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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
FOR

JANUARY, 1964

HW--80672

Compiled By
OPERATION MANAGERS

DE93 008583

February 20, 1964

HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON

NOV 2 6 1992

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

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

FEBRUARY, 1964

I. SUMMARY

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

	<u>January</u>	<u>Fiscal Year To Date</u>
Separated plutonium nitrate	116*	98
Separated uranium nitrate	95*	95
Uranium oxide	100	95
Plutonium metal buttons	105	101
Fabricated parts	102	95

*The variation was caused by a downward adjustment in separated uranium nitrate production to compensate for uranium wastes which were transferred from uranium oxide to Purex for reprocessing.

January production met or exceeded forecasted quantities for all products except separated uranium nitrate. Processing performance was satisfactory in all plants, particularly Redox. With a lack of sufficiently aged normal metal feed, Purex devoted most of the month to reprocessing dissolved plutonium scrap from the 234-5 Building.

Two neptunium recovery and purification runs at Purex yielded nearly 1600 grams of neptunium product.

Routine sugar denitration of all Purex high-level waste (IWW) has reduced the amount of sodium transferred to underground storage by approximately 40 percent since early 1963. Since sodium ion concentration is employed as the operational control for determining the capacity of Purex waste storage tanks, the net effect has been one of decreasing the unit volume of Purex stored waste.

The Redox plant operated on a seven-day-per-week schedule during the entire month. Processing followed the flow pattern established during mid-December, namely, a three-cycle solvent extraction for plutonium purification, with neptunium accumulation in the backcycle system to be recovered on a campaign basis. Product quality and waste losses were both satisfactory.

On January 2, cracks appeared in the interior walls as well as between walls and the floor of the 224-U Building ventilation blower room. In-

investigation revealed that both chemical sewer pipes beneath the floor were broken and the leaking water had caused the soil to settle, as much as six inches from the floor in some areas. After installing new drain lines to the sewer header line outside the building, concrete grout was pumped into the void areas beneath the floor for support.

Teflon-lined dissolver equipment has been recommended for installation in the miscellaneous treatment room of the new Plutonium Reclamation facility. Prototype teflon-lined dissolvers have been demonstrated to withstand chemical attack, heat and radiation effects over a long period of time.

A portion of the major equipment in the new Plutonium Reclamation facility was turned over to the Weapons Manufacturing Operation on January 15. Only limited testing has been possible, however, because much of the control and auxiliary equipment has not yet been made available.

P. H. Reinker

General Manager
Chemical Processing Department

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JANUARY 1964

II. ACHIEVEMENTS

A. PRODUCTION OPERATION

1. Production Statistics

a. <u>Percent of Forecast(1) Achieved</u>	<u>January</u>	<u>Fiscal Year to Date</u>
Separated plutonium nitrate	116 *	98
Separated uranium nitrate	95 *	95
Uranium oxide	100	95
Plutonium metal buttons	105	101
Fabricated parts	102	95
b. <u>Purex</u>	<u>January</u>	<u>December</u>
Uranium nitrate produced (tons)	235	668
Average production rate during operation (T/D)	28	29
Total waste loss (%)		
Plutonium	0.39	0.35
Uranium	0.29	0.26
On-line efficiency (%)	77	76
c. <u>Redox</u>		
Uranium nitrate produced (tons)	185	55
Average production rate during operation (T/D)	8	6
Total waste loss (%)		
Plutonium	0.27	0.48
Uranium	0.21	0.19
On-line efficiency (%)	78	29
d. <u>Uranium Reduction (tons)</u>		
Normal UO ₃ loaded	612	653
Enriched UO ₃ loaded	152	31
Normal UO ₃ approved for shipment	551	652
Enriched UO ₃ approved for shipment	148	0
Normal UO ₃ shipped	652	652
Enriched UO ₃ shipped	148	0
Normal UO ₃ backlog	16	393
Enriched UO ₃ backlog	186	153

(1) HW-80544, HAP0 PRODUCTION FORECAST.

*The variation was caused by a downward adjustment in separated uranium nitrate production to compensate for uranium wastes which were transferred from uranium oxide to Purex for reprocessing.

e. <u>Plutonium Metal Processing</u>	<u>January</u>	<u>December</u>
Reduction yield (%)	98	97
Product recovery output (Kgs)	193	85
Product recovery backlog (Kgs)	1289	1351
Waste disposal (grams)	356	416
f. <u>Power</u>	<u>200-East</u>	<u>200-West</u>
Raw water pumped (gpm)	9,264	5,041
Filtered water pumped (gpm)	1,085	1,191
Maximum steam generated (lbs./hr.)	220,000	180,000
Average steam generated (lbs./hr.)	198,000	136,959
Total steam generated (M lbs.)	147,374	101,898
Coal consumed (tons)	8,051	6,355

January production met or exceeded forecasted quantities for all products except separated uranium nitrate. Processing performance was satisfactory in all plants, particularly Redox. With a lack of sufficiently aged normal metal feed, Purex devoted most of the month to reprocessing dissolved plutonium scrap from the 234-5 Building.

J. H. Warner
 Manager, Production

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2. FISSION PRODUCT DATA

	<u>FUREX*</u> <u>RECOVERY</u>	<u>241-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)	0	1232	165	0	2640**	-	110	NYO	
Cs-137 (Kilocuries)									
Ce-144 (Kilocuries)									

** Does not include 200 Kilocuries for rework.

* 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

Processing of regular feed continued through January 10, 1964 at an average capacity factor of 3.4. A special uranium-plutonium rework campaign was conducted during the period of January 15 to January 30. A scheduled outage was initiated January 31.

2. Processing

Uranium and plutonium products met specifications.

Neptunium shipments were made on January 13 and January 20. A neptunium purification run was completed at month's end.

The cask loadings and status are as follows:

<u>Cask</u>	<u>Quantity(Approx.)</u>	<u>Destination</u>	<u>Status</u>
HAP0 I-B-1			Received from ORNL 12-20-63 Available for loading.
HAP0 I-B-2	Ce-144	ORNL	Loaded in January. Preparing cask for drying operation.

Two Hanford Laboratory casks of waste were received and unloaded.

All of the available Purex 1WW was processed for Sr-90 recovery. Feed for cerium production took approximately 120 Kc's of the recovered Sr-90. Feed (1WW) for the Head End was not available after 1-13-64. Nine sulfate runs were completed.

The peroxyacetate Ce-RE test run in B Plant was completed and was successful.

The successful completion of the Ce-RE separation at Strontium Semiworks was achieved after encountering many difficulties. Completion of the run indicated the need for future flowsheet changes to improve overall run performance. The original 4,000 liters of feed plus an additional 4,000 liters were used to get the required quantity of cerium.

3. Equipment Experience

The H-4 concentrator right hand tube bundle (stainless steel tube bundle) failed this month after approximately ten months of service. Replacement was made with new titanium tube bundle.

The F-11 condenser failed when leaks developed at the head connections. Replacement was made with reconditioned hot spare.

Process pump G5-1 (vertical turbine type) located in the Purex Canyon failed this month through long service and normal life expectancy.

The 003 agitator located in the 241-CR Tank Farm vault failed when the electric motor developed an internal ground. Replacement was made with a new agitator from Spare Equipment.

4. Radiation Experience

A contamination spread occurred at C Tank Farm during the 003 agitator change on 1-23-64. Maximum levels found on clothing and personnel were 3,000 c/m. Decontamination was readily accomplished and the work area is in the final stages of being restored to normal.

The cerium cask being loaded at Strontium Semiworks became contaminated and dose-rates in certain areas exceeded 500 rads/hr. Water flushes, 5 percent DTPA washes, and the use of 30 percent nitric reduced most of the readings to 20 rads/hr. All work was performed with excellent contamination and exposure control.

Three burials were made during the month. A box of jumpers enroute to the burial grounds spread contamination along the railroad right-of-way but the spots were picked up without difficulty.

I-131 emission was normal for activity conducted during the month.

WM Harty
Manager-Purex

WM Harty:OVS:gt

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

C. REDOX OPERATION

1. Operating Continuity

The Redox plant operated on a seven-day-per-week schedule during the entire month. Operating rates were maintained at satisfactory levels and product quality and waste losses were both satisfactory.

The Uranium Oxide plant operated satisfactorily throughout the month. All products met shipping specifications and the production of both depleted and enriched uranium oxide exceeded that expected.

2. Processing Operations

a. Redox Processing

The Redox plant operated on the flow pattern established during mid-December, namely a three-cycle solvent extraction process for plutonium purification, with neptunium accumulated in the back-cycle system to be recovered on a campaign basis. The change to this flow pattern was necessary in order to restore the Redox plant to operation without the L-18 anion exchange contactor which was damaged in the 233-S fire.

Processing operations with the revised flow pattern have been satisfactory. Both the uranium and plutonium products have met specifications, and waste losses have been uniformly low, averaging 0.20 and 0.26 percent for uranium and plutonium, respectively.

Virgin feed processing was conducted approximately 78 percent of the time available. The remaining time was required to replace or repair failed equipment and to correct processing difficulties associated with column operation.

Sporadic flooding of the 2D column was encountered during the last week of the month and the process was shut down on 1-30-64 for dilute acid flushing of the columns. Flushing was completed and processing resumed on 1-31-64.

Investigation of processing conditions at the time of the 233-S building fire, which occurred on November 6, 1963, continued. The L-10-F solution (L-18 ion-exchange column feed) was successfully sampled and submitted to the analytical laboratory for

analysis. Leaching of the resin in the L-18 ion-exchange contactor continued. Holes were drilled in the wall of the contactor (through saddles and ball valves) at selected points and samples of the resin were withdrawn for analysis and study. At month-end, work was in progress to obtain all the additional samples, measurement data, etc., requested by engineering and research personnel in this investigation program.

b. Uranium Oxide Processing

Processing operations were satisfactory throughout the month and the production of both depleted and enriched uranium oxides exceeded that expected by 47 and 11 percent, respectively.

The H calciner was shut down on 1-15-64 for conversion to enriched uranium processing. It was planned to operate two calciners (H and G) on enriched uranium feed in order to reduce the current enriched uranium backlog. However, when both calciners were put on the line, the powder handling system proved to be inadequate for dual operation. Preliminary investigation revealed that some of the powder transfer lines were partially plugged. These were subsequently dismantled and cleaned, but at month-end the dual system had not been restored to service.

3. Mechanical Experience

a. Redox Plant

Erratic performance of the metal solution feed pump in the F-7 position continued. Two failures occurred during the first week of the month, one due to seizure of the shaft (bearings), and the other excessive leakage of solution around the throttle bushings. Efforts to resolve the problem have been intensified. A task force was established to study the solution transfer (pump) problem, in general, and the F-7 pump in particular. Action on task force recommendations has been started.

The backcycle pump in the D-14 waste concentrator was replaced because of a steady loss in flow capacity. This pump was a repaired unit and had been in service since September 1963. Because the pump hold-down nuts were frozen on the studs, it was necessary to remove the D-14 cooling coil, flange and pump as a single unit. Disassembly was subsequently accomplished in the Equipment Reclamation Facility and the coil was returned to the Redox plant for re-installation along with a new pump.

b. Uranium Oxide Plant

On 1-2-64, the floor in the ventilation blower room in the 224-U building began to settle as evidenced by significant cracks that appeared in the interior walls and between walls and floor. Investigation revealed that both chemical sewer pipes beneath the floor were broken. The leaking water had caused the soil to

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settle as much as six inches from the floor in some areas. Due to the nature of the original installation, it was necessary to install new drain lines from the building to the sewer header line outside. Concrete grout was pumped into the void areas beneath the floor for support.

4. Waste Handling and Decontamination

Equipment valued at approximately \$161,400 was received from customers for decontamination, repair, inspection, or burial during the month. Equipment valued at approximately \$135,900 was returned to customers, representing a savings of approximately \$94,200 over the cost of new equipment.

5. Radiation Experience

Construction of the new ventilation exhaust facility for the 233-S building, started in December 1963, is progressing satisfactorily. It now appears that the beneficial use date of March 15, 1964, will be met.

6. Analytical Experience

The Analytical Laboratory provided: 1) special sulfur analyses and particle size determinations in support of a process test to control uranium oxide product; 2) gamma isotopic analyses to resolve process problems in the fission product recovery process solvent system; 3) special uranium and neptunium analyses for NRD uranium fuel corrosion studies.

Improvements within the laboratory included: 1) a new method of reporting beta and gamma activities for UO_3 powder to provide more meaningful data; 2) replacement of bromine water with argentic oxide to eliminate a chemical hazard in a chromium procedure; 3) calibration of the X-ray fluorescence spectrometer for nickel, iron, and thorium in the 0.05 - 1.0 g/l range.

Manager - Redox

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II. ACHIEVEMENTS (Continued)

D. WEAPONS MANUFACTURING OPERATION

1. Operating Continuity

The fabrication of Model 1807 and Model 74-C weapon components was normal during the month with no significant interruptions to production. Production of unfabricated plutonium was also normal, and it was possible to return button line operations to a three-shift, five-day basis on January 13. Plutonium scrap dissolution was carried on without interruption.

Incineration work was curtailed by the necessity to replace the conveyor belt and clean the secondary burner.

2. Processing Operation

a. Plutonium Fabrication

Information on fabrication activities is presented in Document HW-80816 (Atomic Weapon Data).

b. Plutonium Reduction

Adequate feed was available to the button line during the entire month. A large proportion of the supply was special scrap material recycled through the recovery dissolvers and the Purex plant. The processing of Redox feed was resumed during the month. The reduced impurity level attained in December continued through January.

A reduction in the amount of feed scheduled for the button line for the next several months permitted the Plutonium Reduction Operation to be rescheduled to three-shift, five-day week. This permitted the release of several operators to assist in startup preparations for the new recovery facility and also the temporary loan of eight operators to the Redox Operation to permit three-shift, seven-day operation of that plant.

c. Plutonium Reclamation

Approximately 186 kilograms of plutonium scrap was dissolved. Most of this material was reprocessed through Purex before being used as Button Line feed.

c. Plutonium Reclamation (Continued)

The incinerator was operated on Recuplex R&B Hood floor sludge during the early part of the month. Normal incineration activity was resumed late in the month following the replacement of the conveyor belt and cleaning of the after burner. Twenty-eight boxes were processed during the month.

A portion of the major equipment in the new Reclamation facility was turned over to operations on January 15. However, only limited testing was possible because much of the control and auxiliary equipment was not made available at the same time.

3. Mechanical Performance

The fabrication equipment on both the RMA and RMC lines performed exceptionally well during the month.

Modification and installation of a third Sheffield gage in the final inspection facility was completed during the month.

The Hood 9-A button line equipment performed better than in previous months but still required considerable maintenance effort. Several major panel changes were accomplished on this hood during the month.

Renovation of Hood 9-B was completed at month end. Activation of this hood and shutdown of 9-A are scheduled for the early part of next month.

Modification and calibration of the Toledo scales in the new recovery facility (Project CAC-880) were completed.

4. Radiation Experience

Radiation and contamination control statistics revealed satisfactory performance during the month.

Two cases of potential plutonium deposition occurred when two employees received puncture wounds while working in the process hoods. Both wounds were excised and deposition is indicated as less than 1% MFBB in each case.

5. Analytical Experience

	<u>January</u>
Number of Samples Received	3,592
Number of Determinations	20,519

WJ Gartin
 Manager
 Weapons Manufacturing

WJ Gartin:csj

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II. ACHIEVEMENTS (Continued)

E. FINANCIAL OPERATION

1. Production Cost Accounting

Preliminary advice regarding the AEC Financial Plan about to be issued indicates that available funds are adequate, although tight, for CPD in the 02 and 03 production programs. However, no action has yet been taken by the Commission to adjust the Isotope Inventory allowance upwards from the present amount of \$1,373,000 and funds are about \$700,000 short of needs for the current fiscal year.

At the request of AEC, a report detailing waste management costs for the period July through December, 1963 was prepared. Also, a detailed analysis of Isotope Inventory composition for FY 1963 and estimates for FY 1964 and 1965 were completed and forwarded to the Commission.

Special requests handled during the month included:

- (1) A plutonium analytical standards evaluation (a joint effort by HAPO, New Brunswick Laboratory and Rocky Flats.)
- (2) A shipper-receiver plutonium demonstration study (a Dow Chemical and HAPO joint effort).
- (3) Shipment of 2 Kg's of plutonium metal to NUMEC.
- (4) Analytical services for General Electric Company, Atomic Power Equipment Department.

CPD's investment in inventories at December 31, 1963, compared with budgeted amounts, is as follows:

(in thousands)	Balance 12-31-63	Control Allocation	Surplus (Deficit)
<u>Inventories</u>			
Essential Materials	\$ 805	\$ 815	\$ 10
Spare Parts & Standby	1 535	1 615	80
Special Materials	110	103	(7)
Yttrium	153	150	(3)
Gross Inventories	2 603	2 683	80
<u>Reserves</u>			
Essential Materials	49	59	(10)
Spare Parts & Standby	491	404	87
Yttrium	153	150	3
Total Reserves	693	613	80
<u>Net Investment</u>	<u>\$1 910</u>	<u>\$2 070</u>	<u>\$160</u>

2. General Accounting

As of December 31, 1963 twenty (20) active projects had incurred costs of \$3,238,138 against authorized funds of \$4,219,800. Outstanding commitments totaled \$263,782.

During January one work authority was received from the AEC: Work Authority No. 2, Project CAC-965 - In-tank Waste Solidification, 200 East Area, for increase of funds to \$183,000.

3. Personnel Accounting

Final consolidation of appraisal data was accomplished for the Department General Manager, and 1964 salary reviews were summarized and forwarded to the HAP0 General Manager and approved.

4. Business Programs

At the request of AL00-AEC via RL00-AEC, a study of "Weapons Fabrication" was conducted to determine the financial and personnel impact on HAP0 resulting from a termination of Hanford 03 Program work at the end of FY 1965.

5. Auditing

Follow-up of the Traveling Auditor Report relating to their examination of CPD activities was completed and a report issued to the AEC. Irregularities noted involved minor clerical errors and corrective action has been taken.

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An audit of CPD administration of the General Electric Suggestion Plan was completed, and a formal report will be issued early in February. With minor exceptions, performance in this area was satisfactory.

Eight firemen were issued checks totaling \$72.50, a reimbursement for personal effects contaminated in connection with the 233-S incident. Section managers involved were requested to re-acquaint personnel with the provision of HAPO OPG 8.21 and plant procedures.

Manager - Finance

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (continued)

F. FACILITIES ENGINEERING OPERATION

1. Purex

a. Process Design Engineering

J-7 Remote Cartridge

Design was completed and drawings issued for a new high-strength J-7 Cartridge for use in the IC Extraction Column. The cartridge is a "sandwich" type with fluorothene and stainless steel plates in alternate layers. This cartridge also can be interchanged with the K-3 Column. A new jumper was designed with an electronic interface float controller, to supplement the pneumatic controller now used in the column.

Purex Plutonium Re-Work and Storage Package - "L" Cell

A proposed cell arrangement has been submitted for a preliminary nuclear safety review so that equipment sizing and location can be completed. The proposed package will provide separate units for concentration and in-canyon storage of off-standard plutonium solutions for loadout or blending. It will be possible to install the separate packages remotely and to maintain the equipment remotely.

Increased Processing Flexibility - Purex

All of the nineteen (19) drawings for Phase I have been completed and approved. These drawings cover the work to be performed in Cells "A" through "E". The Phase I design criteria report has been completed, including verbal description of work to be performed in the tank farm, aqueous makeup unit, and underground. Dump tests on NPR fuels were begun this month, and development work is being done with gadolinium stainless steels.

Purex F-F6 De-entrainment

Design of the Purex F-F6 de-entrainment vessel was started. Cost estimates were obtained on tantalum wire mesh pads of different densities. The estimated costs of

.005-inch wire pads ranged from \$25,000 for 18 pounds/ft³ to \$16,000 for 12 pounds/ft³.

Neutron Monitors - E-6 and H-4 Tanks

The problem of monitoring the E-6 and H-4 tanks for plutonium content is being investigated. Preliminary data on use of an He³-filled tube indicate more sensitive performance than is obtained from a standard HAP0 BF³ tube. (The manufacturer of the He³-filled tube claims satisfactory operation in gamma fields as high as 10⁴ R/hour.) Further tests are being planned by use of the Co⁶⁰ source available in 3730 Building of Hanford Laboratories.

Tank Farm Pump Burial

A shielded burial frame has been designed and the drawing completed for the pump at the 106 Tank at 241-A Tank Farm. The pump will be loaded into the burial frame in the vertical position, and the loaded frame then lowered to a trailer. The pump column will be shielded for its full length (47 feet).

b. Project Engineering - None

c. Manufacturing Engineering

1 BXP Neutron Monitors

The 1 BXP neutron monitor has been operating satisfactorily for six (6) months.

2. Redox

a. Process Design Engineering

Redox Monitoring

Detail design of monitors for the Redox sand filter, stack, and dissolver off-gas is approximately 75 percent complete. A detailed list of required components and specifications has been provided so that equipment purchase and installation can begin.

Gamma Dose Rate Alarm System

All components required for the Redox gamma dose rate alarm system have been received, and the system is being fabricated.

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b. Project Engineering

CGC-929-Rev. 1-NPR Fuels Processing Facilities-200-W Area

This project proposal revision, requesting authorization to complete facilities required to process "N" Reactor fuels in Redox and to segregate uranium containing various enrichment in UO₃ Plant, is circulating for approval.

3. Weapons Manufacturing

a. Process Design Engineering

Gorton Lathe Operational Improvement Program

The decision was made to modify the hydraulic system and to re-wire control circuitry for one Gorton lathe (probably the 41-M-1). This machine is to be used to determine possible improvements in performance of the Gorton lathes as used in the tracer mode. Areas of required operational improvement are: (1) spindle speed indication; (2) cam-controlled spindle operation; (3) ram feed indication; (4) cam-controlled ram operation; (5) spindle hydraulic pump; and (6) tracer response.

Existing Button Line

Cold testing of the new fluorinator assembly was completed, and it is being installed in Hood HC-9B. Design drawings for a new oxalate metering pump were completed, approved, and issued. All comments on the new vacuum drum filter have been resolved, and detail design of the unit is underway.

Dry Air System

Design has been started on modifications to the new 234-5 Building dry air system to improve its performance and reliability. The improvements will include instrumentation to permit better monitoring and control of the system, and an additional chiller for the "D" dryer.

Incinerator

An electric heater sheathed with an alloy resistant to chloride corrosion has been installed on the furnace off-gas stream. This heater replaces a stainless steel-sheathed heater which failed after two (2) years of operation. The new leaching facility was placed in operation, and the scrubber solution recovery equipment is being cold-tested. A study has been started to determine the feasibility and

cost of the fire protection equipment for the chopper hood in the incinerator.

Americium Recovery Facility

The Americium capture will be done by the temporary installation of an ion-exchange column in Glove Box WT-2. Approximately 100 grams of Americium in the nitrate form can be held up in Glove Box WT-2 for future processing.

b. Project Engineering

CAC-104, Rev. 1 - Recoverable Plutonium Partitioning Facilities - 236-Z Building

The revision is in process of approval. It requests total authorization to provide a solvent extraction system in the 236-Z Building for partitioning recoverable plutonium from actinides. The proposal is to locate the extraction system in the existing process cell and auxiliary equipment in existing gallery glove boxes.

CAC-880 - Plutonium Reclamation

The equipment for dissolver, feed preparation, and solvent extraction is being cold-tested. Design for an additional glove box for the dissolver loading facility was completed. This glove box is to be used for re-canning prior to loading.

4. General

a. Process Design Engineering

Waste Management Program

Phase II - "B" Plant - Packaging Prototype Work

A review of vendor quotations and cost estimates, based on detail design, shows that additional funds will be needed for procurement and testing the prototype equipment. A project proposal requesting an additional \$90,000 is being circulated for approval.

Welding

The second phase of the tungsten-inert gas welding development has been completed. All twenty welds were made at 800°F with no change in the welding equipment or cycle, and all welds were found to be sound. In addition, seven (7) more welds were made in succession at temperatures from 700°F down to 100°F to determine the lower ranges at which acceptable welds could be produced. All were acceptable

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except those made at 200°C and lower. These did not have complete penetration at start of the weld cycle.

Temporary Burial of Hood 39

An experimental burial was made of Hood 39 after its removal from 234-5 Building process line. The special burial box which has been designed for retrieval was covered with two feet of earth instead of the usual six feet. This temporary burial was made to evaluate the possibilities of recovering plutonium from process vessels and equipment by means of the dismantling facility now being prepared in 224-T Building. This hood is believed to contain about 150 grams of plutonium residues, and several other vessels have been surveyed to estimate their content of recoverable plutonium.

b. Project Engineering

Project Cost Information - as of 1/26/64:

Total Authorized Funds - Sixteen	
active projects	\$ 3 421 000
Total Cost-to-date	2 566 000
Commitments and Open Work Releases	313 000
Unencumbered Balance	542 000
Costs Charged to Above Projects -	
12/22/63 to 1/26/64	84 000

5. Shops Operation

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

- a. Boiler Shop completed the D-14 Redox Concentrator, and fabricated and installed five (5) lucite panels in the 234-5 Building.
- b. Sheetmetal Shop completed stainless steel sheathing of the Purex No. 6 Spare Concentrator, six (6) stainless steel air sampling heads for the 202-A Building, and a titanium concentrator vessel to replace existing glass concentrator in 234-5 Building.
- c. Motor Re-wind Shop re-wound four (4) motors, dried out and sealed the stator for a 900-horsepower motor for IPD.
- d. The Jumper Shop fabricated and tested twenty (20) jumpers during the month, seven (7) for Redox and thirteen (13) for Purex.

- e. The Rotating Equipment Shop completed two (2) pumps and two (2) agitators each for Purex and Redox.
- f. The Machine and Tool and Die Shops concentrated on work for 234-5 Building, particularly tool dies and gauge modifications, equipment for the Floturn lathe, and the tensile specimen die set.

6. Power and Services

Operating Continuity

There were no interruptions of steam or electrical services that affected continuity of operation of production facilities.

Repair Activities and Installations

The 2902-B High Tank has been returned to service after installation of new riser pipe and heating element. The 2901-W High Tank is being tested in preparation for return to service after the same repair program.

The contract for repair of CPD steam distribution systems has been awarded to J. P. Head Mechanical, Inc., and the contractor has started work on replacing wooden supports for the main line to "T" Plant Area.

 Manager - Facilities Engineering

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

G. RESEARCH AND ENGINEERING OPERATION

1. Purex Process Engineering

a. Solvent Extraction

Normal Purex plant processing was terminated at mid month. After a brief shutdown, the plant was started up on a special campaign to process Z-Plant rework plutonium solutions consisting of dissolved oxide and skull mixtures and batch ion exchange product. Normal plant flowsheets were used blending plutonium solutions with cold uranium to prepare solvent extraction feed. The campaign was completed with satisfactory yields and product purity.

A plant test to reduce the amount of ferrous sulfamate used in the Second Uranium Cycle by supplementing the ferrous reductant with sulfamic acid was terminated shortly before plant shutdown. While no definite beneficial effect was noted at the outset of the test, a 50 to 100 per cent increase in ferrous sulfamate usage was required to maintain an acceptable plutonium content in the uranium product when the test was terminated.

b. Product Treatment

Because of the recent Redox incident involving a plutonium anion exchange purification system, a safety review was made of the Purex anion exchange systems. Operational controls for the plutonium system were improved to increase assurance that the unit does not exceed process limits found acceptable for safe operation during past laboratory and plant experience. The controls are aimed at limiting process solution temperatures to less than 75° C, process solution acidities to less than 7.5M, and internal column pressures to less than 60 psig. Shutdown of the unit for over 24 hours requires complete stripping of plutonium from the resin and resin replacement is scheduled to limit average service life of the resin in the unit to eight weeks. Similarly, operational controls for the neptunium anion exchange system were reviewed to assure solution temperatures of less than 75° C, acidities of less than 8.5M, and internal column pressures of less than 60 psig. Resin in the column is kept flooded and not exposed to stagnant, high acid, product-loaded conditions for more than 24 hours.

c. Waste Treatment

Routine denitration of all high-level waste with sugar has reduced the amount of sodium transferred to underground storage by approximately 40 per cent since early 1963. A decrease in the amount of salts in the waste results in a corresponding decrease in the volume of stored waste per unit of production.

The radiation readings in the north lateral under Tank 105-A remained essentially unchanged throughout the month. Adjacent laterals and wells continued to be free of activity.

Work continued in assembling the in-tank sluice-mixing system. The Tank 102-A cooler unit which failed to pass pressure tests last month was disassembled, repaired, tested and accepted for field installation.

d. Fission Product Processing

A plant test of the peroxyacetate process for separating cerium from the rare earths was conducted at B-Plant. Promethium yields in excess of 90 per cent were achieved with a cerium decontamination factor of 15.

A cerium production campaign was conducted at the Strontium Semiworks (SSW). Normal B-Plant feed, as prepared in the Purex head-end system and containing cerium, rare earths, strontium and lead, was transferred to the SSW and the cerium separated and purified by batch solvent extraction. The processing sequence consisted of batch extraction contacts at a pH of 2 in the presence of a complexant to extract the cerium and rare earths away from the strontium and lead, followed by a silver catalyzed persulfate strip to separate the trivalent rare earths from cerium-IV. Cerium was subsequently stripped from the solvent with nitric acid, precipitated as the sulfate and slurried into the HAPO IB-2 cask.

Although the campaign was successfully completed, several process problems were encountered necessitating special rework efforts to accumulate enough purified cerium for loadout. During the extraction contacts, insufficient complexant was added to prevent lead extraction. Over-saturation of the solvent resulted with excessive cerium losses and poor phase disengagement. Subsequent strip solutions that were concentrated for rework contained precipitates of lead and rare-earth sulfates. Separation of cerium from the rare earths by silver-catalyzed persulfate oxidation was not quantitative as expected and rework of the rare-earth fractions was required.

Precipitation and lead extraction difficulties can be corrected by appropriate flowsheet adjustment. The poor persulfate run behavior appeared to be associated with solvent quality. Laboratory studies with plant solvent were initiated.

Cask loading proceeded smoothly with over-all cerium losses of less than 5 per cent. At month end, preparations to dehydrate the cake in the cask were underway.

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2. Redox Process Engineering

a. Solvent Extraction

The process was operated on the same flow pattern as described in the December, 1963 report. Decontamination across the solvent extraction system was good, and all of the plutonium and uranium product batches were well within gamma specifications. The plutonium product solution contained from 2000 to 10,000 parts aluminum per million parts plutonium (versus 1000 ppm reported in December).

b. L-18 Plutonium Anion Exchange Contactor

Investigation of the 233-S fire was continued during the report period. Examination of the L-18 Contactor showed that the number 10 schedule pipe which makes up the scrub and extraction portion of the contactor had been expanded from 4.5 inches (outer diameter) to about 5 inches (outer diameter). About half of the resin inventory had been lost from the contactor. This indicates that the lower portion of the contactor had been pressurized. Samples of resin have been taken from different locations of the contactor. Those resin samples which have been taken from the scrub section appear to be normal. The resin samples taken four inches above and four inches below the feed entry nozzle showed considerable evidence of bead shattering and the whole beads were swollen and degraded. To date there has been no evidence of charred resin, and the amount of degradation was about what might be expected under severe oxidizing conditions. Sampling has not been completed. The feed solution to the ion exchange contactor was found to contain chromium at a concentration of 1.7 g/l of Cr^{+6} and 6.6 g/l of total chromium.

3. Plutonium Process Engineering Operation

a. PuO_2 - Teflon-Lined Dissolvers

A test program was initiated in early 1962 to develop teflon-lined dissolvers to replace the laboratory-type glass dissolvers which are used for plutonium oxide dissolution. Testing of the prototype equipment was delayed one year because of the nuclear incident which occurred in April, 1962. Test work was resumed in April, 1963, and continued intermittently into November, 1963.

The dissolvers have demonstrated their ability to withstand chemical attack, heat, and radiation effects over a comparatively long period of time. They have proven to be a safe, efficient facility. Each is equivalent to two glass dissolvers, and can be made even more efficient with minor process and equipment changes which are planned for the near future. The use of the teflon-lined dissolver equipment has been recommended for installation in the new Plutonium Reclamation Facility miscellaneous treatment room.

b. Incinerator

The discharge end of the upper (secondary) burning chamber of the incinerator was found almost completely restricted by a build-up of clinkers and soot in an 18-inch long baffled section which had not been removed when the incinerator repairs were made in mid-1963. The small remaining pieces of the baffle were removed, along with six 1-liter cans of ash containing an estimated 350 grams of plutonium. Neutron readings, taken with Radiation Monitoring's portable counter, showed no significant change in readings on the burning hood since the initial readings in October, 1963.

The second leach hood installation in the incinerator building was completed when the "hot" tie-ins were made in the last week of the month.

c. Plutonium Reclamation Facility - Project CAC-880

Plutonium Reclamation Facility 'Cold' Run Plans were issued during the month. The purposes of the cold runs are 5-fold: (1) To train operating personnel, (2) to perform all operating procedures possible using simulated feed, (3) to test the process and equipment under simulated (everything except plutonium) flowsheet conditions, (4) to locate and revise potential problem areas before "hot" plutonium testing, and (5) to obtain data which could minimize "hot" plutonium testing.

d. Anion Exchange

The anion exchange system used for recovery of plutonium from button line filtrates was reviewed to determine whether either the operating procedures or equipment should be changed to provide increased assurance of continued safe operation of the unit. On the basis of the review, modifications to both the facility and the operating procedures have been recommended. Operating procedure changes were aimed at (1) reducing the chemical and radiation degradation potential of the system (e.g., columns eluted, temperature and acid concentration reduced during periods when columns stand stagnant), (2) assuring that the ion exchange resin is always "flooded" such that reaction heat can be easily dissipated, and (3) minimizing use of degraded resin.

4. Separations Chemistry Laboratorya. Purex Process ImprovementOxalic Acid Addition to HAF

The effect of oxalic acid additions to the Purex feed stream (HAF) was evaluated with fresh Soltrol to verify previous findings which had been conducted with Soltrol containing an excessive amount of TBP. These tests confirmed earlier results with no apparent effect on plutonium waste losses up to .003M $H_2C_2O_4$ in the feed. Also the improvement factor of 1.6 in ZrNb decontamination at .001M and of 2.8 at .003M $H_2C_2O_4$ checked the earlier data.

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b. Redox Process Improvement

Plutonium Ion Exchange

Laboratory evaluation of resin and process samples from the Redox ion exchange unit continued during the month. The presence of dichromate in the feed to the ion exchange column and on the resin has been confirmed. Samples of the resin from various locations in the column have been delivered to the laboratory. Samples of these have been photographed and are undergoing further evaluation by Chemical Processing Department and Hanford Laboratories' personnel.

c. Fission Product Process Improvement

Cerium Recovery - Laboratory work was conducted on synthetic solutions in an effort to find possible reasons for the poor cerium recovery sometimes experienced in the semiworks. The following information was developed. (1) In the initial complexing of Pb with DTPA, an insufficient amount of DTPA will permit the Pb to extract with the rare earths into D2EHPA where it will suppress the extraction of cerium. (2) Up to .05M DTPA in 2M HNO₃ will not cause cerium to precipitate. (3) Pb will precipitate with sulfate concentrations as low as .01M forming a precipitate insoluble in 4M HNO₃. (4) Cerium sulfate is soluble in 2M HNO₃ in sulfate concentrations up to 0.5M. (5) Lead sulfate will dissolve in 4M NaOH - 0.1M DTPA.

The best cerium sulfate precipitate with low supernatant losses was achieved with synthetic solutions by adjusting the cerium product solution to a pH of 2, adding sodium bisulfate to give 0.5M sulfate, then adding caustic to neutralize the bisulfate (mole for mole). After digesting for 1 hour at 60 C the product can be easily filtered with low losses.

d. UO₃ Process Improvement

UNH Calciner - The laboratory calciner was operated for approximately 50 hours during the month on both 100 per cent and 60 per cent UNH at temperatures near 300 C. Mechanical problems still interfere with performance but they are gradually being resolved. The thermobalance portion of this work is essentially complete and will be activated during February.

e. Laboratory Improvement

Atomic Absorption Unit - The atomic absorption unit for use in determining metallic impurities in various process and product materials arrived early in January. It has been set up in the old X-ray room for initial cold evaluation work. The photomultiplier tube was inoperable on arrival. A replacement by the vendor is expected at an early date which will permit us to proceed with applications of the instrument.

Metal Standard for A Line - Approximately 500 grams of A line material in the form of niblets have been set aside for use as a reference standard for the laboratory. After characterization the material will be dispensed to the 234-5 laboratory as a control reference.

Calcium and Strontium Analyses - The ability of the laboratories to determine calcium and strontium in essential materials was extended during the month by the development of a method for determining the Ca and Sr in verrous sulfamate. The method uses the flamphotometer after the removal of the iron from the sample. Iron is removed by oxidation with hydrogen peroxide in 7.5M HCl followed by absorption of the $(FeCl_4)^-$ complex on a Dowex 1 anion resin.

Gas Chromatography - Characteristic elution curves have been obtained for some of our "heavier" organics using an Apiezon "N" column at 250 C with helium as carrier gas. Curves have been obtained for TBP, DBP, DBBP, TLA and Soltrol. Normal butanol, apparently formed by thermal degradation of DBP, appeared in all DBP runs and its presence can be used to identify DBP in TBP-Soltrol. The quality of TLA can be determined since the elution curve gives peaks for dilaurylamine, trioctylamine, tridecylamine, and trimyristylamine.

Automatic Sample Changer - An automatic sample changer for use with the 5 x 5" NaI (Tl) well scintillation detector and the multichannel analyzer for low activity liquid gamma samples has been installed and is operating. A modification has been made which will allow the introduction of a sample ahead of those loaded in the magazine. A description of the system will be published in conjunction with an invention report.

5. Plutonium Chemistry Laboratory

a. Direct Calcination Of Plutonium Nitrate

Five runs were made in the calciner during the month of January. Approximately seven kilograms of oxide were produced.

Three of the runs were utilized in preparing samples of oxide for shipment to Rocky Flats Plant for use in their oxide shipping study program. Operating conditions for these runs were (1) 400 C calciner temperature and 0.3 SO_4 /Pu additive, (2) 400 C and no sulfate, and (3) 450 C and no sulfate. Product densities were 1.6, 3.0, and 3.7, respectively.

Prior to making any of the runs this month, the calciner unit was completely disassembled and cleaned. During this operation it was found that the chopper was partially plugged. Upon reassembling the unit and running it, it was found that the titanium content of the product was much lower than the values reported previously. The titanium content of the oxide is now about the same level as that of the feed material (100 - 200 ppm). This bears out the contention that the high titanium levels previously reported were due to erosion in the area of the chopper rather than corrosion.

b. Electrowinning Of Plutonium Metal

The 4" cell (PRC-IV) was operated successfully. Twenty-seven hundred grams of plutonium were produced at an average rate of 410 grams/hour at 75 per cent electrical efficiency. Instantaneous rates near 600 grams per hour were attained. Some corrosion of the cell wall was

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experienced. Direct calcined oxide-chloride was used as feed for the run.

c. Americium Recovery

Experiments are being conducted on the recovery of americium from the Reclamation Facility aqueous waste stream (CAW).

A flow sheet which gives a five-fold volume reduction across the solvent extraction step was demonstrated. The flow sheet calls for (1) neutralization of the CAW to 0.5M, (2) extraction of the Am from the CAW with 30 v/o DBBP - 70 v/o CCl₄ using an L/V of one, and (3) stripping the Am from the organic with water using an L/V of 0.2. These conditions resulted in an aqueous americium waste loss of 10 per cent, a strip product solution of 1.5M H⁺, and an americium concentration factor of five.

The path of plutonium in this flow sheet was demonstrated using 0.1 g/l plutonium. The organic phase extracts all of the plutonium and essentially none is stripped.

The nitric acid distribution curves were determined for the system--30 v/o DBBP - CAW and 30 v/o DBBP - nitric acid. The americium coefficient was determined for 30 v/o DBBP and CAW as a function of the hydrogen ion concentration in the CAW (i.e., Am E_d as a function of the degree of neutralization of the CAW). The americium extraction coefficient varied from 0.7 at 2.0M H⁺ in the CAW to 70 at 0.2M H⁺ in the CAW.

d. DBBP Extraction Of Plutonium From Reclamation Facility Waste

This work will provide the basis for the 912 Recovery Facility solvent extraction conditions.

A detailed study of the extraction characteristics of the laboratory test column reaffirms the former conclusion that extraction efficiency is quite low. Based on an E_d of 200 for 25 v/o DBBP in CCl₄, the column behaves at about 1/30 the efficiency of a theoretical stage. However, the plutonium to waste is reduced a factor of about five.

The column was run for 40 hours during which time over 200 liters of CAW were processed. The flow rates were varied from 50 ml/min to 330 ml/min with no apparent change in the extraction characteristics. The concentration of the feed was alternated between 2 mg/l and 11 mg/l, which resulted in a corresponding change in the overflow concentration. The ratio of feed to overflow concentrations remained constant during these changes at a value of about 5.6.

Manager
Research and Engineering

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III. PERSONNEL ACTIVITIES

A. FORCE SUMMARY

<u>Operation</u>	<u>Monthly</u>	<u>Salaried</u>	<u>Weekly</u>	<u>Salaried</u>	<u>Total</u>	
	<u>12-29-63</u>	<u>1-31-64</u>	<u>12-29-63</u>	<u>1-31-64</u>	<u>12-29-63</u>	<u>1-31-64</u>
General Manager's Group	8	8	2	2	10	10
Financial	16	15	21	19	37	34
Research & Engineering	69	68	29	29	98	97
Facilities Engineering	98	98	219	218	317	316
Production	7	7	4	4	11	11
Redox	62	61	222	225	284	286
Purex	71	72	262	260	333	332
Weapons Manufacturing	<u>61</u>	<u>59</u>	<u>262</u>	<u>261</u>	<u>323</u>	<u>320</u>
Total	<u>392</u>	<u>388</u>	<u>1021</u>	<u>1018</u>	<u>1413</u>	<u>1406</u>

B. PERSONNEL CHANGES

J. W. Jordan, Manager, Analytical Laboratory, Redox was transferred to Manager, Nuclear Materials Measurements, Nuclear Materials Operation, Contract and Accounting Operation.

C. TRIPS

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To AEC and Other AEC Contractors</u>		
J. P. Duckworth H. T. Fullam	Dow Chemical Corporation Rocky Flats Plant Denver, Colorado	Discuss ion exchange resin stability. (1/20 - 21/64)
L. R. Michels H. P. Shaw L. L. Zahn	Oak Ridge Nat. Lab. Oak Ridge, Tennessee	Waste management processes and design of hot laboratory. (1/20 - 21/64)
	du Pont Company Savannah River, South Carolina	Centrifugal contactor, dis- solvers, and process matters. (1/23 - 24/64)
A. E. Smith P. H. Reinker	Albuquerque Oper. Office Albuquerque, New Mexico	Program review meeting. (1/29 - 30/64)
R. E. Olson	Mason & Hanger-Silas Mason Co., Inc. Pantex Plant Amarillo, Texas	Interagency Mechanical Operations Group. (1/7 - 8/64)
L. L. McGregor	Mason & Hanger-Silas Mason Co., Inc. Pantex Plant Amarillo, Texas	Interagency Mechanical Operations Group. (1/15/64)
<u>To General Industry</u>		
J. F. Berggren	Instron Mfg. Company Canton, Massachusetts	Investigate possibility of obtaining modified tensile test machine. (1/14 - 16/64)
	Tinius Olsen Willow Grove, Pa.	" "
	Weideman Mfg. Company King of Prussia, Pa.	" "
	M. B. Electronics New Haven, Connecticut	" "
P. S. Kingsley	Esco Corporation Portland, Oregon	"Z" Plant pressure vessels. (1/17/64)
J. P. Duckworth	A. R. Wilfley Denver, Colorado	Materials of construction of Wilfley pumps. (1/22/64)

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C. TRIPS (Continued)

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To Conventions and General Meetings</u>		
J. P. Duckworth H. T. Fullam B. F. Judson J. R. LaRiviere	Denver, Colorado	American Chemical Society National Meeting. (1/20 - 21/64)
W. Watson, Jr.	Portland, Oregon	Attend Western College Placement Association Conference. (1/22 - 24/64)

D. VISITORS

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From AEC and Other AEC Contractors</u>		
W. L. Lenneman	U. S. Atomic Energy Comm. Germantown, Maryland	Waste management. (1/14 - 16/64)
<u>From General Industry</u>		
R. W. Dickinson	Bechtel Corporation San Francisco, Calif.	Tour T-Plant. (1/7/64)
Wm. Heim	Kearney-Trecker Corp. Los Angeles, Calif.	Inspection of milling machine. (1/7 - 8/64)
H. McKnight	Fischer & Porter Seattle, Washington	Consultation on Fischer and Porter Magnetic Flowmeters. (1/13 - 15/64)
Amos Warren	American Lubricants Co. Tiffany Division Richland, Wn. Repv.	Demonstrating cleaning equipment. (1/20/64)
Wm. Chase Holly Cornell	Metro Engineers Seattle, Washington	Discussion of export water system review. (1/23/64)
C. Manners	Westinghouse Corp. Salt Lake, Utah	Timing system for 236-Z Building. (1/24/64)

D. VISITORS (Continued)

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From Foreign Governments and Agencies</u>		
P. J. Berry	United Kingdom Atomic	AVIS-299 meeting; nuclear
E. Hinchliffe	Energy Authority	safety and plutonium technology.
R. C. Lane	Aldermaston, England	(1/23 - 24/64)
A. E. Kay	" "	" "
		(1/30 - 31/64)

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IV. 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>YTD</u>
Dis. Injuries									-
Ser. Accidents									-
Med. Treat. Inj.	1	10	15	11	11				48
Rad. Occur.		5	12		1				18
Contam. Wds.									-
New Dep. Cases			1*						1
Fires									-
Security Viol.				1					1

* - Less than 1% MPBB received in an injury 8/7/63,
confirmed 1/23/64.

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V. REPORTS

A. PREPARED AND ISSUED

- HW-72163, Official Use Only, "Consequences of Accidental Release of Radio-active Cerium During Shipment", dated January 31, 1964, by R. L. Junkins, E. M. Johnston et al. (Rev. #1)
- HW-78251 1, Secret AWD, "A-Line Process", dated January 2, 1964, by R. E. Van der Cook.
- HW-78771, Unclassified, "Equipment Dismantling Facility for Plutonium Recovery, Interim Report #2 - Provision of Lag Storage Capacity Facility by Use of Either Temporary Burials or Interim Storage in Concrete Crypts", dated December 26, 1963, by H. A. Moulthrop.
- HW-79529, Secret, "Design Criteria Plutonium Thermal Treatment Facility "A" Line - 234-5 Building", dated November 20, 1963, by D. D. Wodrich.
- HW-79667 1, Unclassified, "Design Criteria Recoverable Plutonium Partitioning Facilities - 'Z' Plant", dated January 27, 1964, by D. E. Braden and R. A. Ciccarelli.
- HW-80016, Secret, "Assurance of Surface 'V' Flatness - MC-1807 Components", dated December 16, 1963, by J. M. Pinkerton.
- HW-80023, Secret AWD, "Fabrication Process Test Evaluation - Plus Pour Ingotting of Turnings Briquettes", dated December 17, 1963, by C. M. Walker.
- HW-80042, Secret, "Hood 42 Teflon-Lined Dissolvers", dated January 17, 1964, by R. L. Walser.
- HW-80168, Secret, "Campaign Rework of Z-Plant Material at Purex", dated December 26, 1963, by B. F. Judson and J. B. Kendall.
- HW-80244, Confidential AWD, "Waiver of Specifications", dated January 2, 1964, by A. E. Smith.
- HW-80259 RD, Secret, "Purex, Redox, UO₃ Production Schedule - January, 1964", dated January 3, 1964, by D. McDonald.
- HW-80260 RD, Secret, "234-5 Production Schedule - January, 1964", dated January 3, 1964, by D. McDonald.
- HW-80289, Secret, "Production of Clean U-233 - Process Parameters and Limits", dated January 6, 1964, by L. W. Lang, J. W. McCurry, R. H. Meichle and H. C. Rathvon.

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- HW-80295, Secret AWD, "Extension of FPT-63-27 - Dimensional Stability of RMA Line Castings", dated January 3, 1964, by A. E. Smith.
- HW-80296, Secret AWD, "Process Specifications", dated January 3, 1964, by A. E. Smith.
- HW-80299, Secret, "Estimated Volume of Non-Boiling Waste 1963-1975", dated January 10, 1964, by J. J. Shefcik.
- HW-80300, Unclassified, "Trip Report - Phillips' Idaho Facilities and Argonne's Experimental Boiling Water Reactor Fuel Reprocessing Plant", dated January 10, 1964, by S. J. Beard, W. L. Godfrey, W. C. Schmidt, P. W. Smith and S. G. Smolen.
- HW-80304, Secret AWD, "Progress Report - Weapons Process Engineering - December 1963", dated January 6, 1964, compiled by members of the Weapons Process Engineering Operation, Research and Engineering.
- HW-80310, Unclassified, "Plutonium Reclamation Facility - Cold Run Plans", dated January 20, 1964, by L. E. Bruns.
- HW-80325, Unclassified, "Spectrophotometric Analysis of Iron in Plutonium and Uranium Nitrate with Bathophenanthroline", dated January 7, 1964, by M. H. Campbell.
- HW-80328, Secret AWD, "November Casting Information", dated January 7, 1964, by R. J. Dal Ponte.
- HW-80335, Secret AWD, "Yield Strength Data", dated January 6, 1964, by A. E. Smith.
- HW-80399, Secret AWD, "Fabrication Process Test 64-1 - Shipping Container Environmental Conditions", dated January 13, 1964, by R. A. Zinsli, and A. E. Barber.
- HW-80396, Unclassified, "Design Criteria - Wide-Range, Recording, Gamma Instrumentation", dated January 17, 1964, by F. S. Stong.
- HW-80401, Unclassified, "Chemical Processing Department Hazards Review Task Force Report", dated January 13, 1964, by J. R. LaRiviere.
- HW-80403, Secret AWD, "Special Properties Report Format", dated January 14, 1964, by W. L. Lawton.
- HW-80445, Secret, "Analysis of Brandy Batch Purex #9", dated January 15, 1964, by J. H. Warren.
- HW-80474, Secret AWD, "A-Line Product Characteristics - December 1963", dated January 20, 1964, by A. E. Smith.
- HW-80494, Secret AWD, "Quarterly Summary Report and Associated Data for 234-5 Building Final 'C' Line Product Shipped During the Fourth Quarter of Calendar Year 1963", dated January 29, 1964, by A. E. Smith.

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HW-80495, Secret AWD, "Statistical Statements and Associated Data for 234-5 Building Final 'A' Line Product Shipped During Fourth Quarter of Calendar Year 1963", dated January 29, 1964, by A. E. Smith.

HW-80519, Secret, "Analysis of Brandy Batch Purex #10", dated January 22, 1964, by J. H. Warren.

HW-80563, Unclassified, "Precipitation of Cerium Sulfate", dated January 27, 1964, by J. S. Buckingham.

HW-80570, Confidential, "Scheduled Shutdown - Purex", dated January 27, 1964, by J. H. Warren.

B. PREPARED FOR SIGNATURE AND ISSUANCE

HW-80242, Secret, "Production - December, 1963", dated January 2, 1964, by W. E. Johnson.

HW-80544, Secret, "HAPO Production Forecast - January 1, 1964 Through June 30, 1969", dated February 11, 1964, by W. E. Johnson.

DECLASSIFIED

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JANUARY, 1964

VI. PATENT SUMMARY

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

INVENTOR

TITLE

NONE

P. H. Rinker

General Manager
Chemical Processing Department

END

DATE
FILMED

4/1/1993