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DECLASSIFIEDCHEMICAL PROCESSING DEPARTMENTMONTHLY REPORTFORAPRIL, 1964

HW--82089

Compiled By
OPERATION MANAGERS

DE93 008588

May 22, 1964

HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON

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

Classification Cancelled And Changed To
DECLASSIFIED

By Authority of CG-PR2
R. Stevens 8-26-92
by J. Wells 8-31-92
Verified By PM Eick 9-2-92

Classification reviewed for de
classification but left unchanged
by [redacted]
[redacted]
5-15-92

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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
Manager, Facilities Engineering	H. P. Shaw
Manager, Research and Engineering	W. S. Frank
Manager, Employee Relations (Acting)	J. H. Warren

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HW-82089

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

APRIL, 1964

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	<u>April</u>	<u>Fiscal Year</u> <u>To Date</u>
Separated plutonium nitrate	115	101
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Uranium oxide	111	101
Plutonium metal buttons	124	102
Fabricated parts	106	98

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Four STT casks were loaded with 210,000 curies of cesium-137. The HAPO II-1 cask was loaded with approximately 130,000 curies of strontium-90.

The incinerator performed exceptionally well during April and a total of 158 boxes of waste was processed. The previous record high was 86 boxes of waste.

In the new plutonium reclamation facility, cold chemical testing of equipment continued. At month-end, the continuous slag and crucible dissolvers posed the most serious problems, involving pressure surge and massive entrainment of liquids and solids during the energetic reaction of calcium metal with acid. One of the two dissolvers was removed for further development work. Attempts are being made to modify the second dissolver to permit startup in early May with radioactive material.

The third batch of irradiated fuel elements from Hanford's experimental Plutonium Recycle Test Reactor (PRTR) was processed through the Redox plant by mid-month. Conversion of the PRTR plutonium nitrate to oxide is now being done in the laboratory.

Shipments of depleted uranium oxide powder to Paducah, Kentucky were terminated this month according to plan. Car number 860, the last from Hanford, was shipped on April 18.

A project proposal was transmitted to RLOO-AEC on April 28 which requested \$750,000 for replacement of the Purex ventilation filter.

Work was started on the design criteria to provide inserts for the multi-purpose dissolvers which are to be installed in Purex under Project CGC-124. Present plans are to have a design completed by early June for at least one of the several insert concepts.

P. H. Leinker

General Manager
Chemical Processing Department

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MONTHLY REPORT

APRIL, 1964

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P. H. Leinker

General Manager
Chemical Processing Department

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

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II. ACHIEVEMENTS

A. PRODUCTION OPERATION

1. Production Statistics

a. <u>Percent of Forecast⁽¹⁾ Achieved</u>	<u>April</u>	<u>Fiscal Year to Date</u>
Separated plutonium nitrate	115	101
Separated uranium nitrate	117	101
Uranium oxide	111	101
Plutonium metal buttons	124	102
Fabricated parts	106	98
b. <u>Purex</u>	<u>April</u>	<u>March</u>
Uranium nitrate produced (tons)	298	805
Average production rate during operation (T/D)	26	28
Total waste loss (%)		
Plutonium	0.33	0.33
Uranium	0.19	0.26
On-line efficiency (%)	66	95
c. <u>Redox</u>		
Uranium nitrate produced (tons)	89	29
Average production rate during operation (T/D)	8	9
Total waste loss (%)		
Plutonium	0.40	1.4
Uranium	0.29	0.60
On-line efficiency (%)	37	13
d. <u>Uranium Reduction (tons)</u>		
Normal UO ₃ loaded	300	550
Enriched UO ₃ loaded	71	176
Normal UO ₃ approved for shipment	400	450
Enriched UO ₃ approved for shipment	101	202
Normal UO ₃ shipped	400	450
Enriched UO ₃ shipped	101	152
Normal UNH backlog	272	274
Enriched UNH backlog	80	62

(1) HW-81863, HAPD PRODUCTION FORECAST

e. Plutonium Metal Processing

	<u>April</u>	<u>March</u>
Reduction yield (%)	96	97
Product recovery output (Kgs)	38	87
Product recovery backlog (Kgs)	1 288	1 259
Waste disposal (grams)	1 729	1 198

f. Power

	<u>200-East</u>	<u>200-West</u>
Raw water pumped (gpm)	7 401	4 738
Filtered water pumped (gpm)	1 145	1 265
Maximum steam generated (lbs./hr.)	245 000	140 000
Average steam generated (lbs./hr.)	155 275	97 886
Total steam generated (M lbs.)	110 799	70 478
Coal consumed (tons)	5 433	3 588

April production exceeded forecasted quantities for all products.

J. S. Warner
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)	140	750	950	-	** 2230***	--***	-		
Cs-137 (Kilocuries)						210	-		
Ce-144 (Kilocuries)									

* Estimated figures based on Cs. calculations.

** Does not include 200 kilocuries for rework.

*** HAPO II-1 Cask loaded. Calorimeter tests in progress.

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II. ACHIEVEMENTS (Continued)

B. PUREX OPERATION

1. Operating Continuity

Purex processing was continuous at 3.0 to 3.3 capacity factor until April 10, 1964, processing unclassified metal. Increased differential pressure across the main canyon ventilation filter required a plant shutdown April 10, 1964 for investigation. Processing was resumed April 18, 1964 with the unclassified metal run completed April 24, 1964. Routine maintenance work and rework uranium processing were performed until April 29, 1964, at which time normal processing was resumed at a rate of 3.3.

Four neptunium purification runs were completed.

The four STT casks were loaded with approximately 210,000 curies of Cesium-137.

The HAPO II-1 Cask was loaded with approximately 130,000 curies of Strontium-90.

2. Processing Operation

Uranium and plutonium met specifications except for brief periods following plant startups.

Sluicing of the 103-A waste tank to remove the sodium from the sludge layer was started during the period with excellent equipment performance. Initial laboratory data indicate the dissolution of approximately one ton of sodium for each sluicing of 30-35,000 gallons of solution between the 102-A and 103-A tanks.

Nine sulfate runs for fission product recovery were completed in the Purex Plant Head End facilities.

The rare earth fraction of the January cerium campaign was processed at the Strontium Semiworks for semi-refining with the recovery of an estimated 45,000 curies of Promethium-147. This material was loaded to a cask and transferred to the 222-S facility for future promethium refining development work.

3. Equipment Experience

Partial plugging of the Purex Plant glass fiber filter for exhaust ventilation air was encountered, resulting in decreased air flow

and increased pressure drop. Plant processes were shut down to investigate the problem. Holes were bored into the top inlet of the filter and showed that the filter bed was depressed from 12 to 24 inches under various flow conditions and that the filter bed was coated with a material consisting primarily of ammonium nitrate. Ammonia exists in small amounts in essential materials used in the process and is released in large quantities during fuel element dejacketing. To date no mechanism has been found to account for the formation of significant quantities of ammonium nitrate and the relatively sharp decrease in ventilation flow. The fiber glass filter was designed to have a serviceable life of at least five years and has been in service in excess of seven years. Processing was resumed after re-establishing air flow at approximately 90,000 cfm as compared to a normal flow of about 120,000 cfm to demonstrate that processing can be safely continued on a carefully controlled basis while a new replacement filter is constructed. No contamination problems have been experienced with the facility during the period of difficulty.

Major equipment replacements included the following:

<u>Equipment Piece</u>	<u>Function</u>	<u>Cause of Failure</u>
C-2 Heater	Dissolver off-gas heater	External steam leak
F-15 Agitator	Waste tank agitator	Electrical failure
H-1 Pump	First cycle feed pump	Replaced to test new pump-valve system
6-1 Tank	B Plant fission product storage	Coil failure
G-12-2 Centrifuge	B Plant FP centrifuge	Bearing failure
P-5 Pump	SSW column feed pump	Insufficient flow
Deep-Well Pump	103-A tank sluicing pump	New installation

4. Radiation Experience

Two equipment burials consisting of cut up jumpers from the Purex Plant were performed.

I¹³¹ emission was normal for activity conducted during the month.

Manager-Purex

WM Harty:SGS:gt

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CHEMICAL PROCESSING DEPARTMENT
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APRIL 1964

II. ACHIEVEMENTS (Continued)

C. REDOX OPERATION

1. Operating Continuity

Processing of the third batch of irradiated fuel elements from Hanford's experimental Plutonium Recycle Test Reactor was completed and E-metal processing was resumed on April 17. However, a series of equipment failures (two agitators and an in-cell steam supply leak) encountered after the initial start-up caused a two-day delay. Processing was again resumed on April 19 and continued for the balance of the month.

The Uranium Oxide plant production was below expectations due to: 1) a shortage of enriched UO_3 feed; 2) lack of drum loading facilities for depleted UO_3 . However, deliveries to the RLOO-AEC were met on schedule. Shipping of depleted UO_3 to Paducah, Kentucky was terminated this month. The last car left the Hanford plant on April 18, 1964.

2. Processing Operations

a. Redox Processing

Dissolving and processing of the third batch of PRTR fuel elements, started during March, was completed by mid-month. Nine canisters containing thirty-five fuel elements, plus two canisters of cut fuel elements, were dissolved and processed through the extraction columns using the current Redox flowsheet. Approximately 6.3 kilograms of PRTR plutonium were recovered. Based upon measured load-out versus Hanford Laboratories' predicted input, the total PRTR recovery was 100.1 percent.

The processing of E-metal was resumed on April 17. However, after 24 hours of operation it was necessary to shut down for replacement of the failed agitator in the 2D column feed tank (F-1). Processing was resumed on April 19 and, except for a short interruption on April 23 to replace a leaking tube bundle in the D-14 backcycle concentrator, continued for the balance of the month.

Poor gamma decontamination of the uranium product was encountered this month, and approximately half of the uranium production was set aside for reozoning and/or blending with low gamma ratio material. The poor decontamination was believed caused by impurities in the organic solvent, subsequently removed by caustic

washing of the solvent. By month-end, the uranium gamma ratios had returned to normal levels.

b. Uranium Oxide Processing

The production of UO_3 powder was below that expected due to: 1) a shortage of enriched UO_3 feed; 2) lack of drum loading facilities for depleted UO_3 .

The shipping of depleted UO_3 powder to Paducah, Kentucky was discontinued according to plan. Car number 860, the last from the Hanford plant, was shipped on April 18, 1964.

All powder production during the month met specifications. Sulfur concentration control in the E-metal system, formerly difficult and erratic, has been excellent since the installation of a cycle timer in the chemical addition system.

3. Mechanical Experience

a. Redox Plant

The agitators in the E-13 ozonator tank and the 2D column feed tank failed on 4-14 and 4-19, respectively. New units were installed and operation to date has been satisfactory. The failed units had been in service for more than two years.

The helical heat exchanger in the west tube chest of the D-14 backcycle concentrator failed on 4-23 after service dating back only to October 1963, and was replaced with a bayonet-type heat exchanger. This early failure of the helical unit is believed related to known welding difficulties experienced by the off-site vendor.

b. Uranium Oxide Plant

The depleted UNH concentrators developed gasket leaks at the steam chest flanges this month. Both units were disassembled and repaired without incident or lost production time.

4. Waste Handling and Decontamination

Equipment valued at approximately \$108,000 was received from customers for decontamination, repair, inspection or burial during the month. Equipment valued at approximately \$47,000 was returned to customers, representing a savings of approximately \$27,000 based on the cost of new equipment.

5. Radiation Exposure

The level of radioactivity under the 107-SX waste storage tank has increased at an average daily rate of about 2000 counts per minute since it was detected in one of the underground laterals during March;

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reaching approximately 90,000 counts per minute on 4-30. There has been no change, however, in the "geometry" of the radiation in the lateral in which the radioactivity is being picked up; the peak activity is found in a band about one foot wide. As a precautionary measure the process waste routing for the Redox plant was changed from the 107-SX to the 114-SX tank on 4-30-64. The whole problem is being followed carefully to see if a correlation exists between liquid level in the 107-SX tank and the readings.

6. Analytical

The Redox Analytical Laboratory provided: 1) special uranium analyses on 100-N reactor cooling water to detect slug ruptures while the in-line gamma monitors were being repaired; 2) alpha and gamma isotopic analyses for the evaluation of an Am-241 separations process; 3) gamma isotopic and alpha pulse height analyses as part of a neptunium run and PRTR fuel processing run; 4) Scandium-46 analyses on a tantalum rod to provide an IPD customer with data which will help determine graphite lattice irregularities; 5) chromium analyses for the evaluation of the elution characteristics of dichromate on anion exchange resin; 6) bulk density, pack density and hydration rates as part of a plant program to evaluate the problems associated with the long-term above ground storage of unmilled uranium oxide powders in drums.

Manager - Redox

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

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II. ACHIEVEMENTS (Continued)

D. WEAPONS MANUFACTURING OPERATION

1. Operating Continuity

The fabrication of Model 1807 components and Model 74-C components was carried out without interruption during April. The production of unfabricated plutonium was interrupted during the latter part of the month by equipment failures and ion exchange process problems. The laboratory-type dissolvers were operated only when the button line could accept solution for blending. Incinerator operation on a modified procedure was excellent and a record number of waste boxes was processed during the month. "Cold" chemical runs continued in the new reclamation facility.

2. Processing Operations

a. Plutonium Fabrication

Information on plutonium fabrication activities is presented in Document HW-82216 (Atomic Weapon Data).

b. Plutonium Reduction

The major portion of the month's unfabricated plutonium production was unclassified material. This included plutonium oxide for the Hanford Laboratories and for off-site customers. The purity of the metal continued to be high.

The incinerator continued to be operated on the modified procedure initiated last month (burning of plastics eliminated). Operation under the new conditions proved to be excellent and a total of 158 boxes of waste was processed (previous record-86 boxes in March).

In the new reclamation facility, "cold" chemical testing of equipment continued and a number of equipment and construction deficiencies were corrected. At month-end, the most significant problems involved the slag and crucible dissolvers. These difficulties are mainly concerned with solids carryover from the solution section into other parts of the dissolver equipment. At month-end, one of the two dissolvers was being returned to the 300 Area for further development work. The other was being modified to provide a suitable recirculation loop to permit recycling of the undissolved solids. This action will permit facility startup with radioactive materials in early May.

3. Mechanical Performance

Equipment performance was satisfactory in all areas of the plant except in the plutonium processing hoods where the vacuum system required an excessive amount of overhaul. Bellows, flexible lines, filter elements, water jets and air bleed valves all required replacement during the latter half of the month.

4. Radiation Experience

Radiation and contamination control statistics reveal a slight upward trend.

One case of potential plutonium deposition occurred when plutonium-bearing liquid leaked from a hood glove and dripped on the face of one employee who was working below. Although the initial survey revealed 20,000 d/m after flushing, it was promptly reduced to 500 d/m and no internal deposition is anticipated.

5. Analytical Experience

Number of Samples Received	3,104
Number of Determinations	27,097

For the second consecutive month, a record number of determinations was performed. Extra analyses for the new reclamation plant plus a general increase in the service to all customers were responsible for the extra workload.

 Manager
 Weapons Manufacturing

WJ Gartin:csj

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

APRIL, 1964

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II. ACHIEVEMENTS (Continued)

E. FINANCIAL OPERATION

1. Production Cost Accounting

Final schedules for the FY 1965 and 1966 budgets were completed and forwarded to Contract and Accounting Operation for consolidation.

During April, the revised FY 1964 Financial Plan was received from the Commission which included additional funds for the O2 Program and Isotope Inventory. However, the cancellation of isotope shipments to ORNL results in additional build-up of SR-90 inventories requiring an added \$325,000 in the CPD allocation. The Commission has indicated that funds will be provided by transfer of ORNL funds.

Arrangements have been made to isolate and accumulate in a special account costs resulting from the Purex ventilation filter failure.

Numerous requests for special data in connection with the FY 1965 and 1966 budgets were received from AEC Budget and Production offices. In response, cost studies regarding americium and promethium, waste management, and other areas were conducted and information forwarded.

Plutonium scrap received from outside the component for recovery included 4,395 grams from Hanford Laboratories (Project Whitney).

Plutonium scrap processed during the month included 990 grams for Project Whitney.

CPD's investment in inventories at March 31, 1964, compared with budgeted amounts, is as follows:

(in thousands)	Balance <u>3-31-64</u>	Control <u>Allocation</u>	Surplus <u>(Deficit)</u>
<u>Inventories</u>			
Essential Materials	\$ 708	\$ 833	\$ 125
Spare Parts & Standby	1 530	1 615	85
Special Materials	128	103	(25)
Yttrium	144	150	6
Gross Inventories	<u>2 510</u>	<u>2 701</u>	<u>191</u>
<u>Reserves</u>			
Essential Materials	49	59	(10)
Spare Parts & Standby	423	404	19
Yttrium	144	150	(6)
Total Reserves	<u>616</u>	<u>613</u>	<u>3</u>
<u>Net Investment</u>	<u>\$1 894</u>	<u>\$2 088</u>	<u>\$ 194</u>

2. General Accounting

As of March 31, eighteen active projects had incurred costs of \$2,782,137 against authorized funds of \$4,013,800. Outstanding commitments totaled \$236,359.

During April one modification was received from the AEC: Modification #1 Directive No. HW-532, Project CGC-929 - NR Fuels Processing Facilities - 200-West Area, for increase of funds to \$210,000.

One Appropriation Request in the amount of \$3,000 was authorized during the month. Several others were approved during the month; however, they will be held up until FY 1965 Equipment funds become available or additional FY 1964 funds are made available to the department.

The Plant and Capital Equipment budget was transmitted to Contract Accounting and included, among other items, request for funds for the Isotopes Production Plant - Richland (\$9,000,000) in FY 1965.

In addition, a data sheet was submitted for Sludge and Waste Transfer Facilities - 200 East requesting funds from FY 1964 "Super General Plant".

3. Auditing

Assistance was furnished members of the GAO Audit Staff in an examination of CPD overtime practices and experience. There were no exceptions to CPD practices in this area.

An examination was made in April of certain CPD cash controls in relation to an overall HAPO audit of cash controls.

Data was obtained and furnished the AEC Audit Branch relating to their examination of HAPO transportation activities.

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A joint survey by Production and Financial Operation of CPD classification, security and related practices was completed and a formal report is scheduled to be issued in early May.

R. A. Cornell

Manager - Finance

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

APRIL 1964

II. ACHIEVEMENTS (continued)

F. FACILITIES ENGINEERING OPERATION

1. Purex

a. Process Design Engineering

Increased Processing Flexibility - Purex

Process design work has been completed and the design criteria have been revised to reflect the deletion of the new 3WB Tank and associated piping modifications. A draft of the design criteria has been distributed.

Multipurpose Dissolver Inserts

Work was started on the design criteria to provide inserts for the multipurpose dissolvers to be built in Purex under Project CGC-124 (Increased Flexibility). Present plans are to have a design for at least one of the several insert concepts completed by early June. This would allow construction of a mockup of the insert to be tested in the multipurpose dissolver mockup late this summer.

A development program has been initiated to determine the feasibility of dumping current NRD fuel elements into multipurpose dissolver vessels having annuli smaller than twelve (12) inches. A preliminary design of the dissolver mockup has been prepared and issued for comment.

b. Project Engineering

CGC-140 - Ventilation Filter Replacement - Purex

A Project Proposal requesting \$750,000 for replacement of the failed Purex filter was transmitted to the Commission on April 28.

c. Manufacturing Engineering

Canyon Filter

A mock-up of the primary Purex canyon filter was set up. Tests are presently being made at 321 Building to evaluate the current problem and to gain understanding for future rejuvenation.

Purex Vacuum Nitric Acid Fractionator

A study was made to determine the desirability of adding a de-entrainer to the Purex Acid Fractionator (T-U6). An analysis of the current distillation operation was made, based on data taken from the instrumentation on the unit; and the present duty was compared with the equipment design basis. The study indicated that some changes in the operation of the fractionator may make it unnecessary to add a de-entrainer to the unit at this time.

2. Redox

a. Process Design Engineering

Monitors for Redox Sand Filters, Stack, & Dissolver Off-Gas

All fabrication and purchasing of equipment required for the monitors on Redox Sand Filter, Stack, and Dissolver Off-Gas was completed. Installation is expected to start during the first week of May.

Bremsstrahlung Detection System

The Bremsstrahlung (gamma-deceleration of electrons resulting in energy being converted into photons) detection system was installed in the Promethium Purification Facility during the last week of the month. This system is now ready for operation at start-up of the facility about mid-May.

Estimate of Plutonium in Resin

A quantity of resin from the L-18 ion exchange contactor was examined by gamma energy analysis for an estimate of plutonium content. The relatively high gamma contribution of Ru-106 and Zr-NB-95 was stripped from the total reading, allowing reasonably good definition of the Pu-239 380 KV energy. A fairly simple procedure for using this method with the portable gamma

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energy analyzer is now available. The plutonium content of the L-18 resin sample was estimated to be less than five (5) grams.

Process Jumpers

Seven (7) process jumper designs were completed and drawings issued. Four (4) jumpers were for "D" Cell; two (2) for "H" Cell, and one (1) for D-12 (tube bundle) steam inlet.

b. Project Engineering

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

Directive No. HW-532, Mod. #1, dated April 28, authorized an additional \$25,000 for the UO₃ Plant work.

3. Weapons

a. Process Design Engineering

Machining

An experimental attachment to the female tool holder in HC-24B will allow drilling of the "pole hole" in the turning machine. This device, to be tried out about May 1, could eliminate the drill press operation, reduce hand exposure, and shorten over-all machining cycle time.

New Laboratory Glove Boxes

All design on the glove boxes for use on the Euratom orders, with the exception of electrical, has been completed. The equipment has been ordered and the shop is gathering material to start fabrication. Comment prints on the second general purpose glove box to be installed in 179C have been issued.

Thermal Treatment Facility

All detail design drawings and specifications have been completed by Vitro Engineering and approved by the Company. Most equipment is on order and glove box fabrication was started.

Dry Air System

Three (3) of the eight (8) dew point analyzers ordered for the dry air system have been received. These analyzers will be installed downstream from "A", "B", and "D" dryers.

Detail design has been completed for installation of orifices and manometers in each of the five (5) dry air supply zones.

These installations will measure the volume of dry air being supplied to each zone, thus providing valuable information on the dry air distribution. Detail design is in progress for the installation of additional monitoring and control equipment, and a cooler for "D" dryer.

Incinerator

A program of testing feed belts to the 234-5 Building incinerator has resulted in recommendation for a positive drive cast link belt. Tests have been made with belts of Inconel, stainless steel, and Nichrome V. Of these, the Nichrome V Belt had the longest service life, and it was recommended for a replacement until the cast link belt can be procured and installed. Detail design comment drawings for the cast link belt have been issued. A chemical addition tank was installed in Leach Hood #2 to provide a means of adding commercial flocculents for solid recovery from scrubber solutions.

Existing Button Line

The up-dating of button line drawings has resulted in the voiding of 1,350 drawings. An engineering study was started on alternative methods of re-building the HC-17 (sampling, button-breaking, and pickling) complex on the RMC Button Line. A second engineering study was initiated for a new device for taking samples of plutonium oxide from the calciner discharge and for new equipment to remove oxide from the Hood 9 complex without routing it through the fluorinator.

b. Project Engineering

Three (3) proposals were transmitted to the Commission on April 27 ; they are:

CGC-987 - Rev. #1 - Metal Stabilization Facility - 234-5 Building

Requesting total project funds for the "Z" Plant isostatic press.

CAC-138 - Special Plutonium Preparation Facilities-"Z" Plant

Requesting \$410,000 for facilities for preparation of special unclassified plutonium compounds.

CAC-139 - Fire Protection Modernization - "Z" Plant

Requesting design of additional sprinklers, fog nozzles, fire detectors and alarms, and increased sanitary water capacity at "Z" Plant.

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c. Manufacturing Engineering

Casting Cycle Time and Material Cost

The study to determine incremental casting time, casting cycle time, direct labor time and material cost for the casting areas of weapons processing has been completed. The data is being provided to CPD Financial for establishing standard costs.

Final Inspection Work Cycle

A study has been initiated to determine the present inspection cycle time and fixed and variable factors affecting the cycle. The objective of the study is to provide information and recommendations for improving the workload capacity.

4. General

a. Process Design Engineering

Hanford Isotope Plant

Atomic Energy Commission, Washington, requested additional information regarding product specifications and inventories, waste management incremental cost for purification and aging of the desired products, and capital and operating costs for an attached and a separate fission product facility. In conjunction with Purex and R and E personnel, the information was developed and transmitted to them by letter in mid-April.

Purex Shielded Analytical Laboratory

The design criteria document for the shielded laboratory (HW-81400), was approved by CPD and transmitted for approval on April 8.

Promethium Transfer Line

Design criteria drawings and a criteria document have been prepared on a transfer system between "B" Plant Strontium Semiworks, the CR Vault, and the 241-A Tank Farm. The cerium-rare earth crude solution stored in Phase I "B" Plant tanks would be routed to storage via the CR Vault and cerium waste would be routed to the 241-A Tank Farm.

Phase II - "B" Plant Packaging Prototype Work

Bids for the manipulator have been reviewed, and the order can be placed as soon as funds are available. The order has been placed for process station equipment. One bid was received for the dry air heater and the order has been offered with an exception (helium heater test) to the bid. Bids have been requested for design and fabrication of the waste container.

b. Project Engineering

Project Cost Information as of 4/12/64:

Total Authorized Funds-18 active projects	\$ 4 086 000
Total cost-to-date	2 834 000
Commitments and Open Work Releases	259 000
Unencumbered Balance	993 000
Costs Charged to Above Projects - 3/1/64 to 4/12/64	112 000

5. Shops

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 fabrication, mock-up, and test of the Purex T-H2(HA) Column and prepared it for delivery to spare parts for storage. Also, this shop completed the Wet Filter Scrubber for 224-U Building. Work was started on a Purex Dissolver Tower of new design.

b. Sheetmetal Shop

Completed repairs and modifications to the Stronium Semiworks "D" Cell and loading facility.

c. Machine Tool and Die Shops

Completed three (3) special core drills for taking samples of Purex Filter media. Also, these shops made special items for the 236-Z Building and two (2) special transformers for the Sheffield gauging equipment in 234-5 Building.

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d. Jumper Shop

Fabricated and tested twenty (20) jumpers - 12 for Purex and 8 for Redox. Also, fabrication was started on the D-14 Helical Tube Bundle for Redox.

e. Rotating Equipment Shop

Completed and shipped two (2) pumps and four (4) agitators and completed the T-A3-1 Tower Tilting Device for transporting equipment to "T" Plant for decontamination and repair.

6. Power and Services

Steam and electrical services were provided without interruption to the CPD production facilities. Numerous steam outages were scheduled and executed in 200-East Area to facilitate renovation of steam lines.

The ventilation balance crew assisted during the Purex filter difficulties, in addition to routine work.

Manager - Facilities Engineering

HP Shaw/WWC/alr

cc: File

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II. ACHIEVEMENTS (Continued)

G. RESEARCH AND ENGINEERING OPERATION

1. Purex Process Engineering

a. Ventilation Forefilter

The differential pressure across the forefilter in the Purex ventilation exhaust system began a rapid increase about March 27, 1964. Over a two week period, the pressure drop rose from 6 to approximately 14 inches of water with a decrease in air flow from 135,000 to 47,000 cubic feet per minute. Air samples upstream of the filter showed the air loading was a factor of about 30 above normal and was predominantly ammonium nitrate. A visual inspection of the filter plus dew point measurements of the air stream showed the system to be essentially dry. The inspection also revealed that the top of the glass fiber forefilter bed was covered with a crust and had been compacted from the original height of 7 feet to a height of 5.5 feet. Core samples of the glass fiber packed at a low density in the top of the forefilter were obtained. Visual and chemical analyses of the samples confirmed the presence of a crust and the deposition of large amounts of ammonium nitrate. The ratios of Ru-130 to 106, Cs-134 to 137, and Sr-89 to 90 indicated that fission products had been accumulating in the top of the filter for some 5 years with no evidence of a recent large activity deposit. Overall filtration efficiency remains at greater than 99.9 per cent. A sampling program of canyon process vessels and special laboratory studies of recent process activities did not reveal the presence or a likely source of large amounts of ammonia in normal canyon process systems. Special studies were started in the dissolver systems to see if the large amounts of ammonia generated in the coating removal step could have inadvertently entered the canyon ventilation system.

The differential pressure and air flow has been returned to a satisfactory level by fluctuating the canyon static pressure and alternating the supply and exhaust fans. Process operations have been resumed with no indication of large amounts of ammonium nitrate entering the canyon ventilation system and depositing in the filter. The behavior of the plant filter coupled with past observations of pilot plant units indicates the forefilter is approaching the end of its useful service life. Plans are under-way to replace the unit with a new glass fiber filter.

b. Solvent Extraction

A flooding frequency test of the HS Column showed a large aqueous hold-up occurred at the top of the column at a volume velocity of 750 gallons per hour per sq. ft. and a pulse frequency of 75 cycles per minute.

Off-specification uranium product that had been made 0.025 M in oxalic acid by an error during regeneration of the silica gel units was satisfactorily processed through the Final Uranium Cycle. The 2D Column raffinate loss was maintained at a very low value to permit routing the waste to the First Cycle Waste Concentrator.

Laboratory tests of the permanganate pre-treated water showed only a modest improvement in water quality. The plant test, however, is being continued to obtain additional plant and laboratory data.

c. Product Treatment

The heating coil was removed from the plutonium ion exchange strip column. Neither the removal of the coil nor the failure of the strip solution heater have appreciably altered the performance of the strip column.

Most of the neptunium purification runs have required about five attempts before satisfactory oxidation of the neptunium to neptunium-V was attained. Removal of the hydrazine from the preceding fluoride scrub solution eliminated the oxidation problem without causing any processing difficulties.

d. Waste Treatment

The titanium tube bundles in the 3WB Backcycle and IWW Waste Concentrators continued to operate without any evidence of fouling. The apparent decrease in the capacity of the IWW titanium tube bundle reported last month was traced to a defective instrument.

Following replacement of the TK-103-A pump, sluice-mixing tests in the 241-A Tank Farm were started on a daily basis. Operation of the system has been smooth. Analytical data accumulated to date, however, are not sufficient to indicate sluicing efficiency.

Sludge samples were successfully obtained from TK-241-A-101 and TK-241-A-104 with an impact grabber technique.

e. Fission Product Processing

The removal of cesium from waste supernatants with AW-400 Zeolite was successfully demonstrated in a field test program. Breakthrough with an integrated loss of 5 per cent occurred at 25 - 30 column volumes and sodium was separated at a 300 DF with a simple water wash. Greater than 94 per cent of the cesium was eluted with 36 column volumes of 1.5 M potassium nitrate.

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A batch treatment campaign to obtain additional cerium decontamination for part of the February rare earth product was conducted at the Strontium Semiworks to permit final purification of the promethium in a lightly shielded facility. The processing sequence consisted of (1) co-extraction of the rare earths and cerium with D2EHPA from a 0.025 M HEDTA solution, (2) stripping the rare earths from the solvent while extracting the oxidized cerium with a silver catalyzed persulfate solution, (3) extracting the rare earths with D2EHPA, and (4) stripping the rare earths with a nitric acid solution. Overall promethium recovery for the campaign was 94 per cent. The overall cerium decontamination factor was only 8, but a cerium DF of 25 was obtained in the first two processing steps. Recontamination with cerium resulted from reuse of contaminated solvent and equipment. The rare earth solution containing about 85 kilocuries of promethium and 870 curies of cerium was concentrated to a volume of 25 gallons and loaded into a solution cask. Subsequent flushing operations of the loadout system, however, indicated that 40 per cent of the promethium had precipitated during concentration and was not loaded into the cask. Concentration limits are being studied in the laboratory.

2. Redox Process Engineering

a. PRTR Campaign

The processing of 6.3 kilograms of PRTR plutonium (as plutonium alloy fuel elements) was completed satisfactorily during April. The PRTR plutonium solution was blended with uranium metal solution to produce a feed solution within the safe plutonium to uranium ratio. The material was processed through the extraction columns using the current Redox flowsheet; except for the use of neutral HAX solution. Based upon measured load-out versus Hanford Laboratories predicted inputs, the total PRTR recovery amounted to 100.1 per cent. Waste discards amounted to 1.4 per cent and residual heels amounted to 0.5 per cent, giving a total accountability of 102.0 per cent.

b. Analog Computer Study of Specific Gravity Control System for the HA Column

An analog computer study of closed loop specific gravity control for the HA extraction column was completed by Systems Research, Hanford Laboratories. The computer was programmed to simulate the 30-minute "dead time" inherent in the specific gravity response of the HA Column, and take into account several control variables. Computer runs indicated that acceptable control would not be possible using conventional control instruments.

A "dead time" compensation control circuit was proposed, simulated on the computer, and found to give satisfactory control. Additional computer runs of the compensated circuit were made to determine optimum control settings and to avoid unstable operation or column upsets during plant startup of the prototype control system.

3. Plutonium Process Engineering Operation

a. Plutonium Reclamation Facility Start-Up

Testing the process and equipment under simulated (everything except plutonium) flowsheet conditions demonstrated the basic operability of the solvent extraction columns, the Task I filtrate evaporator, and product evaporator.

Testing of the slag and crucible dissolvers has shown a number of problems. Most of the problems originated as a result of the energetic reaction which takes place when the tin can container dissolves to expose the contained calcium to the acid. Solids and solution were ejected to the surge tank, and solids were forced into solution feed lines to cause plugging problems. The prototype dissolver (TK-06) has been modified to minimize surge effects and solids problems. The other slag and crucible dissolver (TK-04), a single-tube unit which showed less potential during cold testing, was taken to 300 Area for additional cold testing and modification.

Temperature checking of the "bank tanks" (interconnected, parallel, geometrically safe cylinders) showed temperatures in the range of 50 - 70° C. Such temperatures caused a number of problems such as pump cavitation, accelerated organic degradation, and loss of CCl_4 due to evaporation. Although not noted in cold run testing, the higher system temperature also would increase equipment corrosion. Oversized canned motor pumps, used both for solution transfer and tank mixing, are the source of the problem. As a short range solution to the problem, three organic bank tank recirculation legs have been fitted with water-cooled heat exchangers to reduce the temperature in critical process locations. For a more satisfactory long term solution to the problem, replacement with smaller pump and/or impeller combinations is planned.

The elevated organic temperatures produced problems with PVC (polyvinyl chloride plastic) piping, which became brittle and caused some leaks. Hence, the PVC has been replaced with PVF₂ (polyvinylidene fluoride - trade name "Kynar"*) to eliminate all potential corrodable PVC in the cell and hoods. The Kynar, which has held up well in tests, has the strength of teflon, yet it can be molded (fittings can be made considerably cheaper) and appears to be highly satisfactory material for this process.

* "Kynar" trademark of the Pennsalt Chemicals Corporation.

4. Separations Chemistry Laboratory

a. Purex Process Improvement

Alternate Reductant

Investigations on the possible use of sodium formaldehyde sulf-oxalate (SFS) as a reductant in the 2D uranium extraction cycle

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continued during the month. Laboratory work indicates that degradation products formed in the 30 v/o TBP-Soltrol are not removed from the organic phase during subsequent hot carbonate washing; this indicates incompatibility of SFS in the Purex process. Study of this problem is continuing.

b. Half-Life of Oxalic Acid in Purex IWW

Further studies on the use of oxalic acid as an additive to the HA Column were continued. Determination of the half-life of oxalic acid in the waste stream by ceric titration indicated a first order reaction with a half-life of 40 minutes at 4.62 M and 16 minutes at 5.73 M HNO_3 concentration. The 2 1/2 days residence time in the F-6 concentrator available for the disappearance of oxalic acid appears to be adequate.

c. Fission Product Process Improvement

Promethium Recovery

A small batch of promethium was received at the laboratory from the Hot Semiworks. This material may be utilized as the feed for the shake-down run of the promethium recovery unit within the next 30 - 60 days. Some potential difficulty in separating the cerium from the promethium rare earth fraction at the Hot Semiworks was indicated by laboratory tests on samples of the crude. The cerium did not respond to oxidation by the usual persulfate-silver treatment due to the reducing power present in the semi-works solvent. Attempts to wash the solvent with caustic-tartrate and acid-oxalate solutions indicated little or no improvement. Laboratory tests indicated that excellent oxidation and extraction could be obtained using fresh 0.47 M D2EHPA - 0.2 M TBP in Soltrol and with the usual 0.35 M $\text{K}_2\text{S}_2\text{O}_8$ - 0.02 M AgNO_3 as oxidant. Under these conditions the use of either a 1 M or 2 M HNO_3 aqueous phase produced essentially no difference in the behavior of the cerium.

d. UO_3 Process Improvement

The UNH laboratory calciner has performed quite satisfactorily during the month. Several test batches have been calcined with various additives. These include $(\text{NH}_4)_2\text{SO}_4$, H_2SO_4 , S, traces of hexone and TBP, NaCl, and $(\text{NH}_4)_2\text{C}_2\text{O}_4$. The calcined products will be evaluated on the thermo-balance for rate and percent conversion to the fluoride by first reducing to UO_2 with hydrogen and then hydrofluorinating. During the second hydrofluorination cycle a leak developed in a furnace weld and the unit has been dismantled for repair.

e. Laboratory Improvement

Rare Earth Analyses

Neodymium and samarium were determined spectrophotometrically in 0.015 M EDTA solutions. Neodymium was measured at the 794 millimicron absorption maxima between the concentrations of 0.2 and 2.0 g/l using a 5 cm path length. Samarium was measured at the 401 millimicron absorption peak between the concentrations 0.4 and 2.0 g/l using a 10 cm path length

cell. Both calibrations were accurate to plus or minus 1.0 per cent.

Analysis for NH_3 in Hydrazine

An analysis was developed for ammonia in 35 per cent hydrazine solutions. Hydrazine was first oxidized by bromination in an acid system. The residual ammonia was then determined by oxidation with hypobromite formed on making the sample basic. Standard recoveries were 100 plus or minus 2 per cent.

Atomic Absorption

The Jarrell-Ash absorption photometer was used during the month to determine detection limits for iron, gallium, and aluminum. The instrument has been used as both an absorption unit and as an emission unit. With a stoichiometric mixture of O_2 and H_2 as fuel, the instrument sometimes performs better as an emission unit than it does for absorption, i.e., a detection limit of 3 ug/ml versus .025 ug/ml for gallium. The "OH" lines may be the reason for interference with gallium. No work has been done as yet using the oxygen-acetylene flame, which will probably be a superior flame for aluminum as well as gallium.

5. Plutonium Chemistry Laboratory

a. Electrorefining Plutonium Metal

The formation of unconsolidated plutonium metal product continues to be the major difficulty. Chlorine was substituted for hydrogen chloride as a sparge gas with little or no improvement.

Changing the approach to this problem from improvement of consolidation to prevention of finely divided product formation has produced fruitful results. Experiments were conducted at a temperature below the melting point of plutonium metal so that the cathode product would be trapped at the cathode. This produced a large black mass at the cathode within 3 - 5 minutes. This seemed to add further emphasis to previous observations that the phenomenon is a cathodic process.

The one cathode variable that can be readily studied is current density. Reducing this from the usual 3-5 amps/cm² as used in electrowinning to about 0.4 amps/cm² produced no unconsolidated product and an anode efficiency of 90 per cent.

b. Ion Exchange Resin Stability

Preliminary ignition tests on Dowex 50Wx8 cation resin have shown no appreciable hazard. Sample treatments included (1) loading with americium, (2) washing with 7 M HNO_3 , (3) contacting for 90 hours with 7 M HNO_3 , (4) contacting with DBBP- CCl_4 or (5) as-received. No explosion or reaction other than charring occurred up to temperatures of 200° to 215° C. Removal of surface moisture started

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at 100° to 105° C; a resin color change (darkening) occurred at 135° to 140° C and a final color change of the resin to black occurred at 190° to 200° C. It was also noticed that the resin beads still retain their relative shape through the above heating stages. In comparison, the nitrate form of Permutit SK anion resin explodes under the same ignition test conditions at a temperature of 175° to 180° C.

c. PRTR Fuel Processing

The PRTR fuel plutonium nitrate solution was received from Redox and processing was begun. A total of four PR cans were processed, yielding 5100 grams of oxide. Normal operational difficulties were encountered, but the equipment has functioned satisfactorily. Six additional PR cans of rinse solution are awaiting processing. Concentration will be required for several of the rinse cans before the solution would be suitable for precipitation processing.

d. DBBP Extraction of Plutonium

The final report on the development of a flowsheet for the 912 facility has been issued as HW-81710, "Test Column for Recovery of Plutonium from CAC-880 Waste Stream", Unclassified. The Summary and Conclusions follow:

A packed bed static column was used to evaluate plutonium extraction from 880-generated CAW. Five runs were made in which plutonium(IV) was extracted by a mixture of 25 per cent DBBP-CCl₄. Two runs were made in which the extracted plutonium was stripped from the organic by 0.5 M Na₂CO₃. The product was reacidified for return to 880 feed makeup and the organic was reacidified to match incoming CAW.

The extraction ratio $\left(R_{\text{ext}} = \frac{C_{\text{feed}}}{C_{\text{overflow}}} \right)$ remains relatively unchanged over a wide range of feed concentrations.

An increase in the flow rate should improve phase mixing and decrease drop size with a corresponding increase in R_{ext} . The observed decrease in R_{ext} with increased flow rate indicates the dominant factor in this case is the displacement of the organic phase with the aqueous (flooding).

A decrease in the R_{ext} occurs when the DBBP concentration is increased.

Scrubbing with low-concentration nitric acid is necessary to remove CAW from the column and to lower the organic hydrogen ion concentration.

Sodium carbonate is an effective stripping agent. When used with a scrub stage, no excessive foaming or solids buildup occurs.

Product reacidification is smooth and uncomplicated. No serious foaming problem is evident and the operation is rapid.

A flowsheet for the operation of the CW column was developed which demonstrated an extraction ratio of at least five. Extraction ratios greater than five are expected with the plant CW column operation because of the larger Raschig rings, greater effective column diameter and height than in the test column, and because of the aqueous recirculation provision.

Subsequent to the issuance of this report a column run using aged Recuplex CAW was completed. This run gave a somewhat higher extraction ratio of 10.6 compared to 5-6 found with the synthetic CAW. The change is attributed to an increased density difference between the two phases. The Recuplex CAW had a lower density than the synthetic material and the drop distribution in the column was better.

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>3-29-64</u>	<u>4-26-64</u>	<u>3-29-64</u>	<u>4-26-64</u>	<u>3-29-64</u>	<u>4-26-64</u>
General Manager's Group	8	8	2	2	10	10
Financial	15	15	19	19	34	34
Research & Engineering	67	69	29	29	96	98
Facilities Engineering	101	101	214	216	315	317
Production	7	7	4	4	11	11
Redox	66	66	237	237	303	303
Purex	71	72	261	263	332	335
Weapons Manufacturing	<u>61</u>	<u>61</u>	<u>262</u>	<u>263</u>	<u>323</u>	<u>324</u>
Total	<u>396</u>	<u>399</u>	<u>1028</u>	<u>1033</u>	<u>1424</u>	<u>1432</u>

C. TRIPS

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To Other G.E. Components</u>		
E. O. Swain	APED San Jose, California	UF6 - UC2 Plant. (4/4 - 7/64)
T. G. LaFollette	Louisville, Kentucky	Attend Plant Engineering & Maintenance meeting. (4/5 - 9/64)
R. W. Harvey	Computer Department Phoenix, Arizona	Attend G.E. Western Methods & Work Measurement Conference. (4/7 - 10/64)
P. H. Reinker	Palo Alto, California	Business discussions. (4/13/64)
C. B. Foster	Crotonville, New York	Shop Managers Training Course. (4/13 - 17/64)
	Manufacturing Services Schenectady, New York	Manufacturing consultation with Mark ter Vehn. (4/20/64)
	Silicone Products Dept. Waterford, New York	Manufacturing consultation regarding methods and pro- cedures with J. R. Goggin. (4/21/64)
	New York, New York	Business effectiveness with J. W. Talbott. (4/22/64)
H. E. York	Metallurgical Prod. Dept. Detroit, Michigan	To discuss new grade of carbide 999. (4/23/64)
<u>To AEC and Other AEC Contractors</u>		
R. J. Sloat	U. S. AEC Washington, D.C.	Discuss specifications for Euratom plutonium. (4/2 - 3/64)
L. M. Knights A. E. Smith	The Dow Chemical Co. Rocky Flats Plant Denver, Colorado	Discussions on product specifications. (4/3/64)
J. H. Warren	U. S. AEC San Francisco, California	Attend meeting with DRD on Pu diversion. (4/6 - 8/64)

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C. TRIPS (Continued)

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To AEC and Other AEC Contractors (Continued)</u>		
W. S. Frank W. J. Gartin R. C. Hollingshead A. E. Smith	Lawrence Radiation Laboratory Livermore, California	Attend Interagency Mechanical Operations Group mtg. (4/14 - 17/64)
J. B. Kendall T. R. McKenzie	E. I. du Pont Savannah River Plant Aiken, South Carolina	Purex Plant process improvement programs. (4/21 - 22/64)
	Oak Ridge National Laboratory Union Carbide Nuclear Co. Oak Ridge, Tennessee	" " (4/23 - 24/64)
L. L. Zahn	U. S. AEC Germantown, Maryland	Shipment of spent reactor fuel - discuss transport containers. (4/23 - 24/64)
C. B. Foster	E. I. du Pont Savannah River Plant Aiken, South Carolina	Manufacturing consultation with John Hershey. (4/23/64)
R. E. Tomlinson	U. S. AEC Germantown, Maryland	Chemical separations program. (4/27 - 28/64)
L. M. Knights	Bendix Corporation Kansas City, Missouri	Attend Quality Managers Meeting. (4/30 - 5/1/64)
<u>To General Industry</u>		
D. R. Gustavson	Coates Electric Company Seattle, Washington	Equipment for In-Tank Waste Solidification Project. (4/6/64)
J. F. Kane	Reed Electric Company Portland, Oregon	Motors for "B" Plant centrifuges. (4/15/64)
L. B. Bradley	Metropolitan Engineers Seattle, Washington	200-E and 200-W Export Water Lines. (4/20/64)
	Boeing Company Seattle, Washington	FCN System. (4/21/64)

C. TRIPS (Continued)

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To General Industry</u> (Continued)		
P. S. Kingsley	Esco Corporation Portland, Oregon	Testing of pressure vessel. (4/23 - 24/64)
B. M. Johnson	Pulp & Paper Research Institute of Canada Montreal, Canada	Corrosion work and spray calcination technology. (4/24/64)
R. C. Baker	American Air Filter Co. Louisville, Kentucky	Replacement filters for Purex. (4/25 - 29/64)
<u>To Conventions and General Meetings</u>		
H. E. York	Detroit, Michigan	American Society of Tool & Manufacturing Engineers Tool Exposition and Engineering Conference. (4/20 - 22/64)
R. E. Tomlinson	Subcommittee of American Standards Association Washington, D.C.	Attend meeting on radio- active waste disposal as member of committee. (4/29/64)
<u>To Foreign Governments and Agencies</u>		
L. L. Zahn	International Atomic Energy Agency Vienna, Austria	Shipment of spent reactor fuel - discuss transport containers. (4/25 - 5/7/64)
	Paris, France	" "
	Grisley, England	" "
	Harwell, England	" "

D. VISITORS

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From Other G.E. Components</u>		
Stanford Neal	Schenectady, New York	Purex Plant tour. (4/22/64)

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D. VISITORS (Continued)

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From AEC and Other AEC Contractors</u>		
R. D. Walton	U. S. AEC Washington, D.C.	Plutonium, U-233 and thorium uses. (4/3/64)
J. S. Maxon	Sandia Corporation Albuquerque, New Mexico	Visual inspection of secondary standards lab. and audit use of standards in weapons fabrication. (4/7/64)
L. M. Brenner R. E. Georgi M. L. Nash J. A. Waters	U. S. AEC Washington, D.C.	Tour of B Plant greenhouse, Purex Conference Room and 234-5 facilities. (4/14/64)
H. J. Anderson H. Barton L. F. Grill D. P. Jacobson J. L. Lockard	The Dow Chemical Company Rocky Flats Plant Denver, Colorado	Plutonium sample exchange analytical program. (4/14 - 16/64)
W. R. Tyson	E. I. du Pont Savannah River Plant Aiken, South Carolina	" "
H. Evans	Argonne National Laboratory Lemont, Illinois	" "
F. E. Jones C. F. Metz J. Murphy R. Phelps R. K. Zeigler	Los Alamos Scientific Lab. Los Alamos, New Mexico	" "
A. Langhorst	Lawrence Radiation Laboratory Livermore, California	" "
W. R. Amos G. L. Fogle E. L. Gieselmann	Mound Laboratory Miamisburg, Ohio (McClellan, California)	" "
R. K. Zeigler	Los Alamos Scientific Lab. Los Alamos, New Mexico	Discussion concerning Pu Isotopic Determination. (4/15/64)
D. G. Karraker	E. I. du Pont Savannah River Plant Aiken, South Carolina	Thorium - U-233 technology. (4/20/64)

D. VISITORS (Continued)

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From AEC and Other AEC Contractors (Continued)</u>		
B. Swartz	U. S. AEC Germantown, Maryland	General orientation and tour of Redox; visits to UO ₃ , 222-S Laboratory. (4/20/64)
J. J. Burke C. T. Smith	U. S. AEC Washington, D.C.	Inspection of 201-West Area Shops. (4/24/64)
D. G. Heberlein L. D. Hozilton B. L. Kelchner B. L. Page	The Dow Chemical Company Rocky Flats Plant Denver, Colorado	Discuss Pu specifications. (4/27 - 28/64)
<u>From General Industry</u>		
D. Caldwell	Metropolitan Engineers Seattle, Washington	201-E and 200-W Export Water Lines. (4/1/64)
W. A. McCubbin T. Weisman	Martin-Marietta Company Baltimore, Maryland	Discuss Waste Management and Isotopes Plant. (4/2 - 3/64)
C. S. Caldwell H. W. Krake	NUMEC Apollo, Pennsylvania	Critical mass and plutonium reclamation facilities. (4/8/64)
J. Schneider	Wyandotte Chemical Corp. Las Nietos, California	Decontamination chemicals. (4/21/64)
D. Tuel	Wyandotte Chemical Corp. Seattle, Washington	" "
<u>From Other Federal and State Agencies</u>		
R. L. Bruns K. J. Tonyan	U. S. General Acct. Office	Redox overtime usage with H. W. Murray, R. G. Zumhoff. (4/13 - 14/64)

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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>Total</u>	<u>YTD</u>
Dis. Injuries									0	0
Ser. Accidents									0	1
Med. Treat Inj.		10	11	11	5				37	177
Rad. Occur.		2	8						10	45
Contam. Wds.					1				1	7
New Dep. Cases			1 ^Δ						1	11
Fires		1*	1**	1***					3	5
Security Viol.				1					1	6

Δ Approximately 4% MPBB by inhalation, occurring 1-16-64.

* Fire 64-3 - Hot smoking material from ash trays accidentally mixed in with waste papers from offices and thrown in load lugger by janitor. Damage, \$10.00.

** Fire 64-4 - Short in wiring of mobil crane motor. Damage, \$45.00.

*** Fire 64-5 - 232-Z Bldg., probably originated in chopper hopper prior to incinerator. Damage, \$17.60.

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V. REPORTS

A. PREPARED AND ISSUED

HW-77347 REV, Unclassified, "Critical Mass Control Specification - Hood 7-C, 234-5 Building", dated April 13, 1964, by R. J. Sloat.

HW-79386, Official Use Only, "Project Proposal, Special Plutonium Facility - 'Z' Plant - Project CAC-138", dated April 16, 1964, by L. W. Finch.

HW-80712, Unclassified, "Scope Rev. #3, Process Design Engineering, Waste Management, Program Phase II", dated February 13, 1964, by H. W. Caudill.

HW-81018, Official Use Only, "Preliminary Project Proposal - Fire Protection Modernization - 'Z' Plant - Project CAC-139", dated April 20, 1964, by L. W. Finch.

HW-81445, Secret, "Budget for FY 1966 and Revised Budget for FY 1965 - Separations Research and Development Program (02 50 10 15 1)", dated April 1, 1964, by W. S. Frank.

HW-81446, Confidential, "Budget for FY 1966 and Revised Budget for FY 1965 - Plutonium Processing Research and Development Program (02 50 10 20 1)", dated April 1, 1964, by W. S. Frank.

HW-81455, Secret, "Budget for FY 1966 and Revision of Budget for FY 1965 - Proposal for Research and Development - General Weapons Development", dated March 31, 1964, by W. S. Frank and A. E. Smith.

HW-81456, Secret, "21a-6 Budget for FY 1966 and Revision of Budget for FY 1965 - Proposal for Process Development", dated March 31, 1964, by W. S. Frank and A. E. Smith.

HW-81460, Unclassified, "Technical Criteria for the Prevention of Criticality - Chemical Processing Department", dated April 8, 1964, by W. S. Frank.

HW-81480, Official Use Only, "Project Proposal, Rev. #1, Metal Stabilization Facility - 234-5 Building - Project CAC-987", dated April 17, 1964, by L. W. Finch.

HW-81502, Secret AWD, "A-Line Product Characteristics - February, 1964", dated March 25, 1964, by A. E. Smith.

- HW-81531, Unclassified, "Critical Mass Control Specification, Room 43, 236-Z Building", dated April 3, 1964, by R. J. Sloat.
- HW-81533, Secret, "Polishing of Type 74-C Parts", dated March 27, 1964, by A. E. Smith.
- HW-81535, Unclassified, "Budget Facility Description, Button Line Equipment - 234-5 Building", dated March 31, 1964, by R. A. Ciccarelli.
- HW-81542, Unclassified, "Plutonium Buy-Back Facility, 'Z' Plant, FY-1966 Budget Facility Description", dated March 30, 1964, by W. R. Kendall.
- HW-81554, Unclassified, "Engineering Study-Additional Turning Machines - 'A' Line - Weapons Production - 234-5 Building", dated March 30, 1964, by R. C. Hollingshead.
- HW-81636 RD, Secret, "Purex, Redox, UO₃ Production Schedule - April, 1964", dated April 1, 1964, by D. McDonald.
- HW-81637 RD, Secret, "234-5 Production Schedule - April, 1964", dated April 1, 1964, by D. McDonald.
- HW-81661, Confidential, "Scheduled Shutdown - Purex and Uranium Oxide", dated April 2, 1964, by J. H. Warren.
- HW-81663, Secret, "21A-5 Summary Analysis of Proposed Process Development Costs for FY 1966 and Revision of FY 1965", dated March 31, 1964, by W. S. Frank and A. E. Smith.
- HW-81664, Secret, "Analysis of Brandy - Purex Nos. 11, 12 and 13", dated April 13, 1964, by J. H. Warren.
- HW-81679, Secret, "Weapons Process Engineering Technology Report - March, 1964", dated April 3, 1964, by A. E. Smith.
- HW-81678, Secret, "Plutonium Purity", dated April 3, 1964, by A. E. Smith.
- HW-81708, Secret, "Fabrication Process Test - Casting Model 74-C Preforms in Double Cavity Molds", dated April 7, 1964, by A. E. Barber.
- HW-81710, Unclassified, "Test Column for Recovery of Plutonium from CAC-880 Waste Stream", dated April 7, 1964, by D. M. Creighton.
- HW-81721, Secret, "Fabrication Process Test 64-7, Test of Co-Reduced Alloy in the Fabrication of Model 74-C Components", dated April 6, 1964, by S. T. Field.
- HW-81730, Secret, "Critical Mass Control Specification for Fabrication Process Test 64-10 - Casting Model 74-C Preforms in Double Cavity Molds, HA-20-MB, HA-28-C, HC-2, HC-3, and HC-19-A1", dated April 8, 1964, by A. E. Barber.
- HW-81766, Secret, "Formed Plutonium Hardness and Yield Strength Data", dated April 13, 1964, by A. E. Smith.

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HW-81768, Official Use Only, "Chemical Processing Department Budget for FY 1966 and Revision of FY 1965 Plant and Capital Equipment", dated April 13, 1964, by L. L. Zahn.

HW-81841, Secret, "Preliminary Investigation - Integrated Waste Management and Fission Product Costs", dated April 17, 1964, by J. H. Warren.

HW-81858, Secret, "Expedited Redox Shutdown", dated April 24, 1964, by P. H. Reinker.

HW-81867, Unclassified, "Redox Process Study for the F-7 Pump Improvement Program", dated April 10, 1964, by J. T. Knight.

HW-81868, Unclassified, "CPD Hazards Evaluation Task Force Report - Americium Recovery Facility - 'Z' Plant - Phase I", dated April 30, 1964, by D. E. Braden.

HW-81937, Secret, "Analyses of Brandy Batch - Purex Nos. 13 and 14", dated April 21, 1964, by J. H. Warren

HW-81981, Official Use Only, "Project Proposal - Purex Ventilation Filter Replacement - Project CGC-140", dated April 27, 1964, by L. W. Finch.

HW-82006, Secret AWD, "74-C Pitting Problems", dated April 27, 1964, by W. S. Frank.

HW-82042, Secret, "Plutonium Parts No. 206-6171 and 205-7469", dated April 28, 1964, by G. C. Oberg.

B. PREPARED FOR SIGNATURE AND ISSUANCE

HW-81619, Secret, "Production - March, 1964", dated April 1, 1964, by W. E. Johnson.

HW-81863, Secret, "HAPO Production Forecast - April 1, 1964 Through December 31, 1965", dated May 1, 1964, by W. E. Johnson.

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VI. PATENT SUMMARY

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

INVENTOR

TITLE

NONE

J. H. Rinker

General Manager
Chemical Processing Department

END

DATE
FILMED

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