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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
FOR

HW--83102

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By Authority of CG-PR2JUNE, 1964

Compiled By
 OPERATION MANAGERS

Robert J. Ten 8-26-92by J.W. Wells- 8-31-92Verified By PM Eick 9-2-92

July 22, 1964

HANFORD ATOMIC PRODUCTS OPERATION
 RICHLAND, WASHINGTON

by Date 5-15-92

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I. SUMMARY

Production through June, as compared with the HAPO Production Forecast (HW-81863), is summarized below:

	<u>June</u>	<u>Fiscal Year 1964</u>
Separated plutonium nitrate	138*	101
Separated uranium nitrate	119*	100
Uranium Oxide	125	101
Plutonium metal buttons	101	103
Fabricated parts	166	103

*The variation resulted when the processing of unclassified metal, which contains a higher plutonium content than normal metal, was deferred from May to June.

June production was highly satisfactory, with forecasted quantities being exceeded for all products. In the Uranium Oxide plant, output exceeded the previous record high (896.1 tons, August, 1962) by four percent.

Purex processing was continuous except for a five-hour shutdown to replace a failed first cycle acid waste process feed pump. The processing rate was maintained at 30 tons per day until June 17, when production was switched to unclassified metal. All uranium product met specifications. Plutonium product quality was satisfactory except for a brief period when repairs were being made to the plutonium ion exchange unit.

A coil leak in the Purex first cycle acid waste storage tank (F-15) caused the release of an estimated 10,000 curies of mixed fission products to the Purex cooling water discharge swamps. Much of the activity settled in the mud at the bottom of the swamps and was concentrated by algae along the swamp edges. Prompt action was taken to precipitate the fission products, to kill the algae, and to cover the contaminated inlet ditches.

A strontium purification run and a rework refining run were completed successfully at the Strontium Semiworks, producing 880,000 curies of specification product.

The HAPO I-B-1 Cask was loaded with approximately 420,000 curies of strontium-90.

After being plagued most of the month with high product wastes and poor uranium product quality, the Redox plant was shut down on June 22 and remained down for the balance of the month. During the outage, steps were taken to improve processing performance. These actions included: 1) flushing the system with water and 60 percent nitric acid; 2) replacing the solvent inventory with fresh hexone; 3) replacing the ion exchange resin in the water demineralizer; 4) improving the acidity control instrumentation. E-metal processing is expected to be resumed during the first week of July.

Approximately 81 kilograms of plutonium were processed through the Plutonium Reclamation Facility, with an over-all waste loss of 0.5 percent. Purity of the plutonium nitrate product was generally good.

Cold chemical runs were started in the Waste Treatment Facility and Phase I Americium Facility on June 25.

Total project funds of \$2,300,000 were authorized by the Atomic Energy Commission for Project CGC-124, "Increased Processing Flexibility-Purex".

J. H. Warren
 General Manager
 Chemical Processing Department

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS

A. PRODUCTION OPERATION

1. Production Statistics

<u>a. Percent of Forecast(1) Achieved</u>	<u>June</u>	<u>Fiscal Year to Date</u>
Separated plutonium nitrate	138	101
Separated uranium nitrate	119	100
Uranium Oxide	125	101
Plutonium metal buttons	101	103
Fabricated parts	166	103
 <u>b. Purex</u>	 <u>June</u>	 <u>May</u>
Uranium nitrate produced (tons)	727	471
Average production rate during operation (T/D)	24	25
Total waste loss (%)		
Plutonium	0.28	0.41
Uranium	0.15	0.23
On-line efficiency (%)	97	72
 <u>c. Redox</u>		
Uranium nitrate produced (tons)	86	174
Average production rate during operation (T/D)	9	8
Total waste loss (%)		
Plutonium	0.48	0.32
Uranium	0.34	0.37
On-line efficiency (%)	32	67
 <u>d. Uranium reduction (tons)</u>		
Normal UO ₃ loaded	653	571
Enriched UO ₃ loaded	111	141
Normal UO ₃ approved for storage	784	403
Enriched UO ₃ approved for shipment	152	101
Normal UO ₃ shipped	0	0
Enriched UO ₃ shipped	152	101
Normal UNH backlog	298	172
Enriched UNH backlog	85	114

(1) HW-81863, HAPO PRODUCTION FORECAST

e. Plutonium Metal Processing

	<u>June</u>	<u>May</u>
Reduction yield (%)	95	97
Product recovery output (Kgs)	105	53
Product recovery backlog (Kgs)	1340	1332
Waste disposal (grams)	561	939

f. Power

	<u>200-East</u>	<u>200-West</u>
Raw water pumped (gpm)	11 525	4 880
Filtered water pumped (gpm)	1 149	1 267
Maximum steam generated (lbs./hr.)	220 000	115 000
Average steam generated (lbs./hr.)	197 000	71 000
Total steam generated (M lbs.)	139 864	51 359
Coal consumed (tons)	6 930	2 619

June production was highly satisfactory, with forecasted quantities being exceeded for all products. In the Uranium Oxide plant, output exceeded the previous record high (896.1 tons, August, 1962) by four percent.

McK Harmon
for Manager, Production

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2. FISSION PRODUCT DATA

	<u>PUREX*</u> <u>RECOVERY</u>	<u>244-CR*</u> <u>INVENTORY</u>	<u>B-CANYON*</u> <u>INVENTORY</u>	<u>SEMIWORKS</u> <u>PRODUCTION</u>	<u>PRODUCT</u> <u>INVENTORY</u>	<u>PRODUCT</u> <u>IN CASK</u>	<u>PRODUCT</u> <u>SHIPPED</u>	<u>CUSTOMER</u>	<u>REMARKS</u>
Sr-90 (Kilocuries)	140	590	1050	880	2570	420			
Cs-137 (Kilocuries)									
Ce-144 (Kilocuries)									

* Estimated figures based on Cs. calculations.

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II. ACHIEVEMENTS (Continued)

B. PUREX OPERATION

1. Operating Continuity

Purex processing was continuous except for a brief shutdown (five hours) on June 10, 1964 to replace a failed first-cycle acid waste process feed pump (F-12). Processing rates were maintained at a 3.6 capacity factor until June 17, 1964 when production was switched to unclassified metal and the rates were reduced to a 3.0 capacity factor as a safety precaution.

One neptunium purification run was completed.

The HAPO-1-B-1 cask was loaded with approximately 420,000 curies of Strontium-90 and pressure tested.

2. Processing Operation

All uranium product met specifications. Plutonium product met specifications except for a brief period when maintenance repairs were made to the plutonium ion exchange unit.

Fifteen sulfate runs for Strontium-90 recovery were completed in the head end of the Purex Plant.

Seven oxalate runs to separate strontium and cerium-rare earths were made in B Plant.

A strontium purification run and a rework refining run were completed successfully at the Strontium Semiworks and produced 880,000 curies of specification product.

Sluicing of the 103-A Waste Tank contents to remove the sodium from the sludge layer was increased from a day shift basis to a sixteen-hour operation on June 15, 1964 and to a twenty-four hour schedule on June 29, 1964.

3. Equipment Experience

The Purex canyon ventilation filter performance remained adequate but the pressure drop across the fore-filter increased from approximately 4.5 inches of water to approximately 5.5 inches of water.

The first-cycle acid waste vessel (F-15) tank coil failed on June 11, 1964. The empty vessel was placed in standby pending replacement.

The first-cycle acid waste process feed pump (F-12) failed on June 10, 1964 and was replaced with a repaired unit.

The A-2 silver reactor was regenerated.

The underground process line from the 252-C diversion box to the 112 tank, C Tank Farm, failed. The failed pipeline was isolated. Jumpers were fabricated and installed to establish a new process route.

Annual (third party) inspection of elevators and unfired pressure vessels located in the Purex Plant was satisfactorily completed.

A new direct line from the 103-A to the 102-A waste tank was placed in service for the 103-A waste tank sluicing program.

The use of the strontium product concentrator (TK-6) at the Strontium Semiworks, was re-established by threading a new thermohm through the TK-6 sparge line to replace the normal tank thermohm, which had failed.

4. Radiation Experience

A leak in the Purex first-cycle acid waste storage tank (F-15) resulted in discharge of high level waste solution in the coil to the B Plant and Gable Mountain cooling water swamps. Steps were taken to precipitate the fission products, kill the algae, and cover the contaminated inlet ditches.

I^{131} emission was normal for the activities conducted during the month.

5. Analytical

Magnesium was successfully determined in strontium product solutions, using zirconium molybdate ion exchange crystals. The eluted magnesium fraction is then analyzed by direct titration.

WM Harty
Manager-Purex

WM Harty:AJW:gt

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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 month. However, the difficulties experienced with high product waste solutions and poor decontamination of the uranium product during May continued to plague the operation. For this reason, the plant was shut down on June 22 and remained down for the balance of the month, in order to replace the hexone inventory and improve the acidity control instrumentation. Processing of E-metal is expected to be resumed during the first week of July.

The Uranium Oxide plant operated exceptionally well this month and a new UO_3 powder production record was achieved. The previous record of 896 tons, established during August 1962, was exceeded by approximately 4 percent.

2. Processing Operations

a. Redox Processing

High neptunium and plutonium losses to the waste stream and poor decontamination of the uranium product continued to plague the Redox plant during the first three weeks of the month. Analysis of the poor process performance indicated the cause to be associated with solvent degradation and poor acidity control on the waste backcycle stream. For this reason, the plant was shut down on June 22 and remained down for the balance of the month. During the outage, steps were taken to improve processing performance. These included: 1) flushing the system with water and 60 percent nitric acid; 2) replacing the current hexone inventory with fresh solvent; 3) replacing the ion exchange resin in the water demineralizer; 4) improving the acidity control instrumentation. The shutdown also afforded an opportunity to complete the 90-day nuclear materials inventory and complete necessary maintenance work.

Because of the processing problems encountered, only 70 percent of the expected production was achieved. All uranium product produced was high in gamma ratios and required rezoning and blending to meet shipping specifications.

b. Uranium Oxide Processing

The continuity of operations was excellent this month. All depleted uranium oxide powder met specifications. One car of enriched UO_3 powder exceeded the tentative sodium specification of 50 ppm but was shipped on a waiver of specification from the customer. The dry analysis was 61 ppm, compared to a wet analysis of 30 ppm. The National Lead Company has been requested to re-analyze the material.

3. Mechanical Experience

a. Redox Plant

The planned shutdown work related to the integrated extraction control console and the panel board consolidation additions was completed on 6-17-64.

The underground hexone storage tanks were reactivated in order to store the current inventory of degraded hexone and permit receiving a new hexone supply in the active inventory storage system.

Twenty-four canyon cell jumper installations were made this month, nine for new process routings and fifteen as replacements for failed units. The new jumpers provide a process routing whereby an acid-deficient first cycle will be possible without giving up neptunium recovery, but still allow the current acid cycle to be used by simple valving changes. The acid-deficient flowsheet will be run on a test basis on start-up.

A new helical-type heat exchanger was installed in the west steam chest of the D-12 waste concentrator. Attempts to replace the failed unit during May were unsuccessful because the tube bundle could not be properly seated. During the interim period operations have continued using only one tube bundle, but with a decrease in capacity.

Two 3-inch holes were drilled through the $5\frac{1}{2}$ foot thick concrete wall, separating "F" processing cell and the south pipe gallery. The holes were drilled to provide direct electrical connections for pH meters, rotameters and flow meters on cell equipment, thus providing better acidity and flow control instrumentation for the process.

Two pump replacements were required this month. On 6-4-64 the feed preparation pump (H-1) developed an electrical short and was replaced. The failed pump had been in operation since 11-24-62. On 6-5-64 the F-7 metal solution feed tank pump developed a leak at the annulus where the shaft comes through the mounting flange. It was replaced with a new U. S. pump-agitator.

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4. Waste Handling and Decontamination

Equipment valued at approximately \$146,000 was received from customers for decontamination, repair, inspection or burial during the month. Equipment valued at approximately \$163,000 was returned to customers, representing a savings of approximately \$11,500 based on the cost of new equipment.

5. Radiation Experience

Construction of the new ventilation exhaust facility for the 233-S Building was completed this month and beneficial use was obtained on June 4. The new facility consists of two exhaust systems in parallel, each with double filtration units, i.e., two filters in series. The new equipment is required to: 1) assure protection of personnel and the environs from plutonium in the 233-S exhaust air; 2) simplify maintenance of the filter system.

6. Analytical Experience

The Redox Analytical Laboratory provided a variety of analytical work for the N-Reactor Department which included: 1) hydrogen analyses to test for radiolytic decomposition of water caused by gamma radiation in the N-Reactor coolant water system; 2) back-up analyses for the acceptance testing of N-Reactor in-line monitors; 3) uranium analyses to provide interim analytical coverage until an in-line slug system monitor could be repaired; 4) water sample analyses for selected gamma-emitting isotopes and gross beta-gamma.

Numerous non-routine analytical analyses were performed to assist in resolving the Redox plant's processing problems. These included: 1) nitrite analyses of all aqueous make-up streams to help locate the source of nitroso compounds in the hexone stream; 2) nitroso analyses of samples taken from the hexone recovery system to determine removal efficiency of nitroso compounds; 3) uranium analyses on a variety of process streams to provide data which might assist in determining the cause of the poor decontamination in the 3D column.

S. H. Amolen
Manager - Redox

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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 on without interruption during the month. The production of unfabricated plutonium was normal. Problems with the slag and crucible charging mechanism restricted the operation of the new reclamation facility but operation of the other equipment was satisfactory. Oxide dissolving was continued in Room 161. Incinerator operation was normal. Cold chemical testing of the new waste treatment facility was in progress at month end.

2. Processing Operations

a. Plutonium Fabrication

Information on plutonium fabrication activities is presented in Document HW-83212 (Atomic Weapon Data).

b. Plutonium Reduction

Button line operation was normal during June. Approximately 15 percent of the output was unclassified plutonium.

Scrap powders from the button line are now being blended with the slag and crucible fragments from Task III (reduction casting) for subsequent recovery in the new reclamation facility. This new procedure eliminates the former practice of the deliberate manufacture of scrap metal.

Hood 46 (ion exchange facility) was laid away during the month and is being held in standby.

c. Plutonium Reclamation

Deliveries from the new reclamation facility to the button line amounted to 81 kilograms of plutonium in June. After the first six weeks of operation, a complete flush of the new recovery system was made in order to remove solids from the tanks and piping.

There were 187 containers of slag and crucible fragments processed through the slag and crucible dissolver. The unit was out of service for 50 percent of the month because of misalignment of the ball valves in the loading tube.

c. Plutonium Reclamation (Continued)

A total of 51 kilograms of plutonium was processed through the oxide dissolvers. It was possible to transfer 23 kilograms of this material directly to the button line.

Eighty-five boxes of scrap were processed through the incinerator during the month.

At month end, cold chemical runs were progressing satisfactorily in the new waste treatment facility (Project CAC-912).

3. Mechanical Performance

Performance of the fabrication and inspection equipment was satisfactory during the month.

Plutonium processing equipment in Hood 9-B continued to require a large quantity of maintenance effort during June. Principal problems involved inadequate vacuum for the calciner. The difficulty was traced to sintered stainless steel filters of improper porosity. Operation returned to normal when the faulty filters were replaced with those from Hood 9-A which is in standby.

Mechanical operation of the new reclamation equipment has been good except for the performance of several of the Chempumps, some of the electric motor-driven valves, and the ball valves in the charging device on the O6 slag and crucible dissolver.

4. Radiation Experience

Radiation and contamination control statistics indicated an upward trend in June. Corrective efforts are being directed toward better pre-job planning and more rigid adherence to procedures.

On June 8, 1964, a package of unoxidized plutonium metal chips was added to one of the laboratory-type dissolvers. A rapid reaction occurred which pressurized the hood and spread contamination to Room 149 and to a portion of the adjacent analytical laboratory area. In addition, some of the contamination was released via gravity vents to the roof of the building and to the ground at the rear of the building. All areas, except Room 149, were decontaminated and returned to service within 24 hours. Two employees (an operator and a chemical technologist) were found to have positive nasal smears. Irrigation promptly reduced the nasal contamination to acceptable levels.

Six employees were found to have positive nasal smears after changing the button line exhaust filters. They were promptly cleaned to acceptable levels.

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5. Analytical Experience

Number of Samples Received	3,205
Number of Determinations	16,429

Phosphorous was detected in above normal quantities in several plutonium metal button samples during the month. The source was traced to the new reclamation facility product which contained some residual TPB. Chemical tests are being developed to supplement the spectrochemical analyses so that adequate control is exercised on this impurity.

W. J. Gartin
Manager
Weapons Manufacturing

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II. ACHIEVEMENTS (Continued)

E. FINANCIAL OPERATION

1. Production Cost Accounting

Approval was obtained from RLOO-AEC to establish an additional \$150,000 in the Special Process Spares Reserve to provide for continued excessing of spare parts resulting from the Spare Parts Clean-up Program.

An AEC sponsored meeting (for discussion of Weapons standard costing procedures made mandatory for FY 1965 by AEC Controller directive), held in Boulder, Colorado, was attended by two CPD financial representatives.

Data on fission products costing methods was provided by cost personnel for discussions held during the month with visiting Germantown AEC personnel.

Special handling and service billings processed during the month included: (1) the receipt in June of 2833 grams of Project Whitney scrap; (2) shipment of Pu samples to Monsanto and Battelle; (3) burial of 265 boxes and drums for the University of California; and (4) analytical services provided GE-APED.

2. Business Programs

The fission product and waste management cost estimates requested by the AEC (J. T. Christy to W. S. Frank, dated May 28, 1964), were transmitted to RLOO-AEC by document HW-83055 dated June 26, 1964.

3. General Accounting

As of May 31, 1964, eighteen active projects had incurred costs of \$3,038,574 against authorized funds of \$4,044,800. Outstanding commitments totaled \$122,990.

During June one directive, one modification, and two work authorities were received from the AEC: Directive No. EQT-009 - Modification No. I, Project CGC-124, Increased Processing Flexibility - Purex, increase of funds to new total of \$2,300,000; Directive No. EQT-011, Project CGC-147, Log Radiation Monitors - 200 Areas, authorized funds \$50,000; Directive No. AEC-219, Work Authority No. 2, Project CAC-987,

Metal Stabilization Facility - 234-5 Building, reduction of funds to new total of \$145,000; Directive No. AEC-EQT-007, Work Authority No. 2, Project CAC-121, Americium Recovery Facility - Z Plant, increase of funds to new total of \$47,200.

During June construction completion and cost closing statements were issued and costs transferred to the AEC as follows: Project CAC-101, Redox-216-S-7 Crib Replacement, total GE cost \$2,978; Project CAC-118, Process Waste Disposal Facility - Plutonium Reclamation Operation - Z Plant, total GE cost \$2,362.

Six appropriation requests totaling \$25,550 were authorized during the month.

4. Auditing

Discussions were held by a GAO resident auditor with certain Facilities Engineering personnel and maintenance managers regarding potential use of rare metal in the fabrication of certain process equipment, piping, etc. A survey is being made by the General Accounting Office on a HAPO-wide basis.

An audit of CPD overtime practices and procedures was started and is scheduled for completion early in July.

An audit memorandum was directed to the section managers inviting their attention to new provisions of the Prime Contract which became effective July 1, 1964.

An audit memorandum was directed to the Supervisor, Office Machine Repair, HUPO, requesting review of office machine maintenance in the 222-S Laboratory.

RA Connell
Manager - Finance

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II. ACHIEVEMENTS (continued)

F. FACILITIES ENGINEERING OPERATION

1. Purex

a. Process Design Engineering

Increased Processing Flexibility

The design criteria document, Part 2, which covers the work required for Purex processing flexibility, other than that covered in Part 1, (dissolver and head-end systems), has been completed and is being routed for approval signatures.

Multipurpose Dissolver

Fabrication of the Purex Dissolver Mock-up Assembly is about 65 percent complete. A promising canister dumping concept was developed which involves only a minor change in the approved canister. Two (2) different types of dissolver inserts to accommodate canisterized NPR fuel elements are being studied.

Purex "N" Cell Alterations

An engineering study was started on new product concentration and storage units which are to replace existing "N" Cell units. These modifications are being made primarily to increase "N" Cell plutonium product purity in anticipation of 234-5 Building changes to a plutonium nitrate decomposition flowsheet.

Fin Tube Evaluation

The thermal efficiencies of a standard welded longitudinal fin tube and extruded longitudinal fin tube were prepared for service in Purex off-gas heaters. The standard welded fin was found to be 30 to 40 percent more efficient. It is also concluded that a transverse fin tube would be two to three times as efficient as the longitudinal fin tube.

"N" Cell Ion Exchange

A prototype resin filter is being designed for installation in the XCP Line from the column. Drawings are also being prepared for an air-operated bellows to cycle resin through the column. This "puller" system of handling resin movements will follow general features of a unit previously tested in 300 Area.

Purex "Q" Cell Resin Level Detector

Fabrication of a new electronics system has been completed. The commercial ultrasonic transducer probe currently installed in the column must be replaced or modified because air bubbles on the end of the probe interfere with readings. Hanford Laboratories is assisting with the re-design of the probe with a bubble deflector and other improvements. Also, the vendor is being approached to provide a complete probe assembly of improved electrical and mechanical design.

Temperature Read-out Instrument for In-tank Solidification Project

A prototype portable temperature read-out instrument is planned. This battery-powered instrument concept will include accurate performance over a wide temperature range under adverse weather conditions. The instrument should have an accuracy of one percent when reading temperatures from Minneapolis-Honeywell resistance-type temperature elements.

"L" Cell Package

The design criteria drawings and document describing the proposed modifications to the existing spare "L" Cell package are in final preparation and should be circulated for comments and approval within the next week. The proposed modifications to the package will provide improved flexibility and operability, increased boil-off capacity, and in-canyon storage of re-work and product solutions.

b. Project Engineering

CGC-124 - Increased Processing Flexibility - Purex

Directive No. EQT-009, Modification No. 1, dated June 30, authorized total project funds in the amount of \$2,300,000.

c. Manufacturing Engineering

Laboratory Dry Waste Handling System - Purex

A load lugger was used for contaminated waste on a two-day trial. Cartons reading 2200 mr/hr attenuated to 70 mr/hr on the outside of the lugger. The exposure rate to the driver while transporting to the 200-East Area Burial Ground was 7 mr/hr.

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2. Redox

a. Process Design Engineering

Sand Filter, Stack, and Dissolver Off-gas Monitors

Installation of the new Redox Sand filter monitor is now complete, and the system is in operation and working satisfactorily.

Installation of the stack beta-gamma monitor is complete and calibration is expected to be completed.

The dissolver off-gas monitor is now complete except for the final tie-in to the dissolver off-gas and calibration.

Hexone Scrubbing - Redox

Modifications were made to the 276-S piping system to permit batch scrubbing of hexone with caustic in lieu of continuous scrubbing with the in-line mixer. The initial scrub results were promising, but hexone degradation has continued. Additional studies are being made.

In-line 2DW Stream pH Probe

A new pH probe has been installed in the 2DW stream. The new probe is designed such that the connecting cables are continuous from the probe to the cold side of the operating gallery (no canyon connectors). The cables were pulled through the existing pipe nozzle thereby eliminating canyon connectors. The probe response seems good and the system is working satisfactorily.

b. Project Engineering

CGC-122 - Ventilation Exhaust System - 233-S Building

The new exhaust filtration facilities were placed in service on June 4.

3. Weapons Manufacturing

a. Process Design Engineering

RMC Button Line

The updating of drawings and files was continued, bringing the total of voided drawings to 1890. Bids were received on a replacement fluorinator bellows which was designed for an operating life of more than one (1) year. In actual operation, the life is expected to be 200 million cycles.

Fabrication

Design was completed for a stirring device to be used in the ingotting furnace. One (1) assembly is being fabricated for testing. Glove Box HC-24C is being moved to "A" Line where it will become HA-39 (machine lathe operations).

Portable Critical Incident Alarm

The portable critical incident alarm was completed and turned over to the 234-5 Building operation this past month. A maintenance instruction is presently being written for the instrument.

Television

A closed circuit television system has been installed in the 236-Z Building. A picture of the column interface on Lead 6 is brought into the operating room on the fourth level. This installation will be evaluated over a period of several weeks.

Special Plutonium Preparation Facility

The design criteria has been revised, eliminating the general purpose glove box per request of the Commission. The document has been transmitted to the Commission for approval.

b. Project Engineering

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

Total project funds for the "Z" Plant isostatic press were authorized by Directive No. AEC-219, Modification No. 1, dated June 11.

CAC-110 - Rev. No. 1 - Additional Plutonium Casting Facilities - RMA Line - 234-5 Building

A project proposal revision to abandon this project was prepared and transmitted to RLOO on June 15.

4. General

a. Process Design Engineering

Waste Fractionization - WAFRAX

Part 1 of the design criteria (classified items of engineering data) was approved by the Commission on June 11. Part 2 (unclassified items) was approved for CPD and transmitted to the Commission on June 16.

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Sludge Removal and Waste Transfer

Preliminary studies have been completed and a construction cost estimate obtained for modifications to the 244-CR Vault to be used in place of a new 244-AR Vault. The estimated project cost for use of the 244-CR Vault was \$2,700,000, compared with \$2,650,000 for the new 244-AR Vault. There appears to be no incentive for using the 244-CR Vault.

Alternates for constructing the sludge removal and waste transfer facilities in two (2) steps have been defined. This alteration would provide Purex Acid Waste (PAW) storage facilities and PAW and Fission Product Waste (FPW) transfer facilities with FY-1965 or prior-year funds and to provide sludge removal and transfer facilities with FY-1966 funds.

Technetium Recovery

Work has been started to determine the feasibility and cost of recovering Technetium-99 from the aged supernatant wastes. The study will consider the use of the 244-B Plant for the installation of equipment for ion-exchange separation, thermal concentration, and storage of the crude product.

NPR On-site Cars

Revision Request No. 1 to the 1961 design criteria for on-site NPR casks and cars was approved and forwarded to the Commission. This revision permits consideration in the system design of flat cars in addition to the special drop-center cars originally specified.

Calcined Waste Container Storage

A study of the feasibility and cost of storing Hanford Laboratories prototype calcined waste containers in "U" Plant was made. A water bath storage system similar to that envisioned for CPD - Phase II-type fission waste containers would cost approximately \$90,000 and would have a capacity of sixteen (16) containers. This cost does not include facilities for the transportation, inspection, or monitoring of these facilities.

Adhesion Curtain Greenhouse for Use with Plastic Suits

Construction has now been completed on the framework of the prototype adhesion curtain greenhouse. It is currently installed in the equipment development area on the third floor of 271-T Building, for temporary use in the continuing program of supplying air conditioned plastic suits to plant maintenance work.

Prototype design was completed during the month on various auxiliary devices for use in conjunction with the adhesion curtain technique for repeated entry into and return from highly contaminated areas without need for decontamination.

b. Project Engineering

Project Cost Information - as of 6/18/64:

Total Authorized Funds - 18 active projects	\$ 4 086 000
Total Cost-to-date	3 061 000
Commitments & Open Work Releases	135 000
Unencumbered Balance	890 000
Costs Charged to Above Projects 5/17 to 6/14/64	60 000

CGC-147 - Log Radiation Monitors - 200 Areas

A project proposal requesting wide range (1 mr/hr to 1000 R/hr) gamma radiation monitors and recorders for Purex, Redox, and "Z" Plant was partially authorized by Directive No. EQT-011, dated June 26.

c. Manufacturing Engineering

Craft Time Distribution

A new time distribution system, which removes much clerical work from the foreman, was installed and "debugged". This method eliminates several paper steps and consequently should reduce errors as well as processing time. Time distribution information is now available each day while previously it was current only at weekly intervals.

5. Shops Operation

Normal services were provided to operating facilities as required. Major shop work progress or completions were as follows:

Boiler Shop

Completed the Purex J2-1 Tank and returned it to the Spare Parts. Work was continued on hoods for the 234-5 Building, Dissolver Tower for Purex, Multipurpose Dissolver Mock-up for Purex, and other process items. The shell of the HAPO-1B-3 shipping cask arrived from the off-site fabricators on June 29.

Sheetmetal Shop

Completed repairs and modifications to the ventilation system in 224-UA Building. The Purex T-H2 (HA) Column cartridge was assembled and installed.

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Jumper Shop

Fabricated and tested twenty-four (24) jumpers, nine (9) of which were fabricated on an emergency basis. The D-14 Redox Helical Tube Bundle was completed and installed in the D-12 Concentrator.

Rotating Equipment Shop

Completed four (4) pumps for return to service, prepared a centrifuge drivehead and motor for a re-conditioned Purex D-4 Centrifuge, and fabricated a special lifting yoke for a Purex Dissolver Tower.

6. Power & Services

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

Ventilation crews completed original balancing of 236-Z Building.

The painting contractor has completed renovation of 2902-B and E high tanks. Work was started on 2902-W tank.

The mechanical contractor has completed modifications of the 200-East and West Area steam lines, with the exception of lagging some portions.

Manager - Facilities Engineering

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II. ACHIEVEMENTS (Continued)

G. RESEARCH AND ENGINEERING OPERATION

1. Purex Process Engineering

a. Solvent Extraction

The addition of ferrous sulfamate to the middle of the 2D Column scrub section was terminated at month's end. During the test, the ferrous sulfamate added was reduced from 0.4 to 0.2 flows of 2.0M ferrous sulfamate (HAF = 75 flows of 1.8M UNH) without appreciable increases in the plutonium, neptunium and iron levels of the uranium product. No other process effects were noted during the test. The test was terminated to obtain comparative data under current processing conditions with the ferrous sulfamate added to the 2D Column feed tank.

The consumption of ferrous sulfamate by the Neptunium Recovery Cycle was reduced 33 per cent by reducing the 3A Column scrub stream from 0.15 to 0.10M ferrous sulfamate. The plutonium concentration of the 3BN neptunium process stream recycled in the system increased less than three-fold and no effect on neptunium accumulation performance was noted.

b. Product Treatment

The addition point of the plutonium anion exchange scrub stream was changed from near the top of the XA Column to near the bottom of the downcomer. This change increased the scrub section height about 15 per cent. Sufficient analytical data have not yet been accumulated for an accurate evaluation, but it appears the purity of the plutonium product has not changed markedly.

c. Waste Treatment

The failed E-F6 high level waste concentrator was replaced with the E-F11 concentrator. The E-F11 concentrator was used for the concentration of high level waste before the adoption of single cycle acid concentration, and has been used periodically since that time in rework recovery operations.

During the month, the zirconium-niobium and ruthenium levels of the T-F5 acid absorber bottoms increased about two and four-fold, respectively while the overheads increased about twenty-fold. The activity levels were not reduced by increased sugar usage or by sodium nitrite additions to the E-F6 high

level waste concentrator. The capacity of the E-F6 concentrator also decreased about 40 per cent because of increased pressure drop in the tower and the solids content of the concentrate waste apparently increased. The data thus indicate that the higher zirconium-niobium levels may be the result of increased entrainment associated with pot foaming or a tower restriction. Part of the increased ruthenium levels may be the result of reduced water additions to the E-F6 feed to compensate for the lower concentrator capacity.

The recovery of plutonium and neptunium from high level waste by batch extraction with triauryl amine was tested during the month with two batches of plant IWW. Approximately 5 grams of plutonium was present in the first batch representing extraction column losses of less than 0.04 per cent. As much as 80 per cent of the plutonium appeared to be associated with the high solids content in the IWW and thus was not available for TLA extraction. The extraction efficiency for the plutonium in the supernatants was 80 - 85 per cent with a 20-minute contact time. The ferrous sulfamate stripping efficiency, however, was only 60 - 80 per cent due to unexpectedly high acid concentrations. The TLA was water scrubbed in the second test to control stripping acidity. Analytical results were uncertain for neptunium recovery due to solids interference and were not yet available at month's end for the second test. Laboratory tests are underway to define possible solvent degradation limits.

Sluice-mixing test operations in TK-103-A were accelerated to a three shift basis. Forty-five sluice passes have been made to date with approximately 30 per cent of the 230,000 pounds of sodium originally in the tank moved to TK-102-A. The rate of sodium removal has decreased about 50 per cent.

A leak in the coil of the F15 tank which contained a heel of acid high level waste caused the release of an estimated 10,000 curies of mixed fission products to the Purex cooling water discharge swamps. Fifty per cent caustic was added to the swamp inlets in order to precipitate and confine the majority of the fission products. During a ten day period, the fission products were dispersed throughout the swamps. Much of the activity settled in the mud at the bottom of the swamps and was concentrated by algae along the edges of the swamps. Work is in progress to cover the original swamp inlets and some of the swamp edges and to kill the algae. Studies are also underway to determine ways of fixing the activity in the swamp lakes.

d. Fission Product Recovery

A 750 kilocurie purification campaign with B-Plant crude strontium product and a 150 kilocurie rework campaign were completed at the Strontium Semi-works using the washed solvent described in the March, 1964 report. The results indicated good process performance in terms of waste loss control and calcium decontamination, but less stable column operation than "fresh" solvent. The product concentrator pressurized during the citrate decomposition operation in the main purification campaign due to high acidity and required shutdown and special treatment.

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2. Redox Process Engineering

a. Uranium Product Quality

During the report period, there was a loss of decontamination factor across the third uranium cycle from an arithmetic 10 to 20 down to three. During this period there was a marked increase in the rate of hexone degradation as noted by the rapid build-up of nitroso compounds. In order to provide a clean system, the process equipment was acid flushed with concentrated acid and the process hexone was replaced with new hexone. The following laboratory work has been done to define the problem:

- (1) Simulated 3D Column runs have been made using the process 3DF solution (9000 gamma ratio compared to natural uranium) with plant hexone and new hexone. This test showed the presence of extractable ruthenium and a decontamination factor of about three noted with either type of hexone.
- (2) Simulated column test using uranium product solution which had been treated with ozone, as feed (23 gamma ratio) gave a decontamination factor of 14 with new hexone versus 1.2 with plant hexone. The plant hexone was contaminated with ruthenium which was responsible for the poor decontamination
- (3) Gas chromatographic analyses of the plant hexone shows the presence of a small amount of organic materials other than hexone. These are believed to be nitroso compounds, since spectrophotometry has shown the presence of nitroso compounds.

3. Plutonium Process Engineering Operation

a. Plutonium Reclamation Facility

During June, approximately 81 kilograms of plutonium were processed through the Plutonium Reclamation Facility with an overall waste loss of 0.5 per cent. A large fraction of this loss came as a result of unstable operation of the CC stripping column and subsequent CO column difficulties. During occasional flooding periods, a portion of the CC column plutonium inventory was "dumped" to the CO column, producing plutonium fluoride concentrations above solubility limits. The plutonium fluoride precipitated in the CO column packing. Subsequently the precipitate leached from the column and produced an abnormally high plutonium concentration in the organic recycled to the CA column. A portion of this plutonium entered the CAW to produce a high waste loss.

At month's end, a comprehensive flush was being given to the CO column to remove precipitated plutonium compounds. Routine flush procedures for the CO column have been specified. In addition, a neutron probe will be installed on the CC column to permit early detection of movement of the plutonium inventory down the CC column

The purity of the plutonium nitrate solution produced was generally good. Data for the eleven batches of product are summarized below:

Parts per Million Parts Plutonium

	<u>June Average</u>	<u>May Average</u>	<u>June Range</u>
Total Metallic Impurities	1630	1680	1000 - 6000
Aluminum	60	270	10 - 100
Iron	180	270	50 - 600
Chromium	<20	22	5 - 50
Sodium	900	580	200 - 1000
Calcium	400	420	200 - 1000

In two batches of product sent to the button line, phosphorus concentrations of greater than 5000 ppm. were noted, indicating improper decanting and stripping of solvent from the product stream. The abnormally high phosphorus content carried through the button line to produce 5 reject buttons. Test results indicate that the majority of these buttons "clean up" sufficiently in ingoting to permit their subsequent introduction as weapons feedstock. Source of the organic entrainment has been traced to the malfunctioning of a decanter jackleg system. Modifications have corrected this difficulty. However, phosphorus determinations are now made on all product batches prior to shipment to the button line.

Cold runs (all chemicals except plutonium) were initiated on June 25, 1964, in the Waste Treatment Facility and Phase I Americium Facility (isolation, partial purification, and concentration). "Hot" start-up is now scheduled in July.

4. Separations Chemistry Laboratory

a. Purex Process Improvement

Sodium formaldehyde sulfoxalate (SFS) as reductant

Laboratory evaluation continued on SFS as a substitute for ferrous sulfamate as a plutonium reductant in the Purex process. A flowsheet covering the conditions for a plant test has been completed.

Mini-mixer runs using SFS in the partition cycle LBX stream gave better partition than the plant experiences using ferrous sulfamate. In the neptunium recovery system, the distribution ratios for both plutonium and neptunium were evaluated on simulated flowsheets for changes in temperature and acid concentration (25 to 50° C and 2 to 6M, respectively). Results show that concentrations of 0.01M SFS and 0.1M N_2H_2 in the 3AF should be adequate for good performance.

b. Redox Process Improvement

Hexcne decontamination

Laboratory work was performed during the month in an effort to find the cause of poor uranium decontamination in the Redox plant. Evidence at present indicates the presence of an extractable

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ruthenium species in the feed to the 3D column. There may have been a build-up of this material in the system since some of the hexone stream by-passes the organic still. The "ruthenium complex" did not appear to be destroyed effectively by the head-end dichromate treatment but it was destroyed by ozone and periodic acid oxidation.

c. Fission Product Process Improvement

Control of Citric Acid Kill

Laboratory investigation has attributed a recent rapid reaction during the citric acid kill at the Strontium Semiworks to excessive nitric acid concentration. Solutions with nitric acid concentrations below 4M react smoothly to the peroxide addition. At higher concentrations a delayed secondary reaction could be encountered which gases excessively and could result in loss of material from the vessels.

Peroxy acetate waste

Optimum conditions were determined in the laboratory for the transfer of the cerium fraction from a peroxy acetate precipitation to the tank farm. The recommended conditions call for the addition of 2 moles of tartaric acid per mole of metal ion (to complex the cerium and rare earths) and the addition of caustic to a pH of 11 to convert the lead to the soluble plumbite.

d. Laboratory Improvement

Differential Thermal Analysis

A remote head for the Differential Thermal Analyzer was installed in a glove box to handle plutonium-loaded ion exchange resins. Permutit SK, at two different plutonium loadings (45 and 113 g/l), had an exothermic event starting at 170 - 180° C which culminated in deflagration at 197 - 203° C. Another sample, loaded to 34 g/l with thorium, had an exotherm beginning at 187° C which deflagrated at 217° C. Except for the slightly higher temperature at deflagration for thorium, the thermograms of the two loadings were quite similar.

A calibration was performed to permit the conversion of the areas under the exothermic peaks to calories. The calibration is accurate to plus or minus 15 per cent, much of the variation being due to differences in heat conductivity. Based on this calibration, nitrated Permutit SK had a heat of reaction of 180 cal/gram, while the same resin treated with 7M HNO₃ yielded 350 cal/gram. (These heats account for exothermic events only.) Thorium loaded (34 g/l) Permutit SK had a heat of reaction of 260 cal/g. No change was found in these heats of reaction as the mesh size of the resin varied between 20 and 200.

Intercalibration Program

Results of the intercalibration exchange of three types of activated foils among members of the American Society for Testing and Materials

were presented at the Chicago meeting of the society, June 23 and 24. The foils were originally gamma-analyzed in the Redox Gamma Analytical Facility and then distributed to the nine participating sites. Among the seven participants reporting, agreement at the plus or minus four per cent level has been attained. This compares with an agreement at the plus or minus seven per cent level for the nine participants and four types of foils in the year-old Irradiation Damage Intercalibration Exchange.

EURATOM is expanding its intercomparison with the Hanford Atomic Products Operation from two to four types of foils. When all the data is compiled there will be sixteen laboratories, both domestic and foreign, that can state a common calibration for a minimum of three radioisotopes.

5. Plutonium Chemistry Laboratory

a. Direct Calcination of Plutonium Nitrate

Two calcination runs were made to supply direct calcined oxide for chlorination. The volatile content of the oxide was within tolerable limits (up to twenty-five per cent) but still posed difficulties in charging the laboratory chlorinator. No difficulty is expected in a vibrating tube reactor.

A second off-gas filter in series with a primary filter was tested on the calciner to determine its effect on filtration efficiency and pressure drop. At high flow rates, the second filter cartridge served as a partial condenser. Condensed water from the second filter unit refluxed into the first filter, causing an excessive pressure drop across the filter. The test showed that a second filter was not necessary for filtration purposes, and if required for safety reasons, it should be heated to prevent condensation.

b. Stirred Fluidized Bed Contactor

Four differentially-fed runs were made in the fluid bed reactor to supply feed for electrowinning experiments. The conversion to chloride ranged from 90 to 94 per cent. Spectrochemical analyses generally indicated additional purification except for possible contamination with chromium and nickel. Stirrer contact with the reactor wall contributed to this. Because the emphasis of the run was on maximum conversion, product was not removed during a run.

Typically, an initial 200 ml of oxide was chlorinated as a batch. Incremental additions of about 25 ml each were made from a new glass hopper (for better visual control) when the preceding addition of feed had reacted as indicated by a rise of 10 to 15 degrees in temperature, and when temperature had returned to the normal operating temperature between 435 and 450° C. The phosgene flow varied due to pressure buildup in the reactor, but the flow was more than adequate for minimum fluidization. Powder fines apparently clogged one or both manometer filters, and off-gas filter problems were encountered.

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c. PRTR Plutonium Purification

The processing of 6500 g of PRTR plutonium was completed and satisfactory purity was obtained. Over 7000 g of calcined oxide were produced at an average composition of 81 per cent plutonium. An accurate analytical method is not available for plutonium containing a high concentration of plutonium²⁴⁰ and plutonium²⁴¹. It is felt that the analytical results are 3 - 4 per cent low as measured by the XRD-5 x-ray analyzer.

The PRTR hoods were cleaned and made ready for transfer to Quality Control Operation. Hood operating procedures, job hazard breakdowns, and process descriptions were written for the new operators of the equipment.

d. Critical Mass Facility Support

Approximately 1850 grams of plutonium as concentrated plutonium nitrate solution were shipped to Critical Mass Physics during the month.

High waste losses (≈ 0.1 gram per liter) are still a problem in the ion exchange process. A check was made to see if solids in the waste tank could be causing the problem, but after circulating 8 N nitric acid through the tank for several hours, the Pu content of the acid was only 0.004 grams per liter, indicating no solids problem.

The titanium concentrator section installed in May has worked very well and a vaporization rate of 3 - 3.5 liters per hour can be obtained with the unit. This eliminates the need of installing a second concentrator.

The Critical Mass Facility operation will be turned over to Quality Control Operation, Weapons Manufacturing Operation, July 1, 1964.

e. Cation Distribution Into 25 Per Cent DEBP in CCl₄

During the development of a flowsheet for the CW column in the 912 facility, the distribution coefficients of typical CAW cations were measured in Hanford Laboratories. This work is summarized in the following table.

Distribution Of Metal Ions Into 25 Per Cent DEBP -
CCl₄ From CAW*

HNO ₃ M	Fe	Al	E _g Ca	Mg
0.03	0.17	0.0005	0.14	<0.0005
0.12	0.14	<0.0003	0.12	<0.0005
0.5	0.11	<0.0003	0.052	<0.0005
2	0.015	<0.0003	<0.0005	<0.0005

(*) CAW: 0.6 M Al⁺⁺⁺, 6.7M NO₃⁻
0.1 M Fe⁺⁺⁺
0.6 M Mg⁺⁺
0.3 M Ca⁺⁺

A. S. Frank
Manager

Research and Engineering

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III. PERSONNEL ACTIVITIES

A. FORCE SUMMARY

<u>Operation</u>	<u>Monthly Salaried</u>		<u>Weekly Salaried</u>		<u>Total</u>	
	<u>5-31-64</u>	<u>6-28-64</u>	<u>5-31-64</u>	<u>6-28-64</u>	<u>5-31-64</u>	<u>6-28-64</u>
General Manager's Group	8	9	2	1	10	10
Financial	15	15	19	19	34	34
Employee Relations		2		1		3
Research & Engineering	69	71	29	29	98	100
Facilities Engineering	100	99	215	216	315	315
Production	7	5	4	3	11	8
Redox	66	66	235	238	301	304
Purex	70	71	263	264	333	335
Weapons Manufacturing	<u>62</u>	<u>61</u>	<u>264</u>	<u>264</u>	<u>326</u>	<u>325</u>
Total	<u>397</u>	<u>399</u>	<u>1031</u>	<u>1035</u>	<u>1428</u>	<u>1434</u>

B. PERSONNEL CHANGES

J. W. Fillmore transferred from Manager, Plutonium Reduction to Manager, Plutonium Reclamation, Weapons Manufacturing Operation, effective June 1, 1964.

C. E. King transferred from Manager, Engineering Reclamation Startup to Manager, Plutonium Reduction, Weapons Manufacturing Operation, effective June 1, 1964.

C. TRIPS

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To Other G.E. Components</u>		
P. H. Reinker	New York, New York	Management Consultation (6/16/64)
W. J. Gartin	Philadelphia, Pennsylvania Schenectady, New York	Manufacturing Management Conference (6/16-17/64) Manufacturing Engineering Methods (6/18-19/64)
H. H. Hopkins, Jr. H. T. Fullam	Atomic Power Equipment Dept. San Jose, California Vallecitos Atomic Lab. Pleasanton, California	Discuss plutonium tech- nology and americium chemistry. (6/23/64) Same as above. (6/24/64)
<u>To AEC and Other AEC Contractors</u>		
L. L. McGregor	Oak Ridge National Lab. Union Carbide Corp. Oak Ridge, Tennessee	Attend 9th IMOG Gaging Sub-group Meeting (6/3-4/64)
M. K. Harmon C. W. Malody R. Y. Lyon	Mallinckrodt Chemical Works St. Louis, Missouri National Lead of Ohio Fernald, Ohio	UO ₃ Storage. (6/3/64) E-metal processing. (6/4/64)
G. R. Kiel	Goodyear Atomic Corp. Portsmouth, Ohio National Lead Co. of Ohio Fernald, Ohio Mallinckrodt Chemical Works Weldon Springs, Missouri Nuclear Materials & Equip- ment Corp. (NUMEC) Appollo, Pennsylvania	Nuclear safety and equip- ment for processing uranium. (6/8/64) " (6/9-10/64) " " (6/11/64) " " (6/12/64)
J. A. Forest	E. I. du Pont Aiken, South Carolina	Decontamination methods and procedures. (6/16-17/64)
R. E. Tomlinson P. H. Reinker	U.S. AEC Washington, D.C.	Advisory Committee On Reactor Safeguards. (6/18-19/64)

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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>		
H. H. Hopkins, Jr. H. T. Fullam	The Dow Chemical Co. Rocky Flats Plant Denver, Colorado	Discuss ion exchange and americium chemistry. (6/25/64)
D. L. Morrell J. D. Hourigan L. I. Brecke B. M. Dobbs	Dow Chemical Co. Rocky Flats Plant Denver, Colorado	Standard Cost Methods. (6/25-26/64)
<u>To General Industry</u>		
E. M. Johnston	American Smelting & Refining, Company Plainfield, New Jersey	Fabrication of Cadmium Shielding. (6/17/64)
H. A. Lee	Programmed & Remote Systems Company St. Paul, Minnesota	Manipulator and Material Handling Device (6/15-16/64)
<u>To Conventions and General Meetings</u>		
P. E. Cunningham	Toronto, Canada	American Water Works Association. (6/1-5/64)
L. L. Zahn	New York City, New York	ASA Committee on trans- port of solid irradiated fuel. (6/4-5/64)
E. M. Johnston	Hotel Commodore, New York City, New York	Attend Summer Annual Meeting of ASME. (6/13-16/64)
M. H. Campbell W. C. Johnson	Spokane, Washington	Northwest Regional American Chemical Society meeting (6/15-16/64)
W. H. Zimmer	Chicago, Illinois	American Society for Testing and Materials. (6/23-24/64)
G. H. Sahler	Lewiston, Idaho	Idaho Association of Training Directors. (6/24/64)

D. VISITORS

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From AEC and Other AEC Contractors</u>		
Mr. Torres Mr. Trombler	AEC - DMA Albuquerque, New Mexico	Standard Cost system (6/2/64)

D. VISITORS (Continued)

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From AEC and Other AEC Contractors (Continued)</u>		
Cpt. R. J. Thomas	Defense Atomic Support Agency, Sandia Albuquerque, New Mexico	Product Quality. (6/4/64)
B. B. Ernst	The Dow Chemical Co. Rocky Flats Plant Denver, Colorado	Nuclear safety in plutonium fabrication. (6/10/64)
Admiral John A. Waters	US-AEC Washington, D.C.	Purex Plant Tour. (6/10/64)
W. Lenneman	US-AEC Washington, D.C.	UO ₃ Storage. (6/24/64)
H. A. Troutman F. E. Butler J. N. Vance	The Dow Chemical Co. Rocky Flats Plant Denver, Colorado	Plutonium incinerator waste disposal. (6/26/64)
<u>From General Industry</u>		
Dr. David Caldwell R. G. Grantham	Metropolitan Engineers Seattle, Washington	Export Water Line. (6/4/64)
Dr. Howard Scott	Consultant Los Angeles, California	Export Water Line. (6/10/64)
F. Reeber	Ball Associates Denver, Colorado	Underground Storage of Process Wastes. (6/22/64)
J. W. Woomer	Woomer & Associates Pittsburgh, Pennsylvania	Waste Storage Methods. (6/24-25/64)
J. A. Seguire	Crane Hoist Engineering Co. Bell, California	Hoisting Equipment. (6/23-29/64)
J. H. Crumley	Industrial Specialists Portland, Oregon	Welding of Process Equipment. (6/25/64)
J. H. Kaufman	Hydro-Forming Co. Chicago, Illinois	Inspect Shops in connection with Hanford Diversification. (6/29/64)

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D. VISITORS (Continued)

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From Other Government and Foreign Agencies</u>		
G. Wormser	French Atomic Energy Commission	Discuss plutonium waste disposal practices.
A. deCalmes	Fontenay-Aux-Roses	(6/9/64)
Mr. Fernandez	Marcoule, France	
G. Lefillatre		
Roger E. R. Lees	United Kingdom-AEA	Purex Plant Tour. (6/10/64)

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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.		15	14	8	8				45	257
Rad. Occur.		4	10		4				18	72
Contam. Wds.			2		2				4	13
New Deposition Cases									0	12
Fires				1*					1	6
Security Violations		1	1		1				3	11

* Fire 64-6, on 6-1-64, Involved old Steam Line poles piled near burning pit in 200 West Area. Sparks from burning pit ignited poles which were scheduled for later burning. Damage, - \$10.

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V. REPORTS

A. PREPARED AND ISSUED

- HW-65402 REV 1, Unclassified, "Uranium Trioxide Product Specification Analyses", dated May 5, 1964, by W. H. Zimmer.
- HW-75380 REV 2, Unclassified, "Critical Mass Control Specification - Storage of Plutonium Metal In Vault 106", dated June 22, 1964, by R. J. Sloat.
- HW-80396, Unclassified, "Design Criteria Installation of Wide-Range, Gamma Radiation Recording Instruments", dated January 1, 1964, by F. S. Stong.
- HW-81533 REV, Secret AWD, "Polishing of Type 74-C Parts", dated June 25, 1964, by A. E. Smith.
- HW-81662, Secret, "Analysis of Alternatives: Plutonium Button-Line Improvements", dated May 1, 1964, by J. B. Fecht, V. W. Smith, E. O. Swain, and L. L. Zahn.
- HW-81802, Pl, Secret, "Design Criteria, 221-B Waste Fractionization, Phase III Waste Management Program" dated May 15, 1964, by H. L. Caudill, E. Doud, D. C. Fleischer, and W. H. Sevier.
- HW-82117, Unclassified, "Replacement Exhaust Ventilation Filter - Purex Plant", dated May 4, 1964, by J. B. Fecht, W. H. Koontz, and W. C. Schmidt.
- HW-82294, Letter #2, Secret, "Button Purity Data", dated June 3, 1964, by R. J. Sloat.
- HW-82328, Unclassified, "Weight Determination", dated May 18, 1964, by R. J. Dal Ponte and A. S. Sobiech.
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B. PREPARED FOR SIGNATURE AND ISSUANCE

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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

W. L. Godfrey, Research and
Engineering

A Counter-Current Crystallization
Process.

H. C. Rathvon, Research and
Engineering

The Production of Separated
Polonium-210 by Its In-Reactor
Volatilization from Bismuth
Oxide.

for J. N. Warner
General Manager
Chemical Processing Department

END

DATE
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