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88281

MARCH, 1964

HW--81620

Compiled By
OPERATION MANAGERS

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April 21, 1964

HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTONWork performed under Contract No. AT(45-1)-1350 between
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STAFF

General Manager, Atomic Products Division	J. F. Young
General Manager, Hanford Atomic Products Operation	W. E. Johnson
General Manager, Chemical Processing Department	P. H. Reinker
Manager, Production	J. H. Warren
Manager, Purex	W. M. Harty
Manager, Redox	M. K. Harmon
Manager, Weapons Manufacturing	W. J. Gartin
Manager, Finance	K. G. Grimm
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Manager, Employee Relations (Acting)	J. H. Warren

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

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I. SUMMARY

Production through March, as compared with the HAP0 Production Forecast (HW-80544), is summarized below:

	<u>March</u>	<u>Fiscal Year</u> <u>To Date</u>
Separated plutonium nitrate	97*	98
Separated uranium nitrate	120*	99
Uranium oxide	93	99
Plutonium metal buttons	100	102
Fabricated parts	90	93

*The variation resulted from a decision to defer the processing of unclassified metal, which contains a higher plutonium concentration than normal metal, from March to April.

March production, in comparison to forecasted quantities, was satisfactory for all products except uranium oxide and fabricated parts. Uranium oxide output was influenced by a temporary feed shortage; the production of fabricated parts fell slightly below forecast because of gaging problems and metal working difficulties with the 74-C Model.

Purex operation was continuous during March except for two brief outages caused by pump failures. Both the plutonium and uranium products met specifications.

A batch of partially sugar-denitrated high level waste, rich in plutonium and uranium, was blended with virgin dissolver solution and successfully reprocessed through the Purex solvent extraction system without any adverse effects. The solvent extraction columns have been used occasionally in the past to rework wastes, however, this was the first attempt to reprocess wastes previously treated with sugar.

Sluice-mix testing, to dissolve and remove salts from the waste sludge, was started in the 103-A Purex underground waste storage tank. With tank 102-A being used for water supply and receiver for dissolved salts, water is pumped from this tank at high pressure through a sluice nozzle into the 103-A tank. The system has operated satisfactorily except for some pump difficulties in returning the solution from 103-A to 102-A.

The HAPO I-B-2 Cask, containing 500,000 curies of cerium-144, was released for shipment on March 2. The HAPO I-B-1 Cask was loaded with 410,000 curies of strontium-90 and released for shipment on March 23.

After the first week in March, Redox E-metal processing was suspended for the remainder of the month to recover the neptunium inventory, make a nitric acid flush of equipment, and dissolve PRTR fuel elements scheduled for processing during April.

HAPO's largest single neptunium recovery campaign was completed at Redox during March, yielding approximately 3.2 Kg.

Chemical runs were started in the new Plutonium Reclamation facility on March 16, 1964.

A study was made and documented (HW-81240) on the corrosion of plutonium metal when stored in containers having plastic components. Two of the conclusions were: 1) pyrophoric hydrides of plutonium are formed, and 2) the nature of the reaction prevents formation of a protective film on the metal.

A start-up flowsheet was developed for the recovery of americium from the plutonium recovery waste stream.

for J. H. Warren
General Manager
Chemical Processing Department

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CHEMICAL PROCESSING DEPARTMENT
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MARCH 1964

II. ACHIEVEMENTS

A. PRODUCTION OPERATION

1. Production Statistics

a. <u>Percent of Forecast(1) Achieved</u>	<u>March</u>	<u>Fiscal Year to Date</u>
Separated plutonium nitrate	97 *	98
Separated uranium nitrate	120 *	99
Uranium oxide	93	99
Plutonium metal buttons	100	102
Fabricated parts	90	93
b. <u>Purex</u>	<u>March</u>	<u>February</u>
Uranium nitrate produced (tons)	805	3
Average production rate during operation (T/D)	28	25
Total waste loss (%)		
Plutonium	0.33	No
Uranium	0.26	production
On-line efficiency (%)	95	12
c. <u>Redox</u>		
Uranium nitrate production (tons)	29	180
Average production rate during operation (T/D)	9	8
Total waste loss (%)		
Plutonium	1.4	0.26
Uranium	0.60	0.22
On-line efficiency (%)	13	79
d. <u>Uranium Reduction (tons)</u>		
Normal UO ₃ loaded	550	0
Enriched UO ₃ loaded	176	157
Normal UO ₃ approved for shipment	450	101
Enriched UO ₃ approved for shipment	202	151
Normal UO ₃ shipped	450	101
Enriched UO ₃ shipped	152	151
Normal UNH backlog	274	19
Enriched UNH backlog	62	209

(1) HW-80544, HAPO PRODUCTION FORECAST.

*The variation resulted from a decision to defer the processing of unclassified metal, which contains a higher plutonium concentration than normal metal, from March to April.

e. Plutonium Metal Processing

	<u>March</u>	<u>February</u>
Reduction yield (%)	97	98
Product recovery output (Kgs)	87	81
Product recovery backlog (Kgs)	1,259	1,285
Waste disposal (grams)	1,198	432

f. Power

	<u>200-East</u>	<u>200-West</u>
Raw water pumped (gpm)	10,070	4,929
Filtered water pumped (gpm)	1,200	1,233
Maximum steam generated (lbs./hr.)	268,000	146,000
Average steam generated (lbs./hr.)	221,000	103,000
Total steam generated (M lbs.)	164,861	76,970
Coal consumed (tons)	8,498	4,101

March production, in comparison to forecasted quantities, was satisfactory for all products except uranium oxide and fabricated parts. Uranium oxide output was influenced by a temporary feed shortage; the production of fabricated parts fell slightly below forecast because of gaging problems and metal working difficulties with the 74-C Model.

E. E. Smith
for Manager, Production

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2. FISSION PRODUCT DATA

	<u>PUREX*</u> <u>RECOVERY</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)	56	580	950	-0-	2230	-0-	410	ORNL	HAPO I-B-1 3-23-64
Cs-137 (Kilocuries)									
Ce-144 (Kilocuries)							500	ORNL	HAPO I-B-2 3-2-64

* Estimated figures based on Cs. calculations.

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

B. PUREX OPERATION

1. Operating Continuity

Purex Plant processing was continuous during the month at a rate of 3.0 to 3.6 capacity factor except for one brief shutdown on March 4, 1964 to replace a failed H-1 (HAF) pump and another on March 15, 1964, when pump trouble interrupted the 2-AF flow temporarily.

Unclassified metal processing was started March 28, 1964.

One neptunium purification run was completed using Redox feed.

HAP0 Cask I-B-2, containing 500 Kc's of Cerium 144, was released for shipment on March 2, 1964.

HAP0 Cask I-B-1, containing 410 Kc's of Strontium 90, was released for shipment on March 23, 1964.

2. Processing Operation

Uranium and plutonium products met specifications.

Cross contamination in the final uranium cycle caused by a process jumper change required uranium rework of the contaminated batches.

The sluicing tests of Tank 103-A at 241-A Tank Farm have started. Pump rates of 500-530 gpm were obtained with the system.

Nine sulfate runs for fission product recovery were completed at the Head End of the Purex Plant.

3. Equipment Experience

a. Purex

The H-1 pump (co-decontamination column feed) failed after approximately three months' service and was replaced.

The G-3 centrifuge high pressure spray pump failed because of excessive cylinder leakage. After a complete overhaul the pump was returned to service.

Canyon vessel agitators E-3, F-15, and F-18 failed during March.

E-3 and F-18 had been in service approximately 15 months. This was the first failure for F-15 since plant startup. The cause of the failures is unknown. New agitators were installed.

b. B Plant

The B Plant exhaust stack steam engine failed. This unit was received from T Plant in February. The engine was repaired and returned to service.

The 6-1 replacement tank from U Plant has been installed. The failed tank was moved to T Plant to determine the cause of the leak in the coil and for possible rebuilding.

The G-12-2 centrifuge (failed in February) was removed and sent to T Plant for an investigation of the cause of failure. A spare centrifuge is being prepared for installation.

c. Strontium Semiworks

The P-5 process feed pump to the HA column failed and is being replaced with a spare.

d. Waste Management

The failed pump in the 106-A Tank was removed and buried.

A reel, hose and fog nozzle were installed in the Purex regulated shop (adjacent to N Cell) and administrative controls established to improve the fire fighting capability at N Cell where ion exchange resin is being used.

4. Radiation Experience

I¹³¹ emission was normal for activity conducted during the month.

Manager-Purex

WM Harty:FEE:gt

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II. ACHIEVEMENTS (Continued)

C. REDOX OPERATION

1. Operating Continuity

E-metal processing in the Redox plant was completed during the first week of the month, including the run-out of inventory and water flushing of the equipment. The balance of the month was used to: 1) recover the neptunium inventory which had been accumulating in the process; 2) make a scheduled nitric acid flush of the processing equipment to satisfy the periodic inventory and nuclear criticality control requirements; 3) begin dissolving the third batch of irradiated fuel elements from Hanford's experimental Plutonium Recycle Test Reactor in preparation for processing the PRTR fuel element feed during early April.

The Uranium Oxide plant production of enriched UO_3 exceeded that scheduled by about six percent. Depleted UO_3 production was below expectations due to a shortage of feed material.

2. Processing Operations

a. Redox Processing

The first week of the month was used to complete the processing of E-metal in-building inventory and flushing of equipment.

Recovery of the neptunium inventory which had been accumulating in the process was started on March 8, using the normal plutonium purification extraction cycles. However, the initial "final" product from solvent extraction, even after several hours of ozone treatment, was approximately five times higher in fission product content (Ru) than specifications. Additional ozonation treatment, using potassium persulfate as a "catalyst" for ruthenium oxidation, successfully reduced the fission product content to acceptable levels. Since DIBAN (di-basic aluminum nitrate) was used to neutralize the free acid in the neptunium solution prior to the addition of the persulfate, it was necessary to reprocess the neptunium through the extraction cycle to remove the sulfate and aluminum ions. While the final (total) neptunium recovery was the largest recovery in a single campaign to date (approximately 3.15 kg), the additional processing extended the campaign about one week beyond that expected.

A 57 percent nitric acid flush of the processing equipment in the 202-S canyon building and the 233-S plutonium concentration

building was completed during the last week of the month. The flush was made to satisfy the 90-day inventory and nuclear criticality control requirements as well as to isolate the PRTR production from the regular E-metal production. The total recovery from both buildings, excluding normal "heels" in the concentration equipment, was approximately 300 grams of plutonium, indicating no serious deposition problems in the plant equipment.

Concurrent with the neptunium recovery campaign and the 57 percent nitric acid flush, dissolving of the third batch of PRTR fuel elements was started. By month end, four canisters, containing 15 fuel elements, had been dissolved and stored for subsequent processing during April.

The canister dissolving waste from the third PRTR charge was found to contain approximately half the plutonium in the charge. This apparently resulted from accidental exposure of cut fuel rods to the canister dissolving solution. The canister solution has been segregated and the plutonium will be recovered during the PRTR campaign.

b. Uranium Oxide Processing

The production and shipment of enriched UO_3 was satisfactory for the month. However, normal UO_3 production was below expectations due to a shortage of feed material.

The H calciner operation reverted to depleted uranium processing in order to achieve maximum depleted uranium production prior to April 16. On this date it is planned to shut down for the installation of required drum loading facilities.

3. Mechanical Experience

Redox Plant

Both the F-7 metal solution feed pump and the D-14 backcycle pump failed during the concentrated nitric acid flush and were replaced with repaired units.

4. Waste Handling and Decontamination

Equipment valued at approximately \$34,000 was received from customers for decontamination, repair, inspection, or burial during the month. Equipment valued at approximately \$63,000 was returned to customers, representing a savings of approximately \$23,500 based on the cost of new equipment.

5. Radiation Experience

On 3-9-64, low level radioactivity was found in the course of routine survey of the laterals under the 107-SX waste storage tank. The band of contamination is a five-foot-long section of one lateral, approximately 15 feet toward the center from the edge of the tank. Surveys

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of the remaining two laterals and the vertical dry wells around the tank have revealed no other contaminated areas.

6. Analytical Experience

The Redox Analytical Laboratory provided: 1) Special uranium, neptunium, americium and fission product analyses to assist the Weapons Manufacturing Operation in developing an americium recovery flowsheet; 2) X-ray emission spectrometric analyses for chemical "70-58" to provide the Separations Chemistry Laboratory with data to evaluate a new method; 3) thorium and uranium analyses to provide the Materials and Process Chemistry Laboratory, HL, with information to help them develop the optimum conditions for decladding and dissolving PRTR fuels.

Improvements within the Laboratory included: 1) ability to provide faster service and cleaner separation of contaminants from process feed solutions that are prepared for mass isotopic analysis; 2) development of a new ammonia procedure for essential material sulfuric acid; 3) removal of methanol interferences in the chloride method used for NRD water samples.

Manager - Redox

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II. ACHIEVEMENTS (Continued)

D. WEAPONS MANUFACTURING OPERATION

1. Operating Continuity

The fabrication of Model 1807 proceeded without significant interruption during the month. The production of Model 74-C was curtailed by gauging problems early in the month and by metal working difficulties later. The production of unfabricated plutonium was normal, as was plutonium scrap dissolving and incinerator operation.

2. Processing Operations

a. Plutonium Fabrication

Information on fabrication activities is presented in Document HW-81726 (Atomic Weapon Data).

b. Plutonium Reduction

The schedule for unfabricated plutonium production was relatively low. Purity continued its steady improvement and all of the metal produced this month met weapons grade specifications.

c. Plutonium Reclamation

The plutonium scrap dissolvers operated to provide the maximum amount of solution which was permissible to blend with current feed for the button line.

A record number of boxes (86) of combustible scrap was processed through the incinerator facility during the month in spite of numerous mechanical problems. The burning of plastics has been discontinued in order to reduce the amount of free carbon added to the burner system and also to reduce the accumulation of chlorides in the scrubber. This change adds to the leaching load and to personnel exposure but is considered necessary at this time to insure better continuity of operation.

In the new reclamation facility (Project CAC-880), "cold" chemical runs were initiated during the month. Progress of testing was good. Inadequacies related to the following are in the process of correction at month end:

c. Plutonium Reclamation (Continued)

1. Hydraulic flow conditions in the extraction columns and to and from the organic treatment columns.
2. Charging of the dissolvers.
3. Heat buildup in recirculated solutions.
4. Deterioration of polyvinyl chloride pipe resulting from contact with warm TBP-CCl₄ mixture.

3. Mechanical Performance

Equipment performance in the fabrication and final inspection areas was excellent.

Plutonium reduction equipment (button line) performance was satisfactory with some feed flowmeter problems experienced near month end.

Considerable maintenance effort was expended on the incinerator equipment. During the course of repairs several replacements and modifications were made to increase reliability and, at the same time, make the equipment easier to maintain.

With the advent of "cold" chemical runs in the new reclamation facility, a craft support force was formed and assigned to shift work. Instrument, millwright and pipefitter crafts are represented in the new crews.

4. Radiation Experience

Radiation and contamination control statistics revealed satisfactory performance in this area.

Three cases of potential plutonium deposition occurred from (1) the collapse of a waste box, (2) improper use of an open-face laboratory hood, and (3) a puncture wound incurred during work in a process hood. Results are pending but it is unlikely that there will be any significant deposition in any of these three cases.

5. Analytical Experience

Number of Samples Received	2,915
Number of Determinations	25,319

The number of determinations (analyses) represents a new record which is 1,506 greater than that established in October of last year. The increase resulted largely from analytical support given to assist in the resolution of a problem in the fabrication process.

L. J. Buda
for Manager
Weapons Manufacturing

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II. ACHIEVEMENTS (Continued)

E. FINANCIAL OPERATION

1. Production Cost Accounting

Production cost estimates, by program and research and development, and process technology costs, by end function, were recently developed for FY 1964 and submitted to Contract Accounting for consolidation.

Analysis was made of weapons fabrication costs, model 1807, and pertinent data forwarded to Livermore, as requested.

As part of a special burial grounds study requested by AEC, CPD costs of dry waste handling for the first six months FY 1964 were compiled for transmittal to AEC.

Special requests and backcharge activities included the shipment of 5 Kg's of Pu metal to Battelle Memorial Institute, 0.2 grams of neptunium nitrate to Savannah River Works and 4 Kg's Pu metal to NUMEC.

11,421 grams of plutonium scrap were received from offsite for processing.

CPD's investment in inventories at February 29, 1964, compared with budgeted amounts, is as follows:

(in thousands)	<u>Balance</u> <u>2-29-64</u>	<u>Control</u> <u>Allocation</u>	<u>Surplus</u> <u>(Deficit)</u>
<u>Inventories</u>			
Essential Materials	\$ 768	\$ 833	\$ 65
Spare Parts & Standby	1 496	1 615	119
Special Materials	117	103	(14)
Yttrium	153	150	(3)
Gross Inventories	<u>2 534</u>	<u>2 701</u>	<u>167</u>
<u>Reserves</u>			
Essential Materials	49	59	(10)
Spare Parts & Standby	448	404	44
Yttrium	153	150	3
Total Reserves	<u>650</u>	<u>613</u>	<u>37</u>
<u>Net Investment</u>	<u>\$1 884</u>	<u>\$2 088</u>	<u>\$204</u>

2. General Accounting

As of February 29, 1964, seventeen active projects had incurred costs of \$2,678,126 against authorized funds of \$3,973,800. Outstanding commitments totaled \$252,103.

During March, one directive was received from the AEC: Directive No. HW-554, Project CCG-134 - UO3 Storage Facilities, authorized in the amount of \$48,000.

During the month five appropriation requests were received, but due to shortage of equipment funds none was authorized.

Manager - Finance

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (continued)

F. FACILITIES ENGINEERING OPERATION

1. Purex

a. Process Design Engineering

E-6 Neutron Monitor

Design was completed for the prototype neutron monitor to be used in the E-6 Tank position. The monitoring system consists of a monitoring pig, one (1) probe jumper, and one (1) multi-head jumper. The monitoring pig is designed so that it will accept two (2) BF_3 photomultiplier tubes - 1-3/4 inch in diameter by 26 inches long. The larger tubes provide a gain in sensitivity of approximately 2.5. Gamma shielding and neutron moderation are provided in the pig by three (3) inches of lead surrounded by 4-1/2 inches of linear polyethylene.

In addition to greater sensitivity, it is hoped that placing of a BF_3 tube in each of the jumpers will make the monitoring system more flexible. Also, recent improvements in canyon instrumentation may make possible the location of pre-amplifiers on the cold side.

Increased Processing Flexibility - Purex

Design criteria, Phase I, has been approved by both the Atomic Energy Commission and the Chemical Processing Department. Advance copies of the criteria have been transmitted to Vitro Engineering to expedite detail design work. Phase II work has been completed and the design criteria written in rough draft form.

"Q" Cell Resin Level Detector

Design of the new ultrasonic device has been completed, and fabrication started. Re-design of the transducer mount may be required if installation tests on the new instrument are not satisfactory. It is suspected that a layer of air bubbles at the transducer-solution interface has been degrading the performance of the existing system. Any effect on the new instrument must be determined.

Purex Dissolver Tower

Material to fabricate a spare dissolver tower for Purex was placed on requisition. The spare dissolver will be fabricated in the 200 Area Shops and will be designed from BPF drawings modified to remove the flanged section of the tower. A process review is underway to determine if extensive other modifications are justified.

b. Project Engineering

None

c. Manufacturing EngineeringPurex Concentrators

The cleaned original H-4 Titanium Tube Bundle was re-installed in the H-4 Concentrator on February 20. On February 27, the left hand stainless steel tube bundle was replaced with another stainless steel tube bundle because of apparent plugging of the stainless steel bundle. On the second start-up, the titanium bundle was apparently plugged until the stainless bundle was placed on line, at which time both bundles unplugged suddenly and have been operating essentially normally since that time. Both the stainless and titanium bundles have exhibited an apparent over-all heat transfer coefficient of 350-400 BTU/(hr-ft²-°F.).

On February 20, a second previously unused titanium bundle was transferred from E-H4 to E-F6. At installation, the titanium bundle was operating with an over-all heat transfer coefficient of 300-380 BTU/(hr-ft²-°F.). By the first of March the over-all coefficient of the titanium bundle had dropped to 200 BTU/(hr-ft²-°F.). The F-6 bundles have operated during March with apparent over-all coefficients of 175-210 BTU/(hr-ft²-°F.) for the titanium and 210-250 BTU/(hr-ft²-°F.) for the stainless. The reasons for these reductions are being investigated.

2. Redoxa. Process Design EngineeringProcess Jumpers

Seven (7) jumper designs were completed and drawings issued - five (5) were for process re-routing and two (2) for temporary vent line re-route.

UO₃ Powder Sampler

A new design was developed for a powder sampler to be used

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at 224-UA Building. Drawings were prepared and the shop has fabricated the unit. The device has one (1) moving part, a flapper which covers and uncovers the mouth of the sampling tube.

E-2 Ozonator Tower

New tower drawings were prepared to up-date and revise materials, specifications, and fabrication details.

Cooling Coil Replacement

Design has been completed on a revised cooling coil replacement for F-1 and F-4 Vessels.

Remote Gaskets

A new drawing was issued for a stainless steel-sheathed gasket for tube bundle service. The current asbestos-re-inforced teflon gaskets have limited life in this service.

b. Project Engineering

CGC-929 - Rev. No. 1 - NPR Fuels Processing Facilities - 200-W

This project proposal revision, requesting authorization to complete facilities required to process "N" Reactor Fuels in Redox and to segregate uranium containing various enrichment levels in the UO_3 Plant, was transmitted to the Commission on March 3.

3. Weapons Manufacturing

a. Process Design Engineering

Plutonium Reclamation Facility

Cold runs on process equipment were continued throughout the month to overcome problems with the slag and crucible dissolver and other equipment. Detail design was completed on equipment and services for Glove Box No. 2 (dissolvers) in the Miscellaneous Treatment Room; and detail design was essentially completed for revisions to Glove Box No. 3 (ash and metal dissolution) in the same room.

Gorton Lathes

The engineering study made to define needed improvements to existing Gorton Lathe hydraulics has resulted in preparation of a schematic-type installation drawing, and purchase specifications for the required new pump, filters, heat exchanger, etc. The hardware is on order for one (1) lathe with probable installation in May.

Ingotting Furnace Mixing Device

Design has been started on a rotary-type mixer or agitator for the ingotting furnace in HC-26. The mixer is to assist the separation of impurities from molten plutonium.

Plutonium Storage Facility

A budget facility description is being prepared for the necessary facilities in the 234-5 Building for receiving, storage, and disbursement of power-reactor-grade plutonium. The new facilities will consist of a shielded glove box in Room No. 166 and 100 new storage containers. The estimated cost is \$100,000.

Existing Button Line

Fabrication of the newly-designed vacuum drum filter is being delayed because of excellent performance of the existing vacuum drum filter. In connection with start-up of the fluorinator hood (HC-9B), several lesser pieces of equipment are being evaluated. Current drawings are being published in a master list for RMA Button Line, and obsolete drawings voided from the active files.

New Button Line

A budget facility description of new button line equipment was made during the month and will be formally issued in early April. This document will serve as a basis for preparation of FY-1966 Equipment and Construction Budget. The new button line equipment would consist of replacing H-9, Hood 9, and Hood 7 on the RMC Button Line. Direct calcination of plutonium nitrate would be coupled with a hydrofluorination process. The estimated cost for the new equipment provided from FY-1966 funds is \$445,000. Four (4) drawings were completed as a part of this engineering study.

b. Project Engineering

CAC-104 - Rev. No. 1 - Recoverable Plutonium Partitioning Facilities-236-Z Building

This project proposal revision, superseding the original, was transmitted to the Commission on March 3. It requests total authorization to provide a solvent extraction system in the 236-Z Building for partitioning recoverable plutonium from other actinides.

c. Manufacturing Engineering

Cost Study

A study has been initiated to determine incremental costs,

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material costs, and cycle times in the casting process of Weapons Processing. Results will be used by CPD Financial to establish standard costs for the Fabrication Operation.

4. General

a. Process Design Engineering

Two-hose Plastic Suit Development

The two-hose plastic suit first used in the Redox fire clean-up, has been further refined to permit increased comfort and maneuverability. The suit is complete with radio transceiver and vortex cooling. Flexibility of operation at temperatures within the suit ranging from 70°F down to 48°F has been demonstrated. Breathing air and cooling air is supplied to the suit through separate hose lines.

Phase II - "B" Plant Packaging Prototype Work

The project proposal requesting \$80,000 additional funds for the prototype equipment has been approved by the Company and transmitted to the Commission. Re-bids were requested for the manipulator and material handler, with bids to be submitted by April 14. The airlock was ordered from Process Equipment Company for delivery by June 23. Alternate arrangements for temperature and pressure monitoring are being reviewed.

b. Project Engineering

Project Cost Information-as of 3/15/64:

Total Authorized Funds - 18 active projects	\$ 4 061 000
Total Cost-to-date	2 722 000
Commitments and Open Work Releases	278 000
Unencumbered Balance	1 061 000
Costs Charged to Above Projects - 2/16 to 3/15/64	102 000

CAC-111 - Remote Liquid Level Gaging System - 200 Areas

This project proposal was returned unapproved by RLOO on March 18.

CGC-132 - Prototype and Mock-up - Waste Management Packaging Equipment

This project proposal, requesting authorization in the amount of \$290,000, to procure, mock-up, and test production-scale waste packaging equipment, was transmitted to the Commission on March 5. This work was previously authorized under Letter of Intent No. 18; however, the cost estimate was increased fol-

Following completion of detail design or receipt of firm vendor quotations on each item of equipment to the extent requiring project proposal and directive approval.

CGC-134 - UO₃ Storage Facilities

The project proposal, requiring \$40,000 for UO₃ powder drum loading and storage facilities, was transmitted to the Commission on March 17 and was authorized by Directive No. HW-554, dated March 23.

5. Shops Operation

The Shops Operation furnished craft and equipment services as required by the operating facilities. Major work completions in the various shops were:

a. Boiler Shop

Completed, for other installations or storage in Spare Parts, the Redox D-14 Cooler Insert, the Comparator Hood for 234-5 Building, and the Decontamination Hood for Redox Sample Gallery.

b. Sheetmetal Shop

Completed the Purex HS Column Cartridge, repaired twelve (12) sections of ducts and ventilators in the 233-S Building, and started extensive repair and modification in Strontium Semi-works.

c. Motor Re-wind Shop

Completed two (2) small motors and two (2) large stators for the Irradiation Processing Department, re-wound one (1) motor for 234-5 Building, and assembled and tested one (1) motor for Purex.

d. Tool and Die Shop

Completed the compound-staging comparator for 234-5 Building, the prototype UO₃ Powder Sample Assemble for 224-U Building, and the "cookie-slicer" for cutting tensile specimens in the 234-5 Building.

e. Jumper Shop

Fabricated and tested thirty-three (33) jumpers during the month.

f. Rotating Equipment Shop

Completed the burial capsule for the Purex 106-A Pump, prepared six (6) replacement pumps, and two (2) agitators.

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6. Power & Services

There were no interruptions of steam or electrical service that affected continuity of operating facilities.

The ventilation balance crew completed balancing to new design air flows and setting static pressures in the 236-Z Building. This crew also assisted the "N" Reactor Engineering group in conducting acceptance tests on the 105-N Reactor confinement. Final balancing of the 105 and 109-N Buildings is awaiting final installation of equipment and physical barriers.

The mechanical contractor is nearing completion of 200-West Area steam line renovation, and has started work in the 200-East Area.

Manager - Facilities Engineering

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

MARCH, 1964

II. ACHIEVEMENTS (Continued)

G. RESEARCH AND ENGINEERING OPERATION

1. Purex Process Engineering

a. Solvent Extraction

The new prototype mixed-plate fluorothene-stainless steel IC Column cartridge installed during the February plant shutdown was under evaluation during the month. Column operation was shown to be stable at a CF of 3.8 and a pulse frequency of 70 cycles per minute. Uranium waste losses were less than 0.003 percent with an aqueous to organic flow ratio of 0.85 and a column temperature of 65° C. Some aqueous entrainment from the IC Column to the solvent treatment system was noted. Whether this resulted from the new cartridge or a decrease in water quality could not as yet be determined.

Increased aqueous flow was required by the 2E Column uranium losses and laboratory tests with process water indicated the seasonal decrease in water quality was beginning. Permanganate treatment of the water at the water treatment plant was shown to be effective in maintaining satisfactory process water quality last year. Activation of the permanganate water treatment system was underway at month-end.

A batch of high level waste rich in uranium and plutonium was partially denitrated with sugar, blended with virgin dissolver solution and processed through the solvent extraction system. No adverse process effects were noted while processing the sugar treated waste.

b. Product Treatment

Platinum rupture disks were installed in the XA and XC plutonium ion exchange columns to prevent excessive pressurization of the columns. The disks are rated at 160 psig at a temperature of 72° F.

c. Solvent Treatment

A process test was made to determine if the amount of salt waste routed to underground storage could be reduced by altering the operation of the final solvent treatment contactor (G7 Turbo-mixer). A reduction in sodium hydroxide strength from 0.25M to

0.12M resulted in emulsion formation. Bypassing the turbomixer resulted in a two-fold increase in solvent zirconium-niobium content and a corresponding increase in the 2BP stream zirconium-niobium content.

d. Waste Treatment

The titanium tube bundle in the 3WB Backcycle Waste Concentrator continued to operate without evidence of fouling. Operation of a high level acid waste concentrator is not as uniform as the 3WB Backcycle Waste Concentrator and small changes in tube bundle efficiency are more difficult to evaluate. Some decrease in the titanium tube bundle capacity in the waste concentrator was indicated but normal process variations prevented firm conclusions.

Sluice-mixing tests have started in the Purex waste tanks 241-A-103 and 241-A-102. Water is pumped at high pressure and 500 GPM from TK-102-A through a sluice nozzle in TK-103-A. Sluicing is interrupted to allow TK-103-A suspended sludge to settle and the water returned to TK-102-A. The tanks being sluiced (TK-103-A) is operated at minimum liquid level while the other tank is operated nearly full. This provides rapid dilution of the dissolved salts from TK-103-A in TK-102-A and minimum solution layer interference between the sludge and high pressure sluice stream in TK-103-A. Operation of the system was satisfactory except for the return transfer of solution from TK-103-A to TK-102-A. Difficulty was experienced in priming this pump.

e. Fission Product Processing

Process testing of the peroxyacetate cerium rare-earth separation process at B-Plant was interrupted by failure of the centrifuge. In-place decontamination of the failed machine was underway most of the month.

During the last strontium purification run at the Strontium Semiworks, reduced column capacities, higher than normal strontium losses from both the HA and HC Columns and reduced calcium separation was attributed to degraded solvent. Hanford Laboratories studies with used solvent indicated solvent quality could be improved with a caustic tartrate wash followed by an acid wash. Efforts to duplicate the laboratory wash results by batch contacts in the Strontium Semiworks equipment were only partially successful. Use of common equipment for both alkaline and acid washes resulted in recontamination of washed solvent.

Additional solvent treatment in the solvent extraction columns appeared to be successful as indicated by preliminary fission product decontamination factors. Solvent was contacted in the HA Column with 1.4M sodium hydroxide-0.2M tartrate and in the HC Column with 2M nitric acid-0.1M oxalic acid. Column temperatures of 48° C and aqueous to organic flow ratios of 1.3 to 1 and 1 to 3 were used in the HA and HC Columns, respectively, with satisfactory operation. Lower temperatures or reduced aqueous to organic flow ratios in the HA Column resulted in unstable operation. Fission product and uranium decontamination factors from 100 to 500 were achieved. Washed solvent samples were sent to Hanford Laboratories for further evaluation.

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2. Redox Process Engineering

a. PRTR Processing

Two charges of PRTR fuels were dissolved during the report period. The processing steps are tabulated below.

<u>Operation</u>	<u>Solution Used for Dissolution</u>
Canister dissolution	4M NaNO ₃ -0.4M NaOH (initially) 19M NaOH (incrementally)
Zirconium cladding dissolution	4.0M NH ₃ F-0.34M NH ₃ NO ₃
Pu-Al alloy dissolution	1.0M HNO ₃ -0.003M HgNO ₃ (to initiate reaction) 13.0M HNO ₃ (added immediately after reaction began)

The hydrogen concentration in the dissolver off-gas stream was maintained below the control limit of three volume percent during the alloy dissolution step by limiting the amount of rod activated with 1.0M HNO₃-0.003M HgNO₃ solution. During previous PRTR runs, hydrogen concentrations slightly exceeded three percent but did not exceed the lower explosive limit of four percent.

b. Neptunium Processing

During the report period the neptunium inventory was processed through the normal plutonium purification extraction cycles. The extraction columns were operated on an acid flowsheet in order to maintain the neptunium in the extractable six valence. The decontamination across each solvent extraction cycle was an arithmetic two. Tail-end treatment without a catalyst resulted in no perceptible ruthenium decontamination. Ozonation treatment using a bismuthate catalyst resulted in a decontamination factor of ten, and ozonation treatment using potassium persulfate (at an acid concentration between 0.0M HNO₃ to 0.4M HNO₃) resulted in a decontamination factor of 20. Acid adjustments were made using dibasic aluminum nitrate.

3. Plutonium Process Engineering

a. Button Line

The rejuvenated hood HC-9B (plutonium oxalate precipitation, calcination, and fluorination) was placed in operation in mid-February and has operated well. The rejuvenation consisted of:

- (1) A new fluorinator assembly (Mark IV) with a new ball valve on the discharge end to replace the "banjo" valve.

- (2) A new calciner screw, insulation, drive shaft, blow-back off-gas filter, teflon off-gas line, and powder sampler.
- (3) New vacuum drum filter pan, agitator, and drive, new piping on the overflow line, and new pump on recirculation of filter overflow.
- (4) A new polyvinyl chloride reactor vessel for plutonium oxalate precipitation.
- (5) A new HF gas preheater external to the hood and a teflon HF off-gas filter case inside the hood.
- (6) New inlet air filters in the top of the hood.

4. Separations Chemistry Laboratory

a. Purex Process Improvement

Alternate Reductant

Studies were continued during the month to determine the suitability of sodium formaldehyde sulfoxalate as a plutonium reductant in the 2D Column. The half-life for a 1.0M solution in water at 25° C was determined to be around 300 days. This reduces to 6 days at 50° C but it can be extended by additions of caustic or hydrazine. There is some tendency for the sulfoxalate to react at low acidities producing colloidal sulfur. However, this is a slow reaction - it does not take place in basic solutions nor at acidities at or above 2.5M HNO₃, also in the presence of excess U or Pu sulfur formation is inhibited. No free sulfur could be anticipated under normal 2D Column conditions.

Water Quality

Laboratory investigations are underway to determine whether the usual spring runoff water will require special pretreatment before delivery to the Purex Plant. The initial test on 21 liters of raw water indicate the materials responsible for lowering extraction efficiency in 1962 are present. The permanganate pretreatment is being evaluated as a corrective measure for application during the spring season.

b. Redox Process Improvement

Elimination of Hexone Nitric Wash

Normal practice has been to remove the "nitroso compounds" from recycled hexone by washing with caustic followed by dilute nitric. Laboratory work has demonstrated that the residual caustic remaining in the hexone is negligible and that the nitric wash can be eliminated thus conserving materials and removing a potential hazard.

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Substitution of NH_4F for HF

Laboratory work has demonstrated the feasibility of substituting NH_4F for HF in the preparation of HNO_3 -HF flush solutions for the removal of silicious material in the Redox process vessels. This substitution achieves the results in a simplified and less hazardous manner.

c. Laboratory ImprovementAnalysis of Lead as Dithizonate

A lead analysis was developed for use with fission product recovery samples. Lead was separated on a Dowex-1 anion exchange resin column from a molar hydrochloric acid solution; then eluted with water. The purified lead fraction was adjusted to pH 9 and contacted with a dithizone chloroform solution. The resulting lead dithizonate was measured at 525 mμ over the range of 10 to 50 micrograms lead with a standard deviation of plus or minus 0.5 percent.

Simultaneous Mg, Ca, and Sr Determination

Magnesium calcium, and strontium were separated using zirconium molybdate ion exchange crystals. After preconditioning the crystals with 4M ammonium nitrate, the alkaline earths are quantitatively adsorbed; then sequentially eluted by increasing the ammonium nitrate concentration stepwise from 0.05M to 0.5M. Average recovery for individual elements was 96 percent. Concentrations as low as five micrograms were measured by EDTA titration.

Atomic Absorption

The photomultiplier tube has been replaced and the absorption unit is undergoing evaluation on cold solutions of 70-58. Sensitivities on cold solutions down to 2-3 ppm are being obtained. Working curves are not straight, however, and it appears that curvature is characteristic of some solutions in the regions being investigated.

Fluorimeter Study

Evaluation of the fluorimetric method for 70-58 was carried on during the month at 234-5 on a special series of samples prepared from a batch of niblets from the production line. Analysis of the data indicate no significant variance between analysts and probably no bias in the procedure. However, the variance of the fluorimetric method gave a standard deviation of plus or minus 4 percent which indicates that either some change in the method or a new procedure will be required if greater precision is to be realized.

Calcination and Thermobalance Studies

The plutonium thermobalance program associated with the continuous chlorination program has been terminated. The equipment will be revised for HF service and fluorination studies should be started by July 1.

The UNH lab calciner was repaired (bent agitator shaft) during the month and after minor revisions and rehabilitation a good batch of UO_3 beads has been produced. The thermobalance for reduction and fluorination studies on the prepared UO_3 is ready to operate except for prolonged difficulty in getting the HF supply line in service.

5. Plutonium Chemistry Laboratory

- a. Capacity and product quality are being determined for different auger speeds.

Four calcination runs were made with the calciner. Three of the four runs were made at an auger speed of 40 rpm to determine the maximum throughput capacity of the calciner. The calciner's production capacity is limited by the heat input of the furnaces, and the residence time at the desired calcination temperature. The first three calcination runs established the maximum throughput of the calciner at a control temperature of $400^\circ C$ and auger speed of 40 rpm to be 2.4 l/hr of liquid. This limit was established for a plutonium throughput of 525 grams of plutonium per hour at an SO_4/Pu ratio 0.25. The volatiles content of the oxide product was sufficiently high to cause difficulty in the chlorination test. The oxide product was 86 percent reactive, indicating that the quality limit of the calciner had been exceeded. A higher capacity and increased reactivity is expected at an auger speed of 20 rpm.

- b. Corrosion of Plutonium Metal when Stored in Containers Having Plastic Components

The following is excerpted from document HW-81240, Secret, Summary and Conclusions:

1. The formation of powder or "oxide" in the storage container is caused almost entirely by the packaging of the plutonium in plastic materials.
2. The corrosion of the plutonium follows degradation of the plastic due to the intense radiation to which the plastic is subjected.
3. The powder formed by this corrosion is not PuO_2 , but a mixture of oxides, hydrides, and chlorides in varying proportions, depending on the type and amount of plastic in the individual storage container.
4. The powder consists predominantly of hydrides. Hydrogen is considered the major cause of severe corrosion. The surface-disruptive nature of hydriding prevents formation of any protective film on the metal. Fresh surface is provided continuously for further attack.

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5. The hydrides are pyrophoric. Spontaneous ignition of the powder and metal occurs occasionally, immediately following opening of the container. This effect may be more severe for ingots than for buttons because of unreacted- or only partially-reacted metal fines in the powder from ingots.
6. Metal loss of eight percent in 100 days of storage has been observed for metal of moderate purity under the storage conditions described in this report. Corrosion rate depends on purity of the metal.
7. Corrosion rate increases exponentially with duration of storage. For a 2000 g ingot of moderate purity, the weight loss per month, as percentage of initial weight, is about 2.0 percent at the end of one month, 2.8 percent at the end of three months.
8. The corrosion rate for buttons is less than that for ingot metal of moderate purity by a factor of 18- to 90-fold. Calcium (or calcium fluoride) as an impurity in buttons may be an important corrosion inhibitor under the conditions of the storage container.
9. Packaging of plutonium metal in all-metal containers--free of all organic materials--should permit storage indefinitely with formation of not more than a gram or two of PuO_2 .

c. Ion Exchange Resin Stability

Work continued on determining the ignition temperature of anion exchange resin. The following conclusions can be drawn:

1. The chloride form of resin does not ignite spontaneously up to 270°C .
2. The nitrate form of resin, after being washed with distilled water, ignited at 200°C .
3. Washing with nitric acid lowered the ignition temperature; the stronger the acid, the lower the temperature.
4. Loading the resin with plutonium proved to be the most effective method of lowering the ignition temperature. The lowest ignition temperature measured for Pu-loaded resin was 138°C .
5. Dichromate loading was not as effective as plutonium in lowering the ignition temperature. A combination of plutonium-dichromate loading was no more effective than Pu alone in reducing the ignition temperature.
6. Drying the conditioned resin for several hours at $90 - 110^\circ \text{C}$ in air prior to heating appears to lower the ignition temperature quite markedly ($15 - 20^\circ \text{C}$) for both loaded and unloaded resin.
7. Resin samples heated in an argon atmosphere reacted in an identical manner to those heated in air. This shows that the oxygen required for reaction is supplied by the conditioned resin.

d. Americium Recovery Interim Startup Flow Sheet

A document with the above title, HW-81236, Unclassified, was issued. The Summary and Conclusions follow:

A flow sheet is described for the recovery of americium from the Reclamation Facility's aqueous solvent extraction waste stream (CWW). The flow sheet calls for:

1. Neutralization of the CWW to $0.30M$ HNO_3 with $19M$ $NaOH$.
2. Extraction of americium from the CWW with 30 v/o DBBP - 70 v/o CCl_4 using an L/V of 1.
3. Stripping americium from the organic with water using an L/V of 0.2.
4. Diluting the solvent extraction product from $\approx 0.8M$ HNO_3 to $0.3M$ HNO_3 (approximately $2\frac{1}{2}$ fold).
5. Loading americium from the diluted solvent extraction product on Dowex 50W-X8 cation exchange resin.
6. Washing excess acid from the column with $0.5M$ NH_4NO_3 .
7. Elution of the americium from the column with $2.3M$ $Al(NO_3)_3$.
8. Storage of the ANN-americium product.

A. S. Frank

Manager
Research and Engineering

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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>2-23-64</u>	<u>3-29-64</u>	<u>2-23-64</u>	<u>3-29-64</u>	<u>2-23-64</u>	<u>3-29-64</u>
General Manager's Group	8	8	2	2	10	10
Financial	15	15	19	19	34	34
Research & Engineering	68	67	29	29	97	96
Facilities Engineering	100	101	214	214	314	315
Production	7	7	4	4	11	11
Redox	65	66	229	237	294	303
Purex	71	71	261	261	332	332
Weapons Manufacturing	<u>60</u>	<u>61</u>	<u>261</u>	<u>262</u>	<u>321</u>	<u>323</u>
Total	<u>394</u>	<u>396</u>	<u>1019</u>	<u>1028</u>	<u>1413</u>	<u>1424</u>

B. PERSONNEL CHANGES

None

C. TRIPS

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To Other G.E. Components</u>		
Alex Smith	Schenectady, New York	Redox pump problems. (3/4/64)
<u>To AEC and Other AEC Contractors</u>		
M. H. Campbell	E. I. du Pont Savannah River Plant Aiken, South Carolina	Discuss neptunium analysis and shipper-receiver differences. (3/5/64)
R. B. Hershey G. C. Oberg G. E. Wilbur	Los Alamos Scientific Lab. Los Alamos, New Mexico	Attend Non-Destructive Testing Meeting. (3/10 - 12/64)
R. B. Hershey G. C. Oberg	Lawrence Radiation Lab. Livermore, California	Discuss gaging problems and product specifications. (3/13/64)
G. E. Wilbur	Albuquerque Oper. Office Albuquerque, New Mexico	Discuss standards and standards programs. (3/13/64)
B. F. Judson	Oak Ridge National Lab. Oak Ridge, Tennessee	Attend AEC meeting on fission products and discuss fission product program with ORNL personnel. (3/17 - 19/64)
R. C. Hollingshead	Mound Laboratories Miamisburg, Ohio	Attend Meeting of IMOG Machine Tool Design Sub- Committee. (3/19 - 20/64)
P. B. Fisk	Dow Chemical Company Denver, Colorado	Inspect weapons components. (3/24/64)
<u>To General Industry</u>		
M. K. Harmon Alex Smith	Lawrence Pump Company Lawrence, Massachusetts	Redox pump problems and inspection of Redox process pump being fabricated. (3/2/64)
Alex Smith	Layne & Bowler Company Memphis, Tennessee	Redox pump problems. (3/5/64)
R. E. Smith	The Boeing Company Seattle, Washington	Present talk to AIEEE & tour. (3/17/64)

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C. TRIPS (Continued)

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To General Industry</u> (Continued)		
R. C. Hollingshead J. M. Pinkerton	Ex-Cell-O Corporation Detroit, Michigan	Technical discussion of Precision Turning Machine. (3/17 - 18/64)
M. T. Slind	Nycalex Corporation Clifton, New Jersey	Application data on Transducers and components. (3/27/64)
	Thomas A. Edison West Orange, New Jersey	" " (3/27/64)
	Versitherm, Inc. Farmingdale, Long Island	" " (3/27/64)
<u>To Conventions and General Meetings</u>		
M. H. Campbell	Pittsburgh, Pennsylvania	Present paper - 15th Pittsburgh Conference on Analytical Chemistry - American Chemical Society. (3/2 - 4/64)
L. L. McGregor	American Ordnance Assn. San Diego, California	Attend annual meeting - Standards and Metrology Div. (3/18 - 19/64)
M. T. Slind	New York, New York	Attend IEEE Convention and exhibit. (3/23 - 26/64)

D. VISITORS

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From Other G.E. Components</u>		
J. D. Billings R. T. Clark	Spokane, Washington Schenectady, New York	Discuss instrument and electrical maintenance and Motor Re-winding Shop Inspection. (3/5 - 6/64)
<u>From AEC and Other AEC Contractors</u>		
R. L. Delnay J. D. Mosely	Dow Chemical Company Rocky Flats Plant Denver, Colorado	Pu nitrate shipper-receiver demonstration. (3/9 - 12/64)

D. VISITORS (Continued)

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From AEC and Other AEC Contractors (Continued)</u>		
M. A. De Sesa	National Lead Company Cincinnati, Ohio	UO ₃ processing. (3/12/64)
B. E. Brown	Lawrence Radiation Lab. Livermore, California	Termite problems, to discuss 1807 costs and tour 234-5. (3/18/64)
J. A. McBride	Phillips Petroleum Company Idaho Falls, Idaho	Unusual incidents at the Purex Plant. Discussion of Geneva paper. (3/18 - 19/64)
F. H. Endorf M. H. Smith	E. I. du Pont, Aiken, S.C. E. I. du Pont, Wilmington	Redox, UO ₃ , Purex and 234-5 tours. (3/23/64)
F. Fairbrother M. E. Harris C. R. Henry J. K. Landauer W. M. Miller	Lawrence Radiation Lab. Livermore, California	Discussion on the production and fabrication of fissile materials, Redox and 234-5 tours. (3/31 - 4/1/64)
<u>From General Industry</u>		
H. Nason	Monsanto Research Corp. Miamisburg, Ohio	Polonium-210 production. (3/4/64)
W. C. A. Woods A. M. Lorenzen	C. F. Braun Assoc. Alhambra, California	Fission products and waste management programs. (3/10 - 13/64)
R. W. Dickenson	Bechtel Corporation San Francisco, California	Redox laboratory tour. (3/18/64)
W. Beamer R. S. Long R. Vandergrist	Dow Chemical Company Midland, Michigan	Fission products and waste management programs. (3/25/64)
R. Studebaker	Process Equipment Company Tipp City, Ohio	Design of prototype welder. (3/31/64)
<u>From Colleges and Universities</u>		
G. Watt	University of Texas Austin, Texas	General plant discussions. (3/13 - 14/64)
<u>From Other Government Agencies</u>		
T. Albert	Nat. Aeronautics & Space Admin. Washington, D. C.	Power sources for NASA. (3/25/64)

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CHEMICAL PROCESSING DEPARTMENTMONTHLY REPORTMARCH, 1964IV: SAFETY AND SECURITY

<u>Operation</u>	<u>General</u>	<u>Purex</u>	<u>WMO</u>	<u>FEO</u>	<u>Redox</u>	<u>R&E</u>	<u>Finance</u>	<u>Prod.</u>	<u>Total</u>	<u>YTD</u>
Dis. Injuries				1					0	0
Ser. Accidents				12					1	1
Med. Treat. Inj.	9	19			6		1		47	140
Rad. Occur.	2	8			2				12	35
Contam. Wds.		5			1				6	6
New Dep. Cases		4*							4	10
Fires										2**
Security Viol.			1			1			2	5

* - All picked up on routine bioassay samples. Detected originally in October and December, 1963. Three cases 1-10% MPBB, one case 10-20% MPBB. No reason known for these cases, in tie-in with any known abnormal conditions.

** - Jan. 26, 1964 - Hood #2, 234-5 Bldg., electric short, damage \$10.00 - WMO
 - Feb. 24, 1964 - Ignited paper in load lugger outside 202A, damage \$10.00 - Purex

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V. REPORTS

A. PREPARED AND ISSUED

- HW-74497 REV 2, Unclassified, "Critical Mass Control Specification, Storage of Miscellaneous Items Containing Plutonium, Army Ammunition Storage Igloo T-107", dated March 4, 1964, by R. J. Sloat.
- HW-79622, Unclassified, "Formaldehyde Treatment of Purex Radioactive Wastes", dated October, 1963, by R. C. Forsman and G. C. Oberg.
- HW-80793 RD, Secret, "Bare Labor and Material Costs, Machining and Inspection, 1807 and 74-C Models", dated March 30, 1964, by J. D. Hourigan and D. E. Peterson.
- HW-80955, Secret AWD, "Development of Process Parameters for Isostatic Press Stabilization", dated February 20, 1964, by C. M. Walker.
- HW-80981, Unclassified, "Critical Mass Control Specification Column Hoods - 236-Z Building", dated March 2, 1964, by R. J. Sloat.
- HW-80982, Unclassified, "Critical Mass Control Specification Process Cell - 236-Z Building", dated March 1, 1964, by R. J. Sloat.
- HW-81007, Secret AWD, "A-Line Product Characteristics - January 1964", dated February 25, 1964, by A. E. Smith.
- HW-81020, Secret, "Waste Management Program - Supplemental Process Flowsheets", dated March 2, 1964, by P. W. Smith.
- HW-81089, Confidential, "Scheduled Shutdown - Redox", dated March 2, 1964, by J. H. Warren.
- HW-81092, Unclassified, "Purex Plant Test of the Cesium Phosphotungstate Process", dated March 16, 1964, by S. J. Beard and W. C. Schmidt.
- HW-81093, Secret, "Startup Flowsheets for the Plutonium Reclamation Facility (CAC-880), Edition II, Miscellaneous Treatment Flowsheets", dated March 27, 1964, by A. P. Roeh.
- HW-81094 RD, Secret, "Purex, Redox, UO₃ Production Schedule - March 1964", dated March 4, 1964, by D. McDonald.
- HW-81095 RD, Secret, "234-5 Production Schedule - March 1964", dated March 4, 1964, by D. McDonald.

- HW-81136, Secret AWD, "Weapons Process Engineering Technology Report - February 1964", dated March 4, 1964, compiled by members of the Weapons Process Engineering Operation, Research and Engineering.
- HW-81189, Secret, "Purex Plant Capability Requirements", dated March 4, 1964, by J. H. Warren.
- HW-81202, Secret AWD, "FPT Evaluation - FPT-63-27 - Dimensional Stability of Unalloyed Plutonium", dated March 5, 1964, by C. M. Walker.
- HW-81216, Secret, "Information Concerning the Effect of Weapons Equipment Procurement on Production Schedules", dated March 9, 1964, by W. J. Gartin.
- HW-81224, Secret, "Analysis of Purex Brandy Batch No. 11", dated March 5, 1964, by J. H. Warren.
- HW-81227, Secret, "Study of UO₃ Storage", dated March 6, 1964, by J. H. Warren.
- HW-81236, Unclassified, "Americium Recovery - Interim Startup Flow Sheet", dated March 6, 1964, by R. S. Kingsley.
- HW-81240, Secret, "Corrosion of Plutonium Metal When Stored in Containers Having Plastic Components", dated March 6, 1964, by R. H. Bond.
- HW-81283 RD, Secret, "Back-Up Data for 17 Case Study", dated March 10, 1964, by V. R. Chapman.
- HW-81373, Unclassified, "Removal of Lead from B-Plant Cerium and Rare Earth Fraction", dated March 16, 1964, by J. S. Buckingham.
- HW-81411, Secret AWD, "Product Characteristics", dated March 19, 1964, by A. E. Smith.
- HW-81561, Secret, "Sodium Content In 94 UO₃", dated March 31, 1964, by J. H. Warren.

B. PREPARED FOR SIGNATURE AND ISSUANCE

- HW-81077, Secret, "Production - February 1964", dated March 2, 1964, by W. E. Johnson.

DECLASSIFIED

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORTMARCH, 1964VI. 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.

INVENTORTITLE

NONE

J. H. Warner
General Manager
Chemical Processing Department

END

**DATE
FILMED
5/12/93**