of Samples Received	3,220	3,107
Number of Determinations	20,416	17,506
Total Impurities, Buttons	1,190 ppm	1,400 ppm
Buttons Rejected	3.8%	4.6%
Pu 240, Normal Buttons (by Neutron Count)	6.0%	5.95%

W. J. Garton
 Manager
 Weapons Manufacturing

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January 1963

II. ACHIEVEMENTS (Continued)

E. POWER AND GENERAL MAINTENANCE OPERATION

1. Operating Continuity

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

2. Inspection, Maintenance and Repair

Fabrication of a hood required for extension of the airlock and conveyor in Weapons Manufacturing Operation's RMA Line was completed. This was part of a large high-priority job involving installation of ventilation, cooling and control systems for the new mold furnace.

Repairs to a new waste concentrator (D-12) for the Redox facility were in progress at month's end. The work involves correcting vendor discrepancies to the extent that the process-exposed surfaces of all plate and pipe end sections are being sealed by welding, to prevent end-grain corrosion.

Alterations to a spare dissolver off-gas filter were in progress at month's end. The unit will be packed with glass wool to conform to the latest design criteria and installed in B-cell at the Redox facility.

Modifications to the shipping buffer for the HAPO 1B-2 strontium cask were completed. Removable sheathed insulation was installed on the cask to make it suitable for winter usage. The method of securing the buffer to the Air Force flatcar was also changed to eliminate the long flexing tie-rod assembly.

Shop work was completed, and field installation is in progress on a ventilation system for the weapons inspection hood at Weapons Manufacturing Operation.

Two specially designed tools were fabricated and successfully used in twisting the studs off of the in-service F-6 waste concentrator at the Purex facility. The tube bundle hold-down nuts were galled, making it necessary to twist the studs off before removal of the tube bundle could be effected. The special tools were used remotely in connection with an air-operated impact wrench.

Fabrication of a spare titanium loop for the Redox facility's Pu Concentrator is again in progress. The titanium pipe originally purchased for this job was faulty and was consequently returned to the vendor. The new loop is approximately 20% complete at this time.

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Field service crews are currently installing the tank farm leak-detection instrumentation as part of Project 33C-928 (Leak-Detection, High-Level Waste Tanks, Redox and Purex). The work was an estimated 35% complete at month's end.

Thirty-five pipe connectors (jumpers) were fabricated to meet requirements as indicated below:

11	Redox
21	Purex
2	Spare Parts - Redox
<u>1</u>	Criticality Laboratory
35	Total

The contract covering the renovation and rerouting of steam-supply lines in the T-Area has been completed. Rerouting of the lines permitted removal from service of 1200 feet of a 6" pipe line.

A new shaft and turbine wheel were installed in the emergency turbo-generator in the 284-E Power House. The unit was tripping out at normal operating speeds (3600 RPM) during the test runs. Amplitude tests disclosed a bent shaft. Also installed on this generator was a new automatic electrical overspeed trip relay which operates entirely independent of the present mechanical oil-pressure-actuated overspeed mechanism. The new device is set to trip the generator at 3950 RPM, and the mechanical trip is set to operate at 4050 RPM.

The Redox cooling-water disposal area was enlarged by approximately ten acres by the construction of a ten-foot-high earthen dam. Existing ponds no. 1 and no. 2 will overflow into the new pond, thereby creating approximately 50% additional settling area.

The delivery of a CPD-built burial box to the Redox facility during the month marks the end of large burial box construction by CPD forces, under normal conditions. Henceforth, burial box requirements will be met by lump-sum contract, except in unforeseen situations.

Services rendered other departments included inspection, by P&GM's air-balance personnel, of all 105 Reactor buildings for compliance with the Irradiation Processing Department's contamination confinement design criteria.

A new electron-beam furnace was installed in Hanford Laboratories' 231-Z facility. A vacuum of 10^{-5} mm of mercury is being satisfactorily maintained within the furnace.

T. S. LaFollette

Manager
Power and General Maintenance

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

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II. ACHIEVEMENTS (continued)

F. FACILITIES ENGINEERING OPERATION

1. Purex

a. Process Design Engineering

Waste Diverter

Demonstration runs using simulated Purex formaldehyde-treated waste were continued in the mock-up waste diverter during the month. The concentration of the waste was varied between 60 and 35 gallons per ton of uranium equivalent with 50 to 75 percent settable solids respectively. The cumulated operating time for 40 runs was 29 hours, 20 minutes with a total throughput of 210,000 gallons. There was no indication of plugging or build-up of sludge in the diverter or piping during these runs. Tests were continued to obtain data on splash and spillage during these demonstration runs. Three variations in the spigot-to-funnel splash guard were tested.

"Q" Cell Start-up

Start-up tests of the ion exchange system revealed that the permanently installed screens in the Q-4 Column were passing resin. Three (3) drawings were completed and issued which called for flanged screens, using 150-pound standard forged steel flanges, and a revised bottom support of the column. Although flanges compromise the design criteria of all welded construction, they were the only practical means of installing replaceable screens.

Removal of the Bundle from Concentrator

Engineering assistance was provided for removing, by remote means, three seized nuts on the Purex F-6 tube bundle. The stud demolition tool was not effective on the new high-strength studs. A large air-driven impact wrench was procured and mocked up for canyon service. The air wrench had sufficient power to break the studs or loosen the nuts; however the pieces must be retrieved to learn which action released the tube bundle.

b. Project Engineering

CGC-930 - Secondary Containment of Dissolver Off-Gases-
Redox and Purex

The first of three hot tie-ins to the dissolver off-gas

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lines was made January 11. The beneficial use date was established as January 14, when the first filter was put into operation. The other two tie-ins were completed on January 17.

CGC-965 - In-tank Waste Solidification-200-E Area

A project proposal revision requesting \$90,000 advance procurement money was transmitted to the Commission on January 31. The equipment to be procured early is (1) a 4200 scfm compressor (35 psig discharge pressure) with a 600 hp motor, and (2) a 1450 KW air heater.

Completed Projects

CGC-897 - Fission Product Concentrate Storage System-
200-E Area

This project was completed and closed out on January 31, 1963.

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

This project was completed and closed out on January 25, 1963.

2. Redox

a. Process Design Engineering

"D" Cell Renovation

Design was completed of stainless steel liners for the D-13 and D-14 positions, of a scoop for cleaning the sump, and of a grab bucket for cleaning the cell floor. Tests have also been made of a vacuum-type cleaner. Several grout mixtures have been tested and have shown poor resistance to acid.

Iodine Filter Revisions

The welded structure of the charcoal-packed filter allowed leakage at the fine screen parameter. An epoxy resin is being used to provide a sealing barrier.

b. Project Engineering

CAC-928 - Leak Detection - High-level Waste Tanks-
Redox and Purex

Modification No. 2 (Dir. No. AEC-195), was issued on January 30, extending the completion date from January 30

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to April 30. Plant forces are installing wiring and making final tie-ins.

3. Weapons Manufacturing

a. Process Design Engineering

RMC Button Line

The calciner off-gas "blow-back" filter is being cold-tested, and preliminary runs with dry stand-in powder are encouraging. The new fluorinator tube detail was approved.

Incinerator

The burning of plastics, which was discontinued in May 1962, has been resumed. Consequently, the requirements for additional leaching facilities have changed. Additional facilities are also necessary for separation of solids from scrubber solutions. It is feasible to combine the additional leaching facilities and the equipment for separation of solids from scrubber solutions in one glove box. A scope drawing which shows the proposed equipment has been prepared and distributed for comment.

Hood Modifications

The wet chemistry hoods of the Recuplex system are being modified for current needs. Hood 44 is being equipped for the dissolution of plutonium powders. Design has been completed and approved prints issued for a heat exchanger for cooling the product from the continuous dissolver. Design changes have been made to the continuous dissolver equipment arrangement drawings for installation of the heat exchanger and re-routing of the service and process piping.

A design has been completed for modification to an existing ultrasonic leach pot and a rinse pot for Hood 227 to make them geometrically favorable. A design has also been initiated for installation of the modified equipment in Hood 227, adjacent to Recuplex.

RMA Fabrication Line

The electrical design was issued for the fifth Stokes furnace stub conveyor, air lock, and hydraulic system. A scope drawing was prepared for the HA-19B2 casting furnace (sixth Stokes).

A decision was made during the month to proceed as rapidly as possible on the procurement of a Floturn machine to handle material being processed along the RMC

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Line. Engineering scope studies have been initiated to expedite this program.

b. Project Engineering

CAC-880 - Plutonium Reclamation Facility - "Z" Plant

The Phase II bid package was transmitted to the Commission on January 16. It requests that the Commission call for a 150-day contract with completion by August 15, 1963.

CGC-984 - Electrical and Hydraulic Equipment Mezzanine -
RMA Line - 234-5 Building

Detail design is essentially complete. Field work by the J. A. Jones Company started on January 4.

Bids for the motor control centers and intercommunication system have been reviewed and returned to the Commission purchasing for placement of orders. Promised deliveries are 30 to 45 days and 30 to 60 days, respectively, after placement of the orders.

c. Manufacturing Engineering

Fire Prevention - 234-5 Building

Two special studies of fire fighting approaches to the 234-5 Building and a review of earlier engineering studies of built-in fire control equipment have been made. Criteria were set for the first approach of personnel to extinguishment of fires in their early stages by use of portable extinguishers and water fog streams.

4. General

a. Process Design Engineering

Fission Product Shipping Cask Pressure Transducers

Specifications were prepared for an electrical pressure transducer for use during cask loading and unloading. Two manufacturers are known who can supply units meeting specifications. No decision has been made as yet on procurement as replacement for a pneumatic transducer which is now used.

Fission Product Shipping

The HAP0-IB-2 Cask, which was completed and delivered to Purex on January 14, is now ready for loading. The HAP0-IA Buffer insulation and tie-down modifications were completed, and the buffer is now ready for shipment.

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b. Project Engineering

Project Cost Information - as of 1/20/63:

Total Authorized Funds - sixteen active projects	\$ 5,760,000
Total Cost-to-date	3,711,000
Commitments and Open Work Releases	604,000
Unencumbered Balance	1,445,000
Costs Charged to Above Projects (12/23/62 to 1/20/63)	124,000

Projects dropped from active status during this period are:

<u>Project No.</u>	<u>Authorized Funds</u>	<u>Total Cost</u>
CGC-811	\$ 3,895,000	\$ 3,855,911
CGC-821	1,575,000	1,574,963
CGC-895	685,000	540,067
CGC-913	325,000	310,444
CGC-953	40,000	36,682

Manager
Facilities Engineering

HP Shaw/WWC/alr

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

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II. ACHIEVEMENTS (Continued)

G. RESEARCH AND ENGINEERING OPERATION

1. Purex Process Engineering

(a) Solvent Extraction

Plant operations during the report period were limited to rework and auxiliary runs of short duration which could be scheduled into the planned maintenance outage.

About ten tons of uranium associated with 93,000 gallons of organic wash wastes (OWW) were successfully recovered using the Final Uranium Cycle equipment without any indications of column instability or excessive waste losses (<0.2 per cent in the 2DW). Normally product-bearing carbonate wastes are acidified, concentrated and digested a minimum of two weeks before any attempt is made to reclaim the material. Following the run, the organic solvent (No. 2 Organic System) did not completely respond to the normal treatment methods and was set aside for additional batch treatment.

(b) Fission Products

Purex

A cerium and rare-earth fraction was prepared for loading into the HAPO IB-2 cask for shipment to Oak Ridge National Laboratories. No effort was made to split the cerium and rare-earths since ORNL is interested in recovering both cerium and promethium from the shipment.

Preparation and purification of the slurry for cask loadout was made by three successive precipitations. The cerium and rare-earths were first separated from the Purex IWW by sulfate precipitation. Additional purification was obtained by metathesizing the sulfate with sodium carbonate, dissolving the carbonates in dilute nitric acid and reprecipitating the cerium and rare-earths as the oxalates. Finally the cerium and rare-earth oxalates were dissolved in nitric acid and reprecipitated as the sulfates for loading into the cask. Actual loadout of the slurry was delayed until February because of failure of one or more ball valves in the Purex loadout station.

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Strontium Semiworks

A megacurie strontium⁹⁰ purification run was completed at the Strontium Semiworks at instantaneous processing rates of 200 to 270 kilocuries of Sr⁹⁰ per day. Performance of the solvent extraction system is shown below:

Average Waste Losses - Per Cent

Stream

HA Column Effluent	6.7
HC Column Organic Effluent	0.4

Decontamination Factors

Impurity

ZrNb	>3 000
Ru	> 400
Ce	19 000
Ba	1.0
Ca	30
Fe	>3 000

Instantaneous HA Column waste losses were generally around 2 - 4 per cent. Difficulties in adjusting the HAF pH at startup resulted in initial HA Column losses as high as 25 - 50 per cent averaging 6.7 per cent for the entire run. Most of the waste containing the high loss was segregated and reworked by batch contact reducing the net HA Column loss to 4.4 per cent.

The reasons for the apparent lack of barium decontamination are under investigation, however, barium concentrations in the purified product were well within specifications.

The HAPO II-1 cask was loaded with 170 kilocuries of Sr⁹⁰. Precipitate filtration behavior was excellent and the loadout was routine. This represents the fifth load for this cask with no apparent decrease in capacity.

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2. Redox Process Engineering

a. Dissolvers

Dissolved waste sludge solution, with a composition of 4.2 M NaNO_3 , 0.1 M NaNO_2 , and 0.3 M NaOH , has been used in the B-2 dissolver to suppress hydrogen during the coating removal step in place of fresh sodium nitrate chemical. The dissolved waste sludge has proven to be a satisfactory and effective hydrogen suppressant, and its use has resulted in savings of \$33.60 per ton of uranium processed. Cost of the facilities to pump waste sludge solution to the dissolver was \$29,500.

b. Neptunium Processing

A successful neptunium recovery operation was completed during the report period. The HS Column stripping pass, using demineralized water, removed 870 grams of neptunium product. This quantity was about one-third of the total amount of neptunium in the accumulation system, but represented nearly 100 percent recovery of the neptunium fed to the HS Column.

The neptunium product solution in the E-1 (3AF Feed) Tank was out of specifications with respect to uranium (25 parts U per part Np versus a limit of 10 parts U per part Np). An acid deficient spin pass through the 3A and 3B Columns reduced the uranium concentration down to 4.5 parts U per part Np. (In an acid deficient solution the neptunium is at the non-extractable five valence state which permits separation from uranium which is extractable.)

The neptunium product solution was then processed through the 3A and 3B Columns on an acid flowsheet with an over-all neptunium recovery of 97 percent. Recovery across the 3A and 3B Columns on most of the previous runs has been poor. The success of this pass can be attributed to: 1) elimination of the hexone, which interferes with the valence adjustment, from the feed solution by decanting and stripping; 2) analyzing and determining that the neptunium is at the extractable six valence before making the pass; and 3) adjusting the scrub stream to a 0.12 M $\text{Na}_2\text{Cr}_2\text{O}_7$, 0.1 M HNO_3 , and 2.0 M ANN composition to reduce the potential for valence reduction in the 3A Column.

c. Hexone Monitor

A combustible gas analyzer is being used to spot check the hexone concentration in the process off-gas streams; the data is used to relate periods of high hexone loss with process activity. The monitor has shown that the improved venting of the 3E Column (see December report) has reduced the hexone consumption rate to 600 pounds per operating day. Other operating conditions which contribute to higher than normal hexone losses include: excessive vacuum applied to the condenser vent header; and excessive quantities of steam injected into the D-5 preheater-decanter.

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d. XASR System

The acid required to prepare XAF feed solution of 7.0 M HNO_3 is now obtained by routing a portion of the spent scrub stream from the L-18 Contactor to the L-12 (XAF) Concentrator. The scrub recycle stream, XASR, replaces new acid which previously had been added at the E-3 Valence Adjustment Tank. This change in flow pattern has reduced the total amount of acid consumed by the 233-S facility by a fourth and has resulted in savings of \$3.60 per ton of uranium processed. The cost of the XASR system was \$3,125.

e. Plutonium Product Quality

The plutonium anion exchange contactor was installed under Project CGC-913 in the 233-S facility to provide additional decontamination of the plutonium product. The anion exchange treatment has not only provided good fission product decontamination, but has also reduced the metallic impurities in the final product. Data on the product quality are tabulated below.

Fission Products (Microcuries/gram)		Metallic Impurities, (part per million part plutonium)					
		Al	Ca	Fe	Na	Ni	Si
Average before Project CGC-913	15.2	4500	<200	1300	1200	322	260
Average after Project CGC-913	2.3	<20	<100	560	400	55	300

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3. Plutonium Process Engineering

a. Metal Finishing Operation

1. Button Line

Button density was good (19.28), and a 3.1 percent rejection rate was experienced, despite the high percentage of the feed coming from dissolved oxidized skull solutions. The feed to the button line consisted of 40 percent dissolved oxidized skull solutions, 24 percent Redox product, 29 percent Purex product, and 7 percent eluant from the oxalate supernatant ion exchange columns. Besides the above normal production, oxalate and oxide sweepings were processed through the button line, culminating in 21 reject buttons. At present, reject buttons are sent to Savannah River for further processing.

Tests increasing the percent excess calcium in the PuF_4 to Pu reduction furnace are in progress. Statistical analyses of past data show that the button density averages an increase of 0.07 units if the percent excess calcium is increased from 25 to 50 percent.

2. Oxalate Supernatant Ion Exchange Facility

Besides handling all the button line supernatants during the month, 30 PR cans and 9 RC cans of refiltered incinerator leach solutions were processed through the ion exchange facility. The overall yield across the ion exchange unit was 98.3 percent. Some resin bed pluggage resulted from fines passing through the filters. Resin from two of the three columns was successfully eluted and replaced with new resin when bed pluggage became a capacity problem and normal back-flush operations were unsuccessful in unplugging the beds.

3. Oxidized Skull Dissolution

The six glass dissolvers processed a record of over 6 kgs/day of oxidized plutonium skulls. As noted under the button line discussion, the quality of the product was acceptable. No corrosion problems were evident with the non-aluminum-killed product.

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4. Recuplex Deactivation

Initial production test runs on drying reception and blending hood floor sludge began during the month. Changes in sludge consistency with time (slurry volume reduced more than 50 percent since initial development tests) presented new problems, e.g., higher radiation levels (less shielding due to evaporation). The sludge has been resampled and results of the sampling, along with findings from initial burning tests, will be studied to determine what changes to equipment and procedures are necessary.

5. Instrumentation

Tests of an in-line alpha monitoring system for low plutonium content aqueous streams have been encouraging. The instrument should be capable of detecting plutonium concentrations between 0.001 and 0.2 g/l, provided the sample cell background count can be minimized. Periodic flushing of the cell with dilute nitric acid is effective for maintaining low background levels. Testing will be continued to optimize accuracy. In-plant tests are planned on the supernatant ion exchange waste stream and the D-6 waste sump stream.

6. Critical Mass

Critical mass specification studies are in progress on CGC-912, hood 44, hood 42, and the leaching portion of hood 227. The critical mass specifications documents concerning the glass dissolvers (hoods 149 and 161) and storage of Pu-Al alloys have been revised (documents HW-74222, HW-75100, and HW-74717, respectively).

7. Incinerator

The welds which connect the primary combustion chamber to the secondary combustion chamber by means of flues failed after approximately one year of intermittent operation. A new chamber is being constructed.

The filtration system in the incinerator leach hood successfully filtered stored leach solutions for processing through the ion exchange columns. A polypropylene sock (about 40-micron size) supported by a perforated stainless steel cartridge was the element used in the filter arrangement.

8. Miscellaneous

Approximately 50,000 liters of flocculant solids (a 10-year accumulation) have been measured in the settling tank that precedes the Z-12 sump waste crib. Neutron monitoring across the approximately 5-foot depth of sludge shows the bulk of the plutonium at the 1 to 3-foot level. Based on the highest analytical value obtained, 0.1 g Pu/l of sludge, the solids could contain as much as 5 kgs of plutonium. An integrated

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value indicates that about 1 kg is a more likely value. Although several critical masses could be present in the tank, no critical mass hazard exists, since the plutonium is distributed over the 338 square foot bottom of the basin.

b. UO₃ Plant

Approximately 15,000 pounds of uranium were transferred from the 301 tank in the 211-U tank farm to Purex for reprocessing. This was the bulk of the solution resulting from the 224-U to 221-U transfer incident in May, 1962. Slightly more than one ton of uranium remains in the 387 tank in the 276-U area.

Severe caking of the M calciner powder bed and excessive heating of the shell (up to 1500° F) occurred on January 15, 1963, following stoppage of the calciner agitator control circuit. Several alarm and protective circuits apparently did not function properly during the period of difficulty. A bent agitator shaft was the only obvious damage found upon inspection of the unit after clean-out.

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4. Separations Chemistry Laboratory

a. Purex Process Assistance

1. Uranium rework material from Tk-P-2, and Tk-301 was processed through the K-cell without any processing trouble. However, the solvent has been contaminated with Pu-retaining materials and is not responding to washing. Solvent samples have been obtained for evaluation.
2. During the last quarter of 1962 the N-cell resin used was 25% 10-20 mesh and 75% 20-40 mesh Permutit SK. The change-out frequency of this resin has been very short, as low as 16 days. Microscopic observation of the used resin showed a large portion of cracked and broken beads. In all cases observed, the large beads, larger than 20 mesh, were most severely damaged.
3. Recently more precise techniques of examining resin using polarized light (crossed Nicol technique) have allowed the detection of internal strains in beads which appear perfect under normal microscopic examination. Utilizing this technique, the laboratory was able to detect variations in samples of 10-20 mesh resin received from the plant. One sample of resin showed over 80% damage (strained to broken beads) by contacting with water, and 50-60% damage by contacting with 0.75 M HNO_3 . These samples may have been mishandled or frozen but in any event would cause a severe push problem in the Purex contactor. It has been decided to use only 20-40 mesh resin for the February run and to take samples periodically for evaluation.
4. Water concentrates, prepared from the Purex process water system, were tested by infrared analysis and uranium transfer rates. In neither case did they show the unfavorable characteristics of last spring. Infrared spectra were similar to those obtained from laboratory distilled water, and uranium transfer rates showed no difference between permanganate treated water and regular process water. Water samples tested represent the months of November and December 1962. This data will serve as a reference to an optimum operating period for additional tests during the coming months.

b. Redox Process Assistance

1. In order to minimize waste losses in the decontamination cycle of neptunium purification, it was recommended that the aluminum nitrate scrub (3AS) contain 0.04 M sodium dichromate with an acidity of 0.2 M (free nitric acid). Hexavalent neptunium in hexone is reduced to the pentavalent state at a rate such that waste losses occur if sufficient oxidation potential is not maintained in the column. Since the small amount of chromium which the above recommendation will add to the neptunium stream is not a problem in subsequent anion exchange, it appears to be a feasible means of decreasing waste loss.
2. Since pushing difficulties were being experienced with recently installed resin, a sample was examined in the laboratory. The

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resin appeared to be in good condition with less than 5% cracking. Subsequent operation with the resin has been more satisfactory.

c. Neptunium Purification

1. Neptunium purification runs 65 and 66 were completed, and run 67 was about 80% completed during the month. Run 65 consisted of processing 65 grams of rework and 768 grams of virgin Purex material. The purified material contained 2.12 uc ruthenium/g Np (specification is 2 uc/g Np) indicating that ruthenium is still being leached from the ion exchange resin bed. In run 66, 1088 grams of virgin Purex material was loaded on the resin. Because of the heavy resin loading and trouble with ruthenium on preceding runs, the acidity of the fission product removal wash (HF wash) was increased from 7 M HNO_3 to 8 M HNO_3 . The purified product met all specifications including ruthenium which was 0.3 uc/g Np. Run 67 consisting of 733 grams of Purex material and 61 grams of Redox material is in process.
2. HSW Assistance. The precipitation characteristics of a new batch of strontium in tank 6 were checked and found to be satisfactory. Better than 99% of the strontium precipitated as a white dense carbonate.

d. Laboratory Assistance

1. Evaluation of the automatic alpha proportional counter continued. Resolving time, measured in the 20,000 to 80,000 c/m region, was three microseconds less than the standard ASP's. The average geometry for the month was 50.28% with a range of 0.12% and the precision of the counts at the 95% confidence level averaged ± 79 c/m ($\pm 0.16\%$). These values, as well as the chi squares compare favorably with ASP's.
2. A promethium method for routine control work was developed. The rare earth group was decontaminated from all other fission products, including yttrium, by a D2EHPA extraction cycle. Rare earths are then absorbed on a short (2 cm) anion resin column (Dowex 1 x 4) from a 90% CH_3OH -10% 7 M HNO_3 matrix. Promethium was selectively eluted from the column with a 90% CH_3OH -10% 0.02 M solution. A mount of the eluent contained 80% of the initial Pm^{147} which was easily corrected for the low $\text{Ce}^{141-144}$ - Pr^{144} contamination. Decontamination factors were: Zr^{95} - Nb^{95} , 1×10^4 ; $\text{Ru}^{103-106}$, 1×10^3 ; $\text{Ce}^{141-144}$ - Pr^{144} , 50. Analysis time was two hours.
3. A set of samples from UO_3 plant was analyzed for Purex solvent content. A carbon tetrachloride extraction was made of each sample using an aqueous to organic volume ratio of 20. Extracts were scanned on the infrared spectrophotometer and compared to the standard spectra of Purex solvent. The peak for the CH bond (3.5 microns), common to all solvent components, was used as a reference. Samples taken between the C-1 tank were found to have 0.2% solvent by volume. This analysis can be completed in 1.5 hours.

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4. Analytical procedures were recommended to the Redox Analytical Control group for determining the free fluoride concentration of Zirflex decladding solutions. Total fluoride was separated by distillation and titrated with a thorium nitrate standard solution. Zirconium was analyzed by X-ray fluorescent spectrophotometer, and alternatively, due to expected radiation levels, by a pyrocatechol violet colorimetric analysis. Free fluoride was then calculated by difference.
 5. The second group of irradiated foils has been issued for the inter-site program of the "Irradiation Effects on Structural Materials" committee. Each program participant will receive nine foils whose gamma activity has been certified by the combined Redox and Separations Chemistry laboratories. The sites presently participating are: ANL, BMI, BNL, NMPO, ORNL, NRTS, GA, and VAL.
 6. Two irradiated uranium foils from ANL in Idaho were received and tested in an exchange program designed to study the feasibility of using this material to determine neutron capture cross-sections. Also participating are ANL in Illinois and LASL. This is the second exchange of foils within this group.
 7. A quality control program for the analysis of gamma emitting isotopes in CPD is now in operation. The content and degree of participation in this program have been documented in a memo which was issued January 23, 1963.
 8. To date, 152 gamma spectra of isotopic standards have been recorded on magnetic tape, as part of a reference library. The library is being used to generate printed records of standard spectra, to strip out known contaminants from isotopic mixtures and to simulate mixtures of isotopes in the energy analyzer. Gamma calibrations were completed during the month for Ca^{47} , Sc^{47} , $\text{Ag}^{110\text{m}}$ and Se^{75} . Thirty-three gamma emitting isotopes have now been calibrated.
 9. Preliminary results show that the differential spectrophotometric method of determining plutonium will yield a recovery of 99.98% $\pm$ 0.17% (precision of the mean at the 95% C.L.). This compares favorably to the X-ray method for plutonium and has the following advantages:
 - a. Nitric and hydrochloric acid corrections are not necessary.
 - b. Iron, uranium¹, and dissolved salts of aluminum and sodium do not interfere.
 - c. Plutonium content may be determined in both nitric and hydrochloric acid systems.
 - d. There is little to no chance of polymer formation in the sample.
- (1) G.M. Allison, PDB-57, The Spectrophotometric Determination of Plutonium as Plutonium(III), p 7-8.

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Glass standards have been obtained for trial with the differential spectrophotometric determination of plutonium but have not yet been evaluated.

10. A fairly extensive revision to the data processing program for handling analytical data is being worked out. The revisions will remove present inconsistencies and will provide for inclusion of data from the gamma fission product control program. This program should be completed by the end of the fiscal year.
11. The 234-5 control laboratory has been evaluating arsenious oxide as a primary standard for ceric sulfate in place of plutonium metal. Experience for the last quarter of 1962 has been reported and the results do not warrant further consideration of this method at least for the present.
12. A sample of National Bureau of Standards standardized 0.1 N $K_2Cr_2O_7$ was sent to the New Brunswick Laboratory as part of the AEC verification program between HAPO and NBL. This shipment is being used to test the packaging and shipping system to see if the analytical integrity of the sample can be maintained in transit.
13. The X-ray spectrometer has been calibrated to determine Zr in Zirflex decladding solution in support of a test run at Redox to simulate the process for PRTR fuel elements. Two solutions were analyzed by this method which is calibrated from 0.001 to 0.04 molar Zr. Chemical analyses of Zr are being performed by the 222-S laboratory personnel for confirmation.
14. The X-ray spectrometer has been calibrated to analyze for Zr in Pu-Zr alloys containing 3 - 15 weight per cent Zr. Standards were prepared using uranium as a stand-in for the Pu. A slope factor calculated by a least squares fit checks within 0.06% of the value determined by graphical analysis, indicating good linear relationship.

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5. Plutonium Chemistry Laboratorya. Direct Calcination Of Plutonium Nitrate

Plutonium dioxide prepared by the direct calcination process has been shown to hydrofluorinate as well as does current oxide from oxalate.

Testing of reactivity of direct-calcination oxides toward hydrofluorination is continuing. The reactivities seem to correlate with those observed for chlorination with phosgene. Oxide prepared in Run SC-7 at a ratio $\text{SO}_4^{2-}/\text{Pu} = 0.5$, and with a maximum shell temperature of 350 C, has been demonstrated to be at least as reactive as Line oxide. Older oxides prepared in trough and annular trough reactors have, so far, proven to be insufficiently reactive, i.e., conversions of about 50 percent resulted.

In order to increase processing rates, the screw calciner has been modified to utilize its entire 30-inch heated length as evaporation and drying-calcination zones by relocating the chopper immediately adjacent to the outlet duct. This will allow determination of the maximum throughput of the unit since none of the unit will be devoted to calcination of solid product. Rather, the entire active length will be used to reduce plutonium nitrate solution to a powder which is just sufficiently calcined to allow grinding of the lumps to granules. In a production unit, these granules can be further calcined to any desired extent by addition of more heated length beyond the chopper. The "drying" operation seems to be the rate controlling process and, thus, is receiving major attention. Reactivity testing is continuing as throughput rates are increasing.

b. Electrowinning Plutonium Metal

Scaleup development of electrowinning is under way. Initial results from four runs show that the consolidation problem is considerably reduced.

The small-scale electrowinning equipment was revamped to handle the large-scale cell. The ceramic cell PRC III lined with tantalum has been used, as well as a single-piece tungsten cell. With no vent tube, these cells are adaptable for changing anode design.

The runs were set up using the optimum conditions. This included using a pretreated LiCl-KCl melt, an HCl sparge in the melt for 30 - 45 minutes prior to starting D.C., an enlarged cathode area, an anode basket, feed with less than six percent water insolubles, and oxide-free starting metal heels.

The runs were plagued with unique mechanical problems that had not arisen before, resulting in short duration. Nevertheless,

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unconsolidated metal (black solids) which previously has been a major problem was not observed.

The tungsten cell run was made to determine whether or not high-density tungsten would absorb the plutonium product. Apparently density is not the major factor, since this cell (95 percent theoretical) still absorbed plutonium about as readily as the lower density (≈ 75 percent theoretical) material.

c. Molten Salt Studies

Experiments were performed to determine what salt composition would permit the most rapid dissolution of plutonium dioxide.

Lithium-potassium chlorides and lithium-sodium chlorides were tested in various ratios and with cesium chloride at 900 C. In all cases the salt was sparged for 30 minutes with Cl_2 or HCl . Crucibles of graphite or MgO were used. Use of the chlorine sparge resulted in greater dissolution of the added oxide.

According to the data, PuO_2 dissolves faster in the melts with the larger chloride ion activity. This would be so if Pu ions in solution are part of a complex ion involving Cl^- ions.

d. Recovery Of Plutonium From Chloride Residues

A process was developed for converting plutonium oxide contaminated with various levels of plutonium chloride to a chloride-free oxide.

Plutonium oxide - plutonium chloride powder mixtures were washed in 200 g batches (Pu weight) with 250 ml portions of 1 M HNO_3 for 30 minutes. Washes were repeated with fresh acid two or three times. The oxide was filtered on a medium glass fritted filter after each wash. The wash solutions ranged from 94.4 g/l to 0.5 g/l Pu. Plutonium in the wash solutions was then precipitated with 1 M oxalic acid. The oxalate cake was then combined with the washed oxide and calcined at 350 C for two and one-half hours. The oxide product ranged from 83 - 86 percent Pu and had a chloride content non-detectable to 0.5 w/o.

e. Plutonium Compound Density Measurements

The densities of plutonium dioxide and of plutonium tetrafluoride were measured for use in a hazards analysis.

Line oxide (calcined from plutonium oxalate) was used to give the density of oxide ordinarily encountered. Oxide produced from the direct calcination of plutonium nitrate was used to represent oxide formed when a nitrate system (i.e., a dissolver or concentrator) is boiled dry. The fluoride used was line fluoride. Bulk, packed, and actual particle densities of these compounds were determined. The bulk density would represent the density of the powder if it were allowed to settle to the bottom of a vessel. The packed density represents the density of the powder if it were centrifuged to the bottom of the vessel. The actual density rep-

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resents the measured particle density. The data appear below.

DENSITY OF PLUTONIUM COMPOUNDS

<u>Source</u>	<u>Bulk Density g/cc</u>	<u>Packed Density g/cc</u>	<u>Actual Density g/cc</u>
PuO ₂ (Line)	0.70	0.92	4.7
PuO ₂ (direct calcined)	1.48	1.58	9.4
PuF ₄	1.38	1.86	6.4

H. S. Frank

Manager
Research and Engineering

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

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JANUARY, 1963

II. ACHIEVEMENTS (Continued)

H. FINANCIAL OPERATION

1. Production Cost

Preliminary FY 1964-65 manpower and overtime budget estimates were developed this month. As expected, increases are reflected in Weapons, Fission Products, and Waste Management programs related to planned expansion in these areas.

The following studies were completed in January:

- (1) A simplified code book for the specific use of Research and Engineering Operation personnel.
- (2) Phase Two of the study, "Cost of Nuclear Weapons Production at HAPO" was issued locally and to AL00.

Special requests handled during the month included billings to UCRL and Carborundum for estimated costs of Pu scrap recovery, and to Euratom Supply Agency-Belgium for added sampling work on a previous order.

CPD's investment in inventories at December 31, 1962 compared with budgeted amounts is as follows:

(in thousands)	<u>Balance</u> <u>12-31-62</u>	<u>Control</u> <u>Allocation</u>	<u>Surplus</u> <u>(Deficit)</u>
<u>Inventories</u>			
Essential Materials	\$ 773	\$ 825	\$ 52
Spare Parts & Standby	1 738	1 600	(138)
Special Materials	<u>99</u>	<u>103</u>	<u>4</u>
Gross Inventories	<u>2 610</u>	<u>2 528</u>	<u>(82)</u>
<u>Reserves</u>			
Essential Materials	61	53	3
Spare Parts & Standby	<u>603</u>	<u>481</u>	<u>122</u>
Total Reserves	<u>664</u>	<u>539</u>	<u>125</u>
<u>Net Investment</u>	<u>\$1 946</u>	<u>\$1 989</u>	<u>\$ 43</u>

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2. Financial Analysis

Capital and operating cost estimates were prepared at the request of RL00-AEC for handling, storage, and disbursing functions involved in determining the chemical form of plutonium buy-back.

3. General Accounting*

As of December 31, 1962, twenty-one active projects had incurred costs of \$9,768,616 against authorized funds of \$12,234,200. Outstanding commitments totaled \$479,523.

During January, Directive No. AEC-195, Modification No. 2 was received from the AEC extending completion date to April 30, 1963 on project CAC-928, Leak Detection - High Level Waste Tanks - 241-A and 241-SX.

Construction Completion and Cost Closing Statements were issued on the following projects:

<u>Project No.</u>	<u>Project Title</u>	<u>Total Cost</u>
CGC-811	Additional Plutonium Fabrication Facilities - 234-5 Building	\$3 855 911
CGC-821	Purex Palm Facilities	1 574 963
CGC-895	Reliability Improvements - Purex	542 322
CGC-913	Project Birch - Redox	310 444
CGC-953	Personnel Protection - Storage Hood Shielding - 234-5 Building	36 682

During January, appropriation requests were approved, authorizing a total expenditure of \$156,000, as follows:

<u>AR Number</u>	<u>Description</u>	<u>Section</u>	<u>Amount</u>
36030	Thread Grinder (03)	P&GM	\$15 000
36031	Universal and Tool Grinding Equipment (03)	P&GM	21 300
36032	Auxiliary Equipment "Z" Plant (Poppies, Sealers, Waste Containers)	WMO	65 000
36033	Finishing Hood	WMO	49 200
36034	Optical Measurements Instruments	FEO	5 500

* Funding approvals only. May differ from costs stated in other sections of this report which include non-fund equipment transfers.

4. Personnel Accounting

Pension benefits resumes were completed this month for 5 employees and discussions held.

Patent award data were developed in connection with awards to two employees, applicable withholding tax calculated, and the data reviewed with the employees.

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[REDACTED] **DECLASSIFIED**5. Auditing

In collaboration with the Managers - Production Cost and General Accounting, rearrangement of nonexempt job duties was made permitting the reduction of one Financial employee. The rearrangement also strengthens internal controls relating to cash working funds by greater segregation of duties.

Follow-up of previous Traveling Audit memorandum was made with each subsection involved.

A special investigation of one employee's absence record was made at the request of Manager - Employee Relations. Memo covering findings was issued.

An audit memorandum was directed to section managers listing certain equipment held for future service for the "T" plant.

JE McDonald
for Manager - Finance

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JANUARY, 1963

III. PERSONNEL ACTIVITIES

A. FORCE SUMMARY

<u>Operation</u>	<u>Monthly Salaried</u>		<u>Weekly Salaried</u>		<u>Total</u>	
	<u>12-31-62</u>	<u>1-31-63</u>	<u>12-31-62</u>	<u>1-31-63</u>	<u>12-31-62</u>	<u>1-31-63</u>
General Manager's Group	11	11	2	2	13	13
Financial	13	13	15	14	28	27
Research & Engineering	64	65	29	29	93	94
Facilities Engineering	61	62	22	22	83	84
Power & General Maintenance	36	37	241	240	277	277
Production	6	6	4	4	10	10
Redox	57	57	236	240	293	297
Purex	63	64	247	255	310	319
Weapons Manufacturing	<u>49</u>	<u>49</u>	<u>223</u>	<u>222</u>	<u>272</u>	<u>271</u>
Total	<u>360</u>	<u>364</u>	<u>1 019</u>	<u>1 028</u>	<u>1 379</u>	<u>1 392</u>

B. PERSONNEL CHANGES

L. L. Zahn, Manager-Extraction Process Design Engineering, was appointed Manager-Facilities Planning, Facilities Engineering Operation.

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C. TRIPS

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To Other G.E. Components</u>		
H. E. York	Metallurgical Products Dept. Detroit, Michigan	Brazing characteristics of experimental grades of carbide. (1/10/63)
W. E. Kaufer	General Electric Schenectady, N. Y.	Industrial Engineering Conference. (1/24-25/63)
M. J. Smith	Philadelphia, Penn. Crotonville, N. Y.	Accounting methods. (1/28-29/63) Management information systems. (1/30-31/63)
C. E. King	Cincinnati, Ohio	Tape controlled machining. (2/1/63)
G. V. Becker	Pleasanton, California	Gas chromatography. (1/28/63)
<u>To AEC and Other AEC Contractors</u>		
H. W. Crocker F. D. Fisher R. S. Kingsley	The Dow Chemical Co. Rocky Flats Plant Denver, Colorado	Plutonium recovery. (1/7-8/63)
W. J. Gartin	US - AEC Albuquerque, N. M.	Program review. (1/16-17/63)
J. H. Warren	US - AEC Washington, D.C.	Fission products. (1/21-22/63)
L. L. McGregor	Sandia Corporation Livermore, California Lawrence Radiation Lab. Livermore, California	To attend IMOG gage subgroup meeting. (1/23/63) To discuss gaging techniques and specification interpretations and tour IRL facilities. (1/24/63)

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C. TRIPS (Continued)

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To AEC and Other AEC Contractors (Continued)</u>		
D. McDonald	US - AEC Albuquerque, N. M.	Nuclear schedule. (1/28-31/63)
<u>To General Industry</u>		
H. E. York	Carbide Products Co. Georgetown, Kentucky	As advisor to AEC Purchasing. (1/8/63)
	Modco Tool Co. Detroit, Michigan	As advisor to AEC Purchasing. (1/9/63)
<u>To Conventions and General Meetings</u>		
P. H. Reinker	Clearwater, Florida	Management conferences. (1/1-4/63)
W. E. Kaufer C. E. King	Chicago, Illinois	Plant Engineering and Maintenance Conference. (1/28-30/63)
<u>To Universities and Colleges</u>		
R. J. Sorenson G. V. Becker	University of Calif. Los Angeles, Calif.	Fundamental Principles of Gas Chromatography. (1/28-2/1/63)

D. VISITORS

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From Other G.E. Components</u>		
J. Keeler	Lamp Metals & Components Cleveland, Ohio	Tungsten vessels. (1/15/63)
J. E. Larsen Leroy Foley	Manufacturing Services Schenectady, N. Y.	Numerical Input System. (1/22/63)
<u>From AEC and Other AEC Operational Contractors</u>		
F. D. Singleton	E. I. duPont Wilmington, Delaware	Remote canyon crane maintenance. (1/21/63)
W. Lenneman	US - AEC Division of Production Washington, D.C.	Waste management, fission product recovery, and pu rework. (1/30-31/63)

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D. VISITORS (Continued)

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From AEC and Other AEC Operational Contractors</u> (Continued)		
W. K. Eister	Division of Isotope Dev. Washington, D.C.	Waste management and fission product recovery. (1/31/63)
<u>From General Industry</u>		
Robert Dewey	Bremerton Naval Yards Bremerton, Washington	Pipe bending operation. (1/11/63)
John Dickinson	Linde Co. Seattle, Washington	Sigma welder training. (1/17/63)
Harry A. Park	Benjamin Moore Paint Co. Spokane, Washington	Protective coatings. (1/17/63)
Earnest H. Holm	Surface Engrg. Co. Wichita, Kansas	Protective coatings. (1/23/63)
W. J. Vasil	Perine Machine Co. Seattle, Washington	Machine tools. (1/29/63)
<u>From Other Government Agencies</u>		
R. E. O'Hare G. M. Williams N. Korniloff	Washington, D. C.	Purex process and radio- iodine control. (1/30/63)

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JANUARY, 1963

IV. SAFETY AND SECURITY

<u>Operation</u>	<u>FEO</u>	<u>Finance</u>	<u>WMO</u>	<u>P&GM</u>	<u>Purex</u>	<u>Redox</u>	<u>Prod.</u>	<u>Rel. Proc.</u>	<u>R&E</u>	<u>Total CPD</u>	<u>YTD</u>
Dis. Injuries											0
Ser. Accidents											0
Med. Treat. Inj.	1		9	12	12	3				37	37
Rad. Occur.			7		4	2				13	13
Contam. Wd.			4							4	4
Pu Dep.			4*							4	4
Fires											0
Sec. Viol.	1				1				1	3	3

* These were confirmations of cases which occurred in November, 1962, (3) and January, 1963. Three were caused by inhalation, one by injection, all were less than 10% MPBB.

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

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VI. PATENT SUMMARY

All persons engaged in work that might reasonably be expected to result in inventions or discoveries advise that, to the best of their knowledge and belief, no inventions or discoveries were made in the course of their work during the period covered by this report, except as listed below. Such persons further advise that, for the period therein covered by this report, notebook records, if any, kept in the course of their work have been examined for possible inventions or discoveries.

INVENTOR

TITLE

P. H. Linker

General Manager
Chemical Processing Department

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END

**DATE
FILMED**

5/03/93