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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
FOR

RL-SEP--618-Del.

DE93 009520

JUNE, 1965

Compiled By
OPERATION MANAGERS

July 21, 1965

HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON

By Authority of CG-PR-2

DS Lewis 19/12/92

DS Kline 10/20/92

PM Eck 10-20-92

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

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CHEMICAL PROCESSING DEPARTMENT
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I. SUMMARY

June production, as per cent of the HAPO Production Forecast (RL-GEN-17), is summarized below:

	<u>June</u>	<u>Fiscal Year To Date</u>
Separated plutonium nitrate	145	108
Separated uranium nitrate	120	107
Uranium oxide	132	105
Plutonium metal buttons	147	110
Fabricated parts	117	102

Output of all products in June was in excess of forecast; however, production was substantially lower than the near-record month of May due to a number of planned plant outages.

The Purex plant operated continuously except for one four-day shutdown to replace the failed F-6 salt waste concentrator and another four days to take an SS material physical inventory.

The Purex Head-End fission product recovery equipment produced an estimated 2500 kilocuries of promethium-147 and 560 kilocuries of strontium-90. Approximately 120,000 curies of promethium-147 were shipped to the Battelle-Northwest Laboratory on June 18, 1965.

The In-Tank Waste Solidification Unit operated continuously during the month, except for approximately 36 hours of scheduled down-time, and evaporated 240,000 gallons from 101-BY waste tank.

Processing of E-metal in Redox was discontinued at mid-month to enter into a period of special processing campaigns which include: 1) a neptunium recovery campaign; 2) processing of a PRTR batch; 3) dissolution and sampling of a batch of N-reactor fuels to obtain reactor conversion data; 4) completion of an SS material physical inventory; and 5) flushing of several process vessels to remove sludge accumulations.

The Uranium Oxide plant performed well until June 24 when it was shut down, as planned, for a three-week period to complete the annual preventive maintenance program and to allow the majority of employees to take their vacations.

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The second of seven planned shipments of blanket fuel elements from the Shippingport reactor were received late in the month and were stored under water in the 221-T canyon.

A Teflon¹⁾ spool piece and cross and a Kynar²⁾ sparge line failed in the slag and crucible dissolver during the month. The appearance of the failed pieces indicate that a localized high temperature was somehow produced, causing some melting and charring of the plastic. Sparging conditions in the dissolver are being modified to prevent accumulation of fines which could inhibit solution cooling of the plastic.

The purification of americium has proceeded slowly due to the high concentration of aluminum causing flocculent, poorly separable precipitates in both sulfate and oxalate systems. A reverse strike procedure has been developed and promises to permit more rapid processing of crude americium.

J. H. Warner

General Manager
Chemical Processing Department

- 1) Teflon - Trade name of E. I. du Pont Company
- 2) Kynar - Trade name of Penn Salt Company

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS

A. PRODUCTION OPERATION

1. Production Statistics

a. Percent of Forecast⁽¹⁾ Achieved

	<u>June</u>	<u>Fiscal Year to Date</u>
Separated plutonium nitrate	145	108
Separated uranium nitrate	120	107
Uranium oxide	132	105
Plutonium metal buttons	147	110
Fabricated parts	117	102

b. Purex

	<u>June</u>	<u>May</u>
Uranium nitrate produced (tons)	529	884
Average production rate during operation (T/D)	28	29
Total waste loss (%)		
Plutonium	0.51	0.29
Uranium	0.36	0.25
On-line efficiency (%)	76	100

c. Redox

Uranium nitrate produced (tons)	41	198
Average production rate during operation (T/D)	28	9
Total waste loss (%)		
Plutonium	0.51	0.38
Uranium	0.36	0.27
On-line efficiency (%)	76	74

d. Uranium Reduction (tons)

Normal UO ₃ loaded	821	875
Enriched UO ₃ loaded	30	127
Normal UO ₃ approved for storage	821	875
Enriched UO ₃ approved for shipment	152	152
Normal UO ₃ shipped	0	0
Enriched UO ₃ shipped	152	253
Normal UNH backlog	280	602
Enriched UNH backlog	148	136

(1) RL-GEN-17, HAPO PRODUCTION FORECAST

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f. Power

	<u>200-East</u>	<u>200-West</u>
Raw water pumped (gpm)	10 331	5 854.
Filtered water pumped (gpm)	1 131	1 182
Maximum steam generated (lbs/hr)	230 000	100 000
Average steam generated (lbs/hr)	171 000	66 000
Total steam generated (M lbs)	123 000	47 851
Coal consumed (tons)	5 985	2 423

Output of all products in June was in excess of forecast; however, production was substantially lower than during the near record month of May due to a number of planned plant outages.

Except for 36 hours scheduled down-time, the In-Tank Waste Solidification Unit operated continuously and evaporated a total of 240,000 gallons.

R.E. Smith
for Acting Manager, Production

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2. FISSION PRODUCT DATA (Kilocuries)

INVENTORIES

[illegible]

Sr-90

Pm-147 (Unaged)

Pm-147 (Aged)

CS-1.37

(1) Effective June 30, 1965, Pm-147 inventory will be adjusted to show quantities at two years of age.

(2) To BNW on June 18, 1965.

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II. ACHIEVEMENTS (Continued)

B. PUREX OPERATION

1. Operating Continuity

The Purex Plant operated continuously except for a shutdown from June 7, 1965 to June 11, 1965 to replace the failed E-F6 (high level waste) concentrator and an SS material inventory outage from June 21, 1965 to June 24, 1965. During operation, rates were maintained at capacity factors of 3.3 to 3.6.

Satisfactory operation of the fission product processing facilities at the Purex Head End and B Plant was maintained. Strontium Purification Run Number Nine was completed at the Strontium Semiworks.

2. Processing Operation

a. Purex Processing

The ruthenium content of the uranium product remained higher than normal with some improvement compared to the last report period. Interim ruthenium specifications were met. Plutonium met specifications throughout the month.

One neptunium purification run was completed, yielding 903 grams. Three shipments, totaling 1841 grams of neptunium, were made.

b. Purex Head End Processing

The Purex Head End fission product recovery equipment produced an estimated 2500 kilocuries of promethium-147 and 560 kilocuries of strontium-90. The lead used as a carrier for the strontium sulfate precipitation step was reduced two-fold with no apparent adverse effect on fission product recovery.

c. B Plant Processing

B Plant oxalate runs (to separate strontium from the rare earths) were suspended temporarily early in the month to permit concentration of the rare earth fraction. Oxalate runs were then resumed and processing of 8000 gallons of current fission product crude from Tank 003-CR was completed. Of a total of 5500 and 1200 kilocuries of promethium-147 and strontium-90 in the feed, a measured recovery of 5000 kilocuries of promethium-147 and 1050 kilocuries of strontium-90 was accomplished and added to the B Plant fission product inventory.

[REDACTED]
DECLASSIFIEDd. Strontium Semiworks Processing

Strontium Purification Run Number Nine was started on June 14, 1965 and completed on June 18, 1965. Of the 535 kilocuries of strontium-90 in the feed material, 530 kilocuries of product, which met all radio-chemical and inert impurity specifications, were recovered. Both equipment and flowsheet performance were excellent. After completing Run Number Nine the total process solvent inventory was washed with a solution of caustic-citrate followed by oxalic-nitric, using the HA-HC column equipment. Based on the two recent strontium purification runs in which the decontamination factors and product recoveries were higher than achieved in any previous runs, the NPH (normal paraffin hydrocarbon) diluent appears to perform very well.

Semiworks Strontium Purification Run Number Eight, completed in May, 1965, resulted in a measured 865 kilocuries of strontium-90 product from 940 kilocuries of feed. All product lost via the concentrator pressurizations was reclaimed within specifications except an unaccounted-for 75 kilocuries. Measured waste losses were less than one percent.

On June 18, 1965, 120,000 curies of promethium-147 were shipped to Battelle-Northwest Laboratories.

e. Waste Management

The In-Tank Waste Solidification Unit operated all month except for approximately thirty-six hours of scheduled downtime. The Fiberglass filter in the off-gas system was flushed with a solution of trisodium phosphate in an attempt to reduce radiation readings and possibly the differential pressure across the filter. The flush was ineffective. The overflow point of the condensate receiver tank was lowered six inches in an attempt to increase condenser capacity. No improvement was noted. Approximately 240,000 gallons of solution were evaporated from Tank 101-BY during June, 1965. A total of 790,000 gallons of solution have been evaporated since startup of the unit.

Pumping of supernatant liquid from Tank 111-B to Tank 112-B to Tank 101-AX for subsequent addition to Tank 103-AX for boil-off was initiated on June 14, 1965. This movement will provide additional waste storage for B Plant processing and Purex coating waste.

3. Equipment Experience

A leak in the bottom of the E-F6 (high level waste) concentrator in the Purex Plant was discovered on June 7, 1965. The plant was shut down and the failed concentrator was moved to the vacated E-F11 (acid concentrator) position. A new concentrator was installed including one new stainless steel tube bundle from spare equipment. The old tube bundle was partially plugged and would not meet heat transfer requirements. Purex Plant operation was resumed on June 11, 1965.

The Purex canyon trench cover block replacement program was completed this month. A total of sixty-nine blocks were replaced since the program was initiated in January, 1965. Eight trench cover blocks with broken lifting balls

were core drilled and fitted with lifting yokes to allow removal. Removed trench cover blocks were buried in the industrial burial grounds. Completion of the program was a significant achievement in that it was accomplished without affecting the continuity of plant operations.

During the inventory outage from June 21, 1965 to June 24, 1965, the E-H4 concentrator (backcycle waste) overflow jumper was replaced to eliminate a flow restriction. The overflow nozzle on the concentrator was also "rodded out".

A comprehensive inspection of the following Purex electrical equipment was completed: a) Number Two 13,800 volt feeder line; b) Number Two 13,800 volt to 2,400 volt transformer; and c) one 2,400 volt breaker. The condition of the electrical equipment met factory specifications and is considered satisfactory.

The reconditioning of a failed, contaminated Purex pulse generator was completed. The gear box and process cylinder were completely overhauled, including required modification work to convert this machine to a short stroke unit. The electric drive motor was replaced with a new motor from spare equipment. This machine will be held as a contaminated spare for future use. Preventive maintenance work was accomplished on three in-service pulse generator systems.

A complete overhaul of the breathing air compressor located in the Purex Plant was performed. This work consisted of replacing bearings, sleeves, seals, etc. as required to place this machine in good condition.

The 10-ton rotating hook on the Purex west canyon crane was replaced. The old hook had become damaged and was no longer operative. The replacement hook was a reconditioned contaminated spare. Ten electrical equipment controllers on the Purex west canyon crane were reconditioned or replaced to improve performance and dependability. This work was a preventive maintenance program item.

The charging chute and gasket were replaced on the A3 dissolver in the Purex Plant in an attempt to improve vessel vacuum. Also, the remote control valve jumper located in the off-gas system was replaced for the same reason. A leak of dissolver solution to the cell floor from A dissolver required replacement of the transfer jumper from the dissolver to Tank D3 (dissolver solution storage).

Regeneration of the silver reactors in the off-gas systems from dissolvers A3 and B3 was completed.

Coil integrity checks were made on Tanks D5, E6, H1, J3, F10, and G7. No leaks were discovered.

The new A27 crib for laboratory waste and ammonia scrubber water was placed in service.

The failed Tank F15 (high level waste treatment) was removed from the Purex canyon and buried. The tank had developed a coil leak and had been removed from service.

The Number Three Heater Bank of the In-Tank Waste Solidification Unit was taken out of service on June 15, 1965 because of severe electrical arcing of the power leads caused by heat degradation of the primary insulation. The electrical leads from the sub-station to the heater and the insulators are scheduled for replacement early in July, 1965.

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The condition of Tank 105-A remained unchanged throughout the month. Additional observation holes were drilled through the tank dome (total of nine) to further characterize the shape of the bulged bottom liner. The maximum bulge height appears to be the eight feet reported earlier. A hole located near the edge of the tank was traversed with a special probe to determine if the tank wall liner had pulled away from the concrete. There appeared to be some variation in the shape of the wall liner, but no large distortion was detected. Core drilling for the two sluice pit risers was also completed. The radiation levels in the laterals beneath the tank have shown no measurable change.

A partial restriction exists in the six inch vessel vent header at B Plant adjacent to Cell 9 in the pipe trench. Exploratory probing to locate the position of the restriction was done from the cold side of the lead shielding wall in the pipe trench. Decontamination of the header was accomplished with alternate steam and air purges into the line in preparation for removal of the restriction. The maximum radiation reading at the edge of the open trench was 2 R per hour.

4. Radiation Experience

Iodine 131 emission from the Purex Plant was 9.15 curies for the month.

5. Analytical Experience

The RAC (Remote Analytical Cave) played a major role in fission product and special support work during the month of June, 1965. This facility was used to handle a multitude of fission product samples which required centrifugation and dilution, a protactinium cask sample and another "dip" sample of the material in Tank F8 (waste rework tank).

New shields and sample holders for the dual crystal gamma counting multi-channel analyzer system were received late in June, 1965. It is anticipated that the two shields, each of which weigh approximately 4000 pounds, will be installed during July, 1965. Electronic data processing will be used for the necessary recalibration calculations.

The Purex Plant Head End Input Measurement systems for plutonium and uranium will be officially started July 1, 1965. The final sampling and analytical frequency are still pending based on the evaluation of June, 1965 analytical and sampling data.

Two new analytical methods were put into routine use.

- a. Determination of Sodium in Highly Radioactive Solutions by Flame Spectrophotometer.
- b. Determination of Yttrium-91 by Solvent Extraction.

Manager-Purex

WM Harty:MLM:gt

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

C. REDOX OPERATION

1. Operating Continuity

E-metal processing in the Redox plant was discontinued at mid-month after the depletion of the dissolved enriched uranium inventory. The balance of the month was used to prepare for and begin a special processing program which included: 1) recovery of the neptunium inventory which has been accumulating in the process; 2) dissolving and processing the fourth batch of irradiated fuel elements from Hanford's experimental Plutonium Recycle Test Reactor; 3) dissolving the first batch of NPR fuels to obtain conversion data; 4) conducting a physical inventory of SS materials; 5) flushing several vessels to remove sludge.

The Uranium Oxide plant performed well until June 24 when it was shut down, as planned, for a three-week period to perform the annual facility preventive maintenance program and provide a three-week vacation period for the majority of employees.

2. Processing Operations

a. Redox Processing

E-metal processing was terminated on June 15 after depletion of the enriched uranium feed inventory. Several days were then required to work neptunium product through the backcycle system, preparatory to precycle treatment and partitioning from uranium and plutonium contaminants. Recovery of the isolated neptunium inventory started on June 17 and was subsequently processed through three successive decontamination cycles before final concentration and load-out at month-end.

Dissolution of the fourth batch of PRTR fuel elements, including Pu-Al alloy fuels, UO₂ charges and PuO₂-UO₂ mixed oxide fuels began on June 17. By month-end all of this material, except one charge which is currently dissolving, had been prepared for processing.

Two loads of NPR fuels (8 canisters) were received during the last week of the month and stored in the J-1 vessel pending dissolution as metal feed for July processing.

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Processing activities early in the month were hampered by an organic degradation product formation in the G-3 organic still which necessitated extensive clean-out of the system. Other sludge accumulations encountered in precycle, backcycle and waste concentrator operations also served to reduce operating efficiency.

b. Uranium Oxide Processing

For the third consecutive month the calciners in the Uranium Oxide plant operated exceptionally well and total uranium oxide production exceeded that expected.

To maintain inventories of depleted and enriched uranium feed solutions in proper balance, and while the Redox plant was engaged in special processing activities, G-calciner operation was diverted to depleted uranium processing on 6-4-65. All six calciners were operated continuously on depleted uranium feed until shutdown on 6-24-65, as planned, for a three-week period for vacations and preventive maintenance. At shutdown, the backlog of uranium was under good control.

3. Mechanical Experience

a. Redox Plant

The Redox canyon processing equipment operated satisfactorily during the month and the mechanical efficiency for the period was 95.5 percent.

Nineteen canyon cell jumpers were installed this month; thirteen as replacements for failed jumpers and six to establish new process routings.

On June 9, the agitator in the D-9 waste sampling tank failed after 12 years of operation. Failure was due to the agitator shaft separating from the motor.

The pump in the D-8 neutralized waste tank was replaced on June 12. The pump failure was apparently due to a shaft seizure, caused by a build-up of solids in the bearings and impeller bowls.

Considerable preventive maintenance work was done on the hoists and optics of the 60-ton canyon crane this month. The work included: 1) replacement of the travel motor and gear train on the left-hand optic to reduce drifting; 2) replacement of worn bolts in the main drive coupling to the hoist drum; 3) replacement of the left-hand impact wrench and swivel because of swivel and stop-bar failures. Although radiation levels were above normal, weekly radiation exposure limits for personnel were maintained.

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b. Uranium Oxide Plant

Equipment performance was exceptional this month and the over-all mechanical efficiency was 96 percent. Essentially all lost production time occurred during the change-over of G-calcliner from enriched to depleted uranium oxide production.

4. Waste Handling and Decontamination

The M-130 cask, containing the second of seven shipments of assembled blanket fuel elements from Shippingport, Pennsylvania, arrived on-plant 6-28-65. The cask was unloaded and the fuel elements stored under water in the 221-T canyon building, on 6-30-65.

The disassembly tool for the Shippingport fuel elements was modified, tested, and successfully used to disassemble one blanket fuel element from the initial shipment (5-3-65). The job was completed without incident.

Work on the reactivation of the 242-T Waste Evaporator began on June 14. By month-end all external decontamination of the operating cells was completed.

5. Radiation Experience

Redox waste tank 108-SX has shown some seepage as indicated by radiation readings in laterals under the tank and dry wells located around the tank's perimeter. Two test holes were drilled near the tank through the seepage zone to determine the extent of seepage. Radioactivity was found to terminate at depths of 7 and 11 feet below the tank bottom. Maximum dose rates from the soil samples were in the range of 2.5 R per hour.

6. Analytical Experience

Laboratory analytical procedure improvements were made this month, which included: 1) a quantitative spectrophotometric procedure for the determination of nitrate using 4-methyl umbellferone in strongly acidic solutions; 2) the use of tri normal octyl phosphine oxide (TOPO) in cyclohexane as the extractant for uranium in highly concentrated solutions, and subsequently improving the laboratory's ability to analyze for iron, chromium and cobalt by X-ray fluorescent spectrometry.

One-hundred and thirty gold foil reactor monitors were analyzed for Au-198 by gamma isotopic analysis, as part of Hanford's participation in the AEC's "Reactor Materials Testing Program".

R. W. McCall
Manager - Redox

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

D. WEAPONS MANUFACTURING OPERATION

1. Operating Continuity

The fabrication of Model 88-C weapon components was without significant interruption during the month. The reduced requirement for these parts permitted scheduled intermittent operation. The production of unfabricated plutonium was satisfactory, with minor interruptions experienced because of vacuum-system problems. Recovery operations were normal. The dissolution of slag and crucible fragments was again curtailed because only one of the two dissolvers was operable. The incinerator furnace was out of service from June 9 to the end of the month because of an accumulation of ash in the line to the scrubber. The waste-treatment facilities and the americium-recovery equipment performed satisfactorily.

2. Processing Operations

a. Plutonium Fabrication

Information on plutonium-fabrication activities is presented in document RL-SEP-629 (Atomic Weapon Data).

b. Plutonium Reduction

The production of weapons-grade plutonium metal was at relatively high rates and the quality continued to be very good. The backlog of feed, which was critically high during May, was reduced to normal by the end of June.

Shipments of non-defense plutonium included the following: 400 grams of nitrate to General Electric-Vallecitos; one kilogram of metal to Monsanto; four kilograms of metal and sixteen kilograms of ceramic-grade oxide to Battelle-NW. (The last item is the first part of the 30 kilograms of oxide reported as prepared for B-NW in May.)

c. Plutonium Reclamation

One hundred and twenty-one (121) kilograms of plutonium, as nitrate, were delivered to the button line from the recovery facilities during the month.

One hundred and fifty-eight (158) boxes of dry waste were processed through the incinerator facility in spite of the fact that the furnace was out of service from June 9 through the end of the

month. Over one hundred of the boxes processed were those containing fabrication molds where it was possible to remove sufficient plutonium by scraping and chipping the surfaces of the molds. Burning of these boxes and contents was not required.

The Mark II (04) dissolver operated satisfactorily during the month. Three hundred and ninety-eight (398) cans of slag and crucible fragments, containing nineteen (19) kilograms of plutonium, were processed through this vessel during the period. The Mark I (06) dissolver was out of service during the entire month.

Six hundred and seventeen (617) grams of plutonium were returned to the main process stream from 82,690 liters of aqueous waste which were processed through the waste-treatment facility. Also, 8.6 grams of americium were recovered and stored for future processing.

Twenty-six hundred (2600) grams of plutonium were removed from the Recuplex RB Hood floor during the month.

3. Mechanical Performance

The equipment in the fabrication and final inspection areas performed satisfactorily, with only minor mechanical problems.

The button line equipment required repairs to the fluorinator vacuum system, the drum filter, the calciner off-gas system, and the feed-flow controllers.

The reclamation equipment performed satisfactorily except for the numerous pumps in the recovery facility. Sixteen failures were experienced. Four of the pumps were replaced and the other twelve overhauled and reinstalled.

The Mark I (06) dissolver was dismantled and inspected during the month. Two of the Teflon-lined sections and the Kynar sparger were found to have failed. Replacement parts were on order at month-end, and repairs are scheduled for completion by mid-July.

Inspection of the incinerator system revealed that the off-gas line from the furnace to the scrubber was clogged with flyash. Removal of this was in progress at month-end.

4. Radiation Experience

Radiation and contamination control statistics indicated good control during the month.

One case of potential plutonium deposition was experienced when dilute contaminated acid leaked through protective clothing to an operator's forearm. Indications at month-end were that there would be no significant deposition.

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5. Analytical Experience

Number of samples received	2,823
Number of determinations	18,400

SG Smolen

Manager
Weapons Manufacturing

SG Smolen:ap

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

E. FINANCE AND SERVICES OPERATION

1. Production Cost Accounting

In late June we received our copy of the AEC FY 1966-67 operating budget submission. This document reflected an O2 Program reduction of \$883,000. Work was begun immediately in detailing this reduction for display on the FY 1966 operating statements.

Working with WMO management and AEC Finance, we developed a new accounting procedure for Pu Scrap Recovery costs which will avoid penalization of Preparation of Pu costs for the costs of working prior years and offsite scrap.

The new cost standards were prepared for reporting O3 Program costs during FY 1966 and the criteria were developed for diverting a portion of weapons costs to Standby due to limitation of effort to one model only.

The detailed procedures were completed for reporting Purex FY 1966 costs in accordance with the new cost centers established in a recent study effort.

Fiscal year end procedures completed during the month included

- (1) review of all expense codes and routine work orders,
- (2) review of IME rates for the beginning of the fiscal year,
- (3) preparation of accruals for year-end closing, and
- (4) preparation of a schedule of landlord services billing rates for use in FY 1966. In addition, rough drafts were prepared for a Cost Manual and a Work Order Manual.

Special requests processed during the month included:

- 3 kg Pu metal to Republic of France
- 200 gr Pu nitrate to GE Vallecitos (for SEFOR)
- 25 gr U-233 oxide to NUMEC (for Westinghouse)
- 200 gr U-233 oxide to Battelle Northwest
- 179 drums contaminated material from Dow for burial

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2. General and Tax Accounting

As of June 30, 1965 there were eleven active projects. Following is a summary of current status of projects:

Total Authorized Funds	\$3 102 000
Total Cost to Date	1 802 000
Commitments and Open Work Release	534 000
Unencumbered Balance	766 000
Costs Charged during June, 1965	328 000

Current authorizations from the AEC include the following: Directive No. AEC-244, Work Authority No. 1, Project CAC-144, Waste Fractionization, B-Plant, authorized \$15,000; Directive No. AEC 261, Work Authority No. 1, Project CAC-159, Geological and Hydrological Wells - FY 1965, authorized \$1,000; Directive No. EQT-023, Project CGC-172, Plutonium Concentration and Storage Facilities - L Cell - Purex, authorized \$230,000.

Construction completion and cost closing statements were issued during June on the following projects:

<u>Project No.</u>	<u>Project Title</u>	<u>Total Cost</u>
CGC-929	NPR Fuels Processing Facilities, 200-W	\$182 421
CAC-945	New Waste Tanks - Purex	206 284
CAC-970	Purex Essential Waste Routing System - 200E	12 594
CAC-109	Degreasing & Briquetting Facility - RMA	
	Line - 234-5	1 679
CAC-121	Americium Recovery Facility - Z-Plant	31 659

One appropriation request for stack monitoring equipment for the In-Tank Solidification Unit was authorized in the amount of \$5,000. At month end two appropriation requests totaling \$23,000 were being held pending release of FY 1966 02 Equipment funds.

3. Business Information Systems

The feasibility study and lease requisition for the Redox communications system has been approved by both General Electric and Atomic Energy Commission management. AEC purchasing is now arranging for the lease of the IBM 1050 communication equipment with the IBM Company. Detailed systems designs are now under way. Three of the five input forms have been finalized. A description of the master file is now being prepared.

4. Audit and Contract Reimbursements

A review of proposed assignments of responsibility for General Ledger accounts and sub-accounts was completed. The review was made with the objective of establishing maximum internal controls within the

framework of our accounting and account reconciliation functions. Recommendations were detailed in our audit memo issued June 2, 1965.

During the month some 35 AEC Manual Chapters and/or revisions were received, reviewed, and transmitted to responsible department personnel.

For reply to an inquiry made by the teamsters, the Employee Relations Operation was provided with details of the procedures to be followed to control use of government vehicles.

5. Administrative Services

The following security infractions have been incurred by the department during calendar year 1965:

January	3
February	-0-
March	1
April	1
May	1
June	<u>3</u>
Total	<u>9</u>

6. Purchasing

Purchase orders and contracts placed (including alterations):

	<u>Number</u>	<u>Value</u>
Formal Orders	337	\$262 536
Verbal Orders	102	5 920
Essential Materials Orders	17	<u>380 226</u>
Total		<u>\$648 682</u>

Significant purchase orders and contracts placed during June, 1965:

<u>Number</u>	<u>Vendor</u>	<u>Material</u>	<u>Price</u>	<u>Date</u>
S5L-30977	Mallinckrodt Chemical Co.	Sulfamate	\$ 47 152.80	6-17-65
S5L-30980	Pennsalt Chemical Co.,	Sodium Hydroxide	\$212 000.00	6-30-65

RA Connell
Manager - Finance

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JUNE, 1965

II. ACHIEVEMENTS (continued)

F. FACILITIES ENGINEERING OPERATION

1. Purex

Purex Processing Flexibility (CGC-124)

Three (3) modifications to the Purex dissolver design have been accepted. These changes will facilitate cleanout for thorium campaigns, minimize foaming problems, and improve pressure relief of the dissolver.

Thorium Processing - Purex 1965 Campaign

The engineering study document (Part IV, Process Design) has been approved and issued.

Performance of New Spare E-F6 Concentrator

After installation of the new spare E-F6 concentrator at Purex, the Zr-Nb content of recovered acid dropped by a factor of about 10 and the ruthenium content by a factor of about 100. Improvement is attributed both to the new clean equipment and the internal demister which was substituted for the Raschig ring de-entrainer section.

Purex 4.0 C.F. Expansion

The first draft of the design criteria for Purex 4.0 Capacity Factor Expansion was completed. The document will be issued for comment early in July.

A review was made of Purex concentrator tube bundle designs for the interim operation prior to 4.0 capacity factor expansion. Briefly, it is recommended that a new F6-type stainless steel bundle with 25% additional area be procured shortly. Increased service life should be obtained at the lower tube temperature in F6 operation.

Repair of Buried Piping in Purex

Two (2) bids were received for a 4-inch Teflon liner for failed Purex piping. Both were for FEP Teflon only, one at \$530 and the other at \$730, plus \$720 tooling charge. No vendor bid on TFE Teflon. Meanwhile, plans were continued for stainless steel liners. Purex maintenance will fabricate the mock-up and perform tests.

105-A Waste Tank

The 1/10-scale model of the Purex 105-A Waste Tank was fabricated by the Chemical Processing Department Shops and prepared for testing. Components required for instrumentation to monitor the 105-A Tank for bottom plate buckling are being assembled. Testing of the system is planned for early July. Design has been completed for a combination bottom detector and sludge temperature probe.

A special high-level radiation probe containing a very small G.M. tube has been used to monitor the activity under the 105-A Tank. This probe was lost because of a faulty cable. A new probe was prepared and put into operation. Readings remain substantially the same for the new probe.

241-BY Tank Farm Stack Instrumentation

Design of a stationary air filter sampler and detector enclosure has been completed. All purchase specifications have been issued. The system is now scheduled for completion by the end of August.

Radiation Self-Monitoring Instrumentation

Design has been completed and purchase specifications written for the components required to modify an existing instrument for usage as a self-monitoring instrument. The required components have been ordered with delivery expected in about ten (10) weeks.

Shops Fabrication for Purex

Twenty-eight (28) jumpers were fabricated for Purex, of which sixteen (16) were for Purex Increased Flexibility. Only two (2) were fabricated on an emergency basis. Assembly of the Purex multi-purpose dissolver has progressed to the phase of setting nozzles. After the setting of nozzles, the only major items remaining are installation of the trunnions, the vapor flange, and as-building. The Purex spare dissolver tower has been tested, lagged, and sheathed. Its completion is planned for early July.

Sequential Schedule - Dissolver Interchange

The major steps of installing the Purex annular dissolvers were charted. The chart allows for point-in-time scheduling and permits immediate determination of the status of each major work phase.

CGC-172 - Plutonium Concentration and Storage Facilities -
"L" Cell - Purex

Directive No. EQT-023, dated June 4, 1965, authorized total funds for this project.

2. RedoxInspection of 115 SX Tank

The television equipment and lighting probes for inspection of the 115 SX Tank were completed. Inspection of the tank will be made during the week of July 12-16.

Fuel Input Weighing System Prototype

Fabrication of the support structure and testing of the unit were completed. The method of weighing the fuel load on the hook of the crane was found to be good, but the present equipment is not adequate. The problem was returned for further design work.

Shop Fabrication for Redox

Of the eleven (11) jumpers fabricated for Redox, eight (8) were completed on an emergency basis.

Swamp Extension

Design and specifications were completed for a 3,000,000 square foot extension to the Redox Swamp. This work includes strengthening of dikes around the present swamp.

3. Weapons"A" Button Line

Comment prints on the modified piping and equipment arrangement of glove box H-7A are ready for distribution. Modifications include routing the inter-hood piping so that the "A" Button Line can be operated independently of the "C" Button Line. The

filtrate kill tank and the filtrate catch tank will be eliminated from Glove Box 7A; an aqueous catch tank and a magnetic flowmeter are new equipment to be added.

The calciner blow-back filter assembly was re-designed to permit the use of "off-the-shelf" stainless steel filter elements rather than modified elements as are now in use.

Plutonium Reclamation

Cold testing of the O8 Dissolver ball valve mock-up has been completed and the unit prepared for installation. A new design was completed for a steam sparge pipe to the TK-06 slag and crucible dissolver. This design for "Kel-F" construction is to replace the pipe of "Kynar" construction which failed.

Design was completed for installation of the de-entrainment vessels between the slag and crucible dissolvers and the caustic scrubbers; liquid entrainment has necessitated the re-cycle of essentially all caustic scrubber solution to date.

Detailed testing and evaluation of chemical transfer pumps were continued. The Dean Line pumps, modified by sealed bearings, have provided better service. A specification for a mechanical seal of boron carbide is being sent to the seal manufacturer for quotation. Also, an impurity eliminator has been designed for use in a line flushing the seal on the Dean Line pump.

Incinerator

Two (2) bids were received for a new cast cyclone assembly. One quoted on "Vendor's Best Efforts"; the other bid was approximately \$16,000, including pattern changes. Because of the cost, consideration is now being given to fabrication of new cyclones with 310 stainless steel pipe.

Fabrication - Power Forming

A major improvement in the Floturn blank holder-mandrel relationship has been scoped. This will (a) eliminate a weak, potentially failure-prone, connection; (b) greatly facilitate mandrel changing; and (c) allow rolling components larger than possible at present. A scope proposal is being circulated.

Removal of Recuplex Facility

A project proposal requesting authorization of total funds in the amount of \$375,000 is in preparation and is expected to be submitted to the Commission in the first half of July.

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4. General

Shippingport Fuel Handling Facility

The first Shippingport fuel element was disassembled by use of the modified ECF disassembly tool. This cumbersome tool requires use of the overhead crane; so the Hanford disassembly tool is being modified so as to be handled by the cell hoist.

Waste Management Program

The Atomic Energy Commission approved the design criteria revision (No. 1), RL-SEP-497, which deletes cesium precipitation and CSREX processing flexibility from the project.

For the second in-tank solidification unit, the engineering study document was issued and the design criteria document transmitted to the Commission for approval. Also, a design authorization request for an immersed heater system was transmitted.

Work was started to define the equipment required for conversion of the 242-T Evaporator Building to continuous operation.

Burial Procedures and Techniques

Experience with concrete burial containers for various kinds of failed equipment has been good. The boxes withstand normal handling and afford better containment in transit and during backfilling.

Interarea Waste Transfers

A system for integrating 200-West to 200-East Waste Transfers into the 200-East routings has been selected. These new routings will require minor changes only in the present Phase III - Hot Pipe Trench and 224-AR project routings.

Handling Costs - UO_3 Shipments

An economic evaluation was completed upon the request of the Commission, covering the handling costs for several alternate methods for shipping uranium oxide. The Commission's end objective was to make better use of the railroad cars which travel the route between Hanford and Fernald. An additional alternate was developed favoring the continued use of hoppers for uranium oxide movements, with these hoppers being loaded in the 200-West Area directly to empty boxcars originally arriving from Fernald with metal for the fuels fabrication activity in the 300 Area.

Spare Parts Management System

A manual of operation for "Process Spare Parts Inventory Control" is being printed. The first seven (7) sections of this manual are being made available to Irradiation Processing Department at their request for this material to facilitate their installation of the same system.

Operating Continuity

Continuous services of water, steam, electricity, special equipment, and craftsmen were provided so as to guarantee continuity of production operations.

200-East Area Raw Water Pumps

Flow tests were conducted on the old 5,000 GPM raw water pumps in the 282-E Building. These tests confirmed the excellent working conditions of the 5,000 GPM pumps, and also indicated they might be retained for use with the new 200-East Area export water line. The suggestion is being made to replace the 3,000 GPM units and retain the 5,000 GPM pumps.

Ventilation Balance Services

A survey of all ventilation systems in 234-5 Building was completed and a survey of Redox ventilation systems is in progress. The ventilation balance crews assisted with changeout and testing of 128 filters in the E-4 Filter Room, 234-5 Building.

[Signature]
for Manager - Facilities Engineering

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JUNE, 1965

II. ACHIEVEMENTS (Continued)

G. RESEARCH AND ENGINEERING OPERATION

1. Separations Process Engineering

Purex

a. Normal Uranium Processing - Ruthenium Decontamination

The ruthenium activity in the uranium product averaged about four-fold above normal, but about one-third below the average for May. The decrease did not appear to correlate with any of the following processing changes that were effected during the month:

- (1) The IWW Waste Concentrator (E-F6) was replaced during the month. A subsequent substantial decrease in both the ruthenium and zirconium-niobium levels of the Purex recovered acid has been noted.
- (2) The equipment of the No. 1 Solvent Treatment System was chemically flushed.
- (3) The solvent inventory of the No. 2 Solvent Treatment System was transferred to the No. 1 System, and was replaced with fresh solvent.
- (4) The Final Uranium Cycle solvent-extraction columns were flushed.

Redox

a. Solvent Degradation and Recovery

The basic solvent recovery system for the Redox hexone solvent (methyl isobutyl ketone) is a distillation operation in the G-3 still. The less volatile solvent decomposition products are transferred to waste from the G-4 still bottoms receiver. Since adoption of the acid solvent-extraction flowsheet required for neptunium accumulation, an increase in the amount of decomposition products in the hexone process streams has occurred, and periodic caustic washing of the hexone inventory has been added to the solvent recovery flowsheet. The decomposition products also accumulate on the heat exchanger surfaces of the G-3 still, and periodic addition of 8 per cent HNO_3 to the still is required for removal of this material.

A plant shutdown was required on June 1 when the hexone still-to-receiver (G-3 to G-4) overflow jumper and jet became plugged with viscous solids. Since similar laboratory-generated solids (hexone decomposition products) were found to be soluble in hexone, the G-3 and G-4 systems were flushed with approximately 1200 gallons of hexone. Operation of the still has been normal following the flush. The flush solutions contained 6 pounds of uranium, 38 grams of plutonium, and 73 grams of neptunium, which were discarded to waste.

b. PRTR 0.48 Per Cent PuO₂-UO₂ Dissolution

Two charges of PRTR Zircaloy-clad, 0.48 per cent PuO₂-UO₂ fuels were dissolved using a flowsheet specifying 11.9M HNO₃-0.1M F (uncomplexed) as the core dissolvent. In practice, the required fluoride and an amount of NH₄NO₃ equivalent to 0.007M in the dissolvent were provided by the NH₄F-NH₄NO₃ heel remaining from the prior Zircaloy decladding operation. Water at 80 C was used to heat the dissolver coil and 87 CFM of humidified sparge air at 70 C was used for agitation. The first charge, containing 1106 pounds of uranium and 2335 grams of plutonium, was held at 60-80 C for 9 hours. According to sample analyses, it had completely dissolved after four hours. The second charge, containing 1142 pounds of uranium and 2507 grams of plutonium, was held at 60-80 C for six hours. According to a sample taken after four hours, 98 per cent of the uranium and 93 per cent of the plutonium had dissolved at that time. The charge was completely dissolved after six hours.

Following dissolution, aluminum nitrate nonahydrate was added to the dissolver solution at a ratio of four moles per mole of fluoride, to complex the fluoride and minimize corrosion of stainless steel equipment. Results of fluoride analyses of dissolver solutions have generally been in the expected 0.1 to 0.2M range; however, the analyses of several samples were considerably higher. Investigation of this problem is continuing.

A third charge of the same type fuel was being dissolved at the end of the month.

2. Fission Products Process Engineering

Process Technology Program

a. In-Tank Solidification

The in-tank solidification unit operated satisfactorily throughout the month. Dose rates near the bottom of the off-gas filter have gradually increased to the range of one R per hour. Back-flushing the filter with water has been ineffective in reducing the dose rate. On the theory that the mineral oil on the glass fibers has adsorbed or trapped radioactivity, a flush was made with a dilute solution of trisodium phosphate. No decrease in the radiation level resulted.

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b. Fission Product Recovery

Solids, consisting primarily of lead compounds, have been troublesome in the rare-earth storage tanks in B-Plant. This lead is carried through from the strontium sulfate lead carrier precipitation process in Purex. A process test was initiated, reducing the lead carrier in the sulfate precipitation process in Purex. A process test was initiated, reducing the lead carrier in the sulfate precipitation step from 0.02 to 0.01M. Preliminary data indicate no adverse effect on fission product recovery efficiencies.

Another strontium purification run was made using recycled solvent prepared from a normal paraffin hydrocarbon diluent (NPH). This solvent has now seen service in two strontium purification runs, and portions of the solvent were also used for promethium purification. Chemical and physical performance of the solvent continues to be excellent. Decontamination factors of 26, 4, 400, 750, and 7000 were achieved for calcium, barium, iron, lead, and cerium, respectively.

Two pressurizations occurred in the strontium product concentrator during the citrate kill, but little or no product was expelled to the other tanks. The pressurizations occurred even though the nitric acid concentration of the product being treated was in the desired range of 1-3M. The pressurizations occurred several minutes after the concentrator had been shut down. Laboratory support studies confirm this unusual behavior.

3. Plutonium Process Engineering

a. Plutonium Metal Ingot Temperatures

Temperature and pressure measurements were taken of two sealed shipping assemblies containing plutonium metal (Pu^{240} content 8.4%) ingots of 3932 and 3957 grams, respectively. The void space between the inner and outer can was loosely packed with plastic to minimize movement in one assembly, and with aluminum shot to dissipate heat in the other. There was no pressure build-up after one week; the maximum recorded skin temperature of the ingots was 210 F in the plastic-stabilized unit, and 177 F in the unit containing aluminum shot.

b. Slag and Crucible Dissolver

The 3-inch Teflon⁽¹⁾-lined spool piece in the bottom cross-over of the O-6 dissolver failed, as evidenced by leakage from the weep holes. Upon disassembly, the Kynar⁽²⁾ sparge leg and the 3-inch Teflon-lined cross at the bottom of the dissolver were found to have failed also. Appearances of the failed material would indicate that a localized high temperature was the cause of the failures. The sparge leg gave the appearance of having been charred, and edges of the failed Teflon

- (1) Teflon - trade name of E. I. duPont Company
- (2) Kynar - trade name of Penn. Salt Co.

showed signs of the liner having melted. The maximum working temperature of Kynar is 250 to 300 F and that of Teflon 350 to 400 F. How the indicated high temperatures were produced is not known.

It is postulated that plutonium metal fines and undissolved residues may have collected in the bottom of the cross-over pipe due to plugging of the sparge tube. Presumably, the plutonium fines were insulated from the circulating dissolver solution by the other undissolved solids. Due to the insulation effect, the temperatures could have built up as the plutonium reacted with acid in a static moist environment, eventually developing temperatures high enough to ignite the fines and char the plastic. Sparging conditions are being modified to provide better agitation during the dissolution cycle.

4. Separations Chemistry Laboratory

a. Purex Ruthenium Decontamination

Some laboratory work was performed in an attempt to determine reasons for occasional poor ruthenium decontamination across the Purex process. Samples of recovered acid, recycled condensates, and of Purex organic have been evaluated by bench-testing with the conclusions that neither recovered acid from the UO_3 plant or from Purex, nor the recycle condensates, have any detrimental effect on ruthenium decontamination across the process, nor do they contribute abnormally to ruthenium buildup in the organic.

b. F-8 Hydrolyzed Waste

Samples of aged waste from the Purex F-8 tank (acid waste recycle) were evaluated in the laboratory to determine whether the material could be processed without causing gross ZrNb decontamination problems. The tests were successful in that the decontamination factors were satisfactorily high indicating essentially complete hydrolysis of the complexing material.

c. Citric Acid "Kill"

The strontium recovery purification flowsheet includes a step called the citric acid kill in which hydrogen peroxide is used to destroy the citric acid by oxidation. While operating parameters for the safe performance of this step have been established by previous laboratory work, some continued difficulty in control has been experienced. Recent laboratory work has apparently defined the mechanism for the persistent pressurizations. As long as peroxide is being added to the solution, nitrite formation is suppressed. However, when the peroxide addition is stopped, nitrite builds up and the formic acid, nitrite, nitric acid reaction sets in. Formic acid has been detected in laboratory samples taken just prior to simulated pressurizations which appear to duplicate plant experience. This information emphasizes the need for controlling the nitric acid concentrations at the lowest reasonable values.

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d. Americium Purification

Attempts to remove the high concentrations of aluminum from the americium crudes were conducted during the month. Both the oxalate precipitation and the sulfate double salt were tried in an attempt to secure adequate americium isolation. In both cases precipitation was only partially successful; precipitates were hard to settle and were difficult to filter. The sulfate precipitate was metathesized with caustic, then dissolved in nitric acid and added to the dissolved oxalate solution. The excess nitric acid was destroyed by use of the sugar kill technique. The first 10 liters of the resulting feed stock containing an estimated 20 grams of americium was then split into four portions, each of which was precipitated with oxalic acid, washed, filtered, and calcined. The calcined product gave a gross oxide weight of 16.8 grams at about 45-50% purity. From this experience and observations made during the processing, we have concluded that the oxalate precipitation is not producing the soluble aluminum complex necessary for separation and that post-precipitation has occurred in the storage vessel either by the presence of precipitating anions or by radiolysis of the solution. Revised plans for future processing have been made which include the use of a reverse oxalate strike during precipitation and a metathesis cleanout and flush of the storage vessel to recover the remaining americium.

Americium oxide on hand at month-end consists of 18.8 grams at 99+% purity plus 16.8 grams at ~50% purity or a net elemental americium availability of $16.6 + \sim 8 = 24$ grams.

e. Gas Chromatographic Methods

Two more gas chromatographic capabilities have been added to our list of analytical methods with the demonstration of reasonably low quantitative detection limits for dibutyl phosphate and di(2 ethylhexyl) phosphoric acid. The limits were .002 v/o and 0.1M, respectively. The analysis is accomplished by converting the organic compounds to their corresponding monomethyl esters by reaction with diazomethane at room temperature. The esters can be processed through the chromatographic columns at temperatures up to 300 C without undergoing decomposition.

5. Plutonium Chemistry Laboratory

a. Solubility of Plutonium(IV) Fluoride

A document, "Solubility of Plutonium(IV) Fluoride in Nitric-Hydrofluoric Acids," RL-SEP-558, D. M. Creighton, Unclassified, was issued. The summary and conclusions follow:

- (1) The solubility of plutonium(IV) in nitric-hydrofluoric acid solution was determined by two methods. The first method, that of dissolution of dried PuF_4 , gave lower solubility values than the second method, in which PuF_4 was precipitated directly in the nitric acid solution with HF .
- (2) In the COP (product of the CO column), the solubility of Pu(IV) should be about 0.5 g/l. This solubility increases quite rapidly with hydrogen ion, and at a hydrogen ion concentration of about 2M, the solubility should be about 6 g/l Pu(IV) .
- (3) Literature values in general agree with the data presented in this report as determined by the second (precipitation) method. These values are included.
- (4) The initiation of precipitation of PuF_4 may be slow (many hours), which may account for the high Pu(IV) concentration sometimes found in the COP.

b. Americium Recovery

The completed laboratory investigations will be issued as "Solvent Extraction Recovery of Americium with Dibutyl Butyl Phosphonate," RL-SEP-518, R. S. Kingsley, Unclassified.

c. Filtration Test

A study was documented as "Laboratory Tests of Filtration Characteristics," RL-SEP-550, M. H. Curtis, June 9, 1965, Unclassified.

A laboratory small scale batch test may be used to relate filtration characteristics to continuous drum filter performance. Ten tests of plutonium oxalate precipitation were used to demonstrate the technique. The method is recommended for further study to optimize the continuous processing of plutonium oxalate.

Basis of the test is the measurement of the volume of filtrate obtained at different intervals while filtering the slurry obtained by precipitating 10 grams of plutonium. The data give a filtration resistance (r) by the relationship $r = \text{minutes}/(\text{milliliters})^2$. A low resistance value is sought. The relative mass of plutonium to be filtered per unit time (M''), may be obtained by the relationship

$$M'' = \left(\frac{20}{\text{Vac}} \times c \times \frac{1}{r} \right)^{\frac{1}{2}}, \text{ where}$$

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Vac = vacuum, inches of mercury
c = concentration of Pu in slurry, grams per liter, and
r = resistance, minutes/(milliliter)².

The M" relationship permits relating runs at different vacuums and slurry plutonium concentrations. A high value of M" is sought.

d. Recovery of PuO₂ - Polystyrene Cubes

An improved method has been found for removing the Krylon-aluminum paint coatings from polystyrene cubes used in criticality studies. The block is heated in hot (90 C) 5 w/o NaOH for 10 minutes, removed, and the Krylon-latex peeled off. The block is then rinsed with water, dried, and immersed in toluene. It is quickly wiped with a rag to remove the aluminum paint. Total time is less than 20 minutes.

R. E. Tomlinson

Manager
Research and Engineering

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JUNE, 1965

III. PERSONNEL ACTIVITIES

A. FORCE SUMMARY

<u>Operation</u>	<u>Monthly Salaried</u>		<u>Weekly Salaried</u>		<u>Total</u>	
	<u>5-30-65</u>	<u>6-30-65</u>	<u>5-30-65</u>	<u>6-30-65</u>	<u>5-30-65</u>	<u>6-30-65</u>
General Manager's Group	10	10	1	1	11	11
Financial	36	35	45	48	81	83
Employee Relations	9	14	5	6	14	20
Research & Engineering	60	62	28	29	88	91
Facilities Engineering	90	90	200	204	290	294
Production	6	5	3	6	9	11
Redox	61	61	229	230	290	291
Purex	71	71	283	290	354	361
Weapons Manufacturing	<u>56</u>	<u>56</u>	<u>237</u>	<u>237</u>	<u>293</u>	<u>293</u>
Total	<u>399</u>	<u>404</u>	<u>1031</u>	<u>1051</u>	<u>1430</u>	<u>1455</u>

B. PERSONNEL CHANGES

None to report.

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C. TRIPS

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To Other GE Components</u>		
M. F. Wiitala	Cleveland, Ohio	Plant engineer's lighting conference. (6/7-9/65)
<u>To AEC and Other AEC Contractors</u>		
H. A. Clark	US-AEC, Washington, D.C.	Am. Standards Committee on Filter Testing. (6/7-10/65)
W. G. Smith	US-AEC	Program Discussions. (6/14-16/65)
M. K. Harmon	Germantown, Md.	
W. P. McCue	Miamisburg, Ohio	Classification Conference (6/15/65)
H. H. Hopkins, Jr.	Savannah River Plant	Discuss U-233 Processing (6/14,15/65)
M. J. Szulinski	Aiken, So. Carolina	
	Oak Ridge National Lab.	Discuss Sol-gel process; U-233 purification. (6/16,17/65)
	Oak Ridge, Tennessee	
A. E. Smith	Lawrence Radiation Lab. Livermore, Calif.	Fabrication consultation. (6/23/65)
R. E. Tomlinson	Lawrence Radiation Lab.	Product quality discussions (6/28/65)
A. E. Smith	Livermore, Calif.	
S. G. Smolen	Sandia Corp. Livermore, Calif.	Product quality discussions (6/28/65)
	Sandia Corp. Albuquerque, N. Mexico	Standards discussions (6/29/65)
	Albuquerque Oper. Office Albuquerque, N. Mexico	Discuss schedule relations and quality assurance. (6/29/65)
	Los Alamos Scientific Lab. Los Alamos, N. Mexico	Fabrication discussions. (6/30/65)
	Dow Chemical Company Denver, Colorado	Product quality discussions (7/1/65)

C. TRIPS (Continued)

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To General Industry</u>		
H. H. Hopkins, Jr. M. J. Szulinski	Babcock & Wilcox Lynchburg, Virginia	Discuss U-233 processing. (6/18/65)
<u>To Technical Conventions & General Meetings</u>		
W. H. Roos	Seattle, Washington	Puget Sound Industrial Conference. (6/1/65)
M. H. Campbell C. A. Colvin L. W. Winkle W. C. Johnson	Twentieth Annual NW Regional ACS Meeting Corvallis, Oregon	To present papers and attend sessions. (6/14,15/65)
R. A. Connell	Miami, Florida	National Association of Accountants. (6/28-30/65)

D. VISITORS

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From Other GE Components</u>		
A. L. Schiedler R. Hubbard	GE-APED, San Jose, Calif.	Equipment for Nuclear Plant Facilities. (6/28/65)
<u>From AEC and Other AEC Contractors</u>		
F. J. Arrotta R. D. Wolfe V. Corso S. G. English J. A. Swarthout F. P. Baranowski	US-AEC Division of Military Application Germantown, Maryland	Tour of weapons facilities. (6/1/65)
J. V. McNamara L. D. Pancer B. Koprowski	US-AEC Division of Production Germantown, Maryland	" "
J. V. McNamara L. D. Pancer B. Koprowski	AEC Chicago Operations Office Argonne, Illinois	Fire extinguishment for Pu fires. (6/3/65)
Major Williams	Div. of Military Application Washington, D.C.	Review of R&D program. (6/10/65)
M. E. Harris W. J. Ramsey	Lawrence Radiation Lab. Livermore, Calif.	Fabrication consultation. (6/16/65)

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D. VISITORS (Continued)

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<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From AEC and Other AEC Contractors (Continued)</u>		
Thomas Gore Fred Huddleston Herb Mayer Frank Lonadier	Dayton AEC Mound Lab. Dayton, Ohio	Health physics, operational practices. (6/21/65)
F. Huddleston H. Mayer F. Lonadier	Mound Lab. Miamisburg, Ohio	Polonium-210 separations. (6/23/65)
Captain Ingram	Washington AEC	Tour weapons facilities. (6/24/65)
<u>From General Industry</u>		
P. E. Cottom	Factory Mutual Eng. Div. Norwood, Massachusetts	Discuss Pu fire extinguishment. (6/3/65)
R. G. Ischinger A. H. Olson	The Fluor Corp. Los Angeles, Calif.	Ion exchange. (6/15/65)
J. B. Conner	Consolidated Electro-Dynamics Corporation, Pasadena, Calif.	Mass Spectrograph Leak Detector. (6/14,15/65)

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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>Empl. Rel.</u>	<u>Total</u>	<u>YTD</u>
Dis. Injuries					1*					0	0
Ser. Accidents										1	2
Med. Treat. Inj.		8	8	12	8				1	37	252
Rad. Occurrences		4	3		6					13	58
Contam. Wds.										0	16
New Deposition Cases										0	0
Fires										0	1
Security Violations						1	2			3	9

*During relocation of an 8,000 gallon railroad tank car, of 50% caustic soda to an unloading spot, caustic solution apparently sloshed back and forth with some spray escaping from the underside of the hinged lid to splash down both sides of the car. The switchman, in position on the west side of the car, was sprayed with caustic on his cap, right side of head, face, back of neck and right shoulder.

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V. REPORTS

A. PREPARED AND ISSUED

- RL-SA-43A, Unclassified, "Administering Criticality Control in the Hanford Atomic Products Operation Non-Reactor Environment", by R. E. Isaacson, G. R. Kiel, K. R. Ridgway, and R. D. Carter, dated June 14, 1965.
- RL-SEP-232 L30, Secret, "Button Purity Data - Letter No. 30", by R. J. Sloat, dated June 2, 1965.
- RL-SEP-232 L31, Secret, "Button Purity Data - Letter No. 31", by R. J. Sloat, dated June 8, 1965.
- RL-SEP-232 L32, Secret, "Button Purity Data - Letter No. 32", by R. J. Sloat, dated June 14, 1965.
- RL-SEP-232 L33, Secret, "Button Purity Data - Letter No. 33", by R. J. Sloat, dated June 21, 1965.
- RL-SEP-232 L34, Secret, "Button Purity Data - Letter No. 34", by R. J. Sloat, dated June 28, 1965.
- RL-SEP-267 PT4, Unclassified, "Engineering Study, Thorium Processing - Purex - Part IV - Process Design", by R. D. Ehrlich and J. R. LaRiviere, dated May 26, 1965.
- RL-SEP-308, Unclassified, "Engineering Study for a Second In-Tank Waste Solidification System", by H. L. Caudill, dated February 26, 1965.
- RL-SEP-315, Secret, "Process Specifications - Uranium-Plutonium Separations at the Redox Plant", by Separations Process Engineering, R&E, dated May 24, 1965.
- RL-SEP-323 REV, Secret, "Supplemental Critical Mass and Chemical Hazards Control Specifications - Sludge Dissolution from Redox Vessels", by G. L. Hanson and H. C. Rathvon, dated June 7, 1965.
- RL-SEP-433 REV, Unclassified, "Critical Mass Control Specification - Recuplex Reception and Blending Hood Floor Clean-Out", by R. J. Sloat, dated June 15, 1965.
- RL-SEP-468, Unclassified, "Proposed Time Cycles for Handling Strontium Containers in 'B' Plant and Recommendations for Remote Handling in Cell 15", by D. E. Peterson, dated May 27, 1965.

A. PREPARED AND ISSUED (Continued)

- RL-SEP-483, Secret, "Purex Thoria Processing, Budget Design Criteria", by R. D. Ehrlich and J. R. LaRiviere, dated May 26, 1965.
- RL-SEP-497, Unclassified, "Design Criteria - Rev. No. 1 - 221-B Waste Fractionization - Phase III, Waste Management Program", by H. E. Caudill, dated May 17, 1965.
- RL-SEP-502, Official Use Only, "Preliminary Project Proposal, Second In-Tank Waste Solidification System - 200 East Area (Project CAC-176)", by L. W. Finch, dated June 9, 1965.
- RL-SEP-504, Secret, "Fabrication Process Test FPT-65-3 - Ingotting of Unalloyed Plutonium Buttons", by C. M. Walker and R. L. Walser, dated May 26, 1965.
- RL-SEP-507, Unclassified, "W-2 Waste Recovery Column Stripping Studies", by D. M. Creighton, dated June 1, 1965.
- RL-SEP-510, Secret AWD, "Fabrication Process Test 64-28 Evaluation: Mechanical Cleaning of Plutonium Buttons", by C. M. Walker, dated June 1, 1965.
- RL-SEP-511, Unclassified, "PRTR Plutonium Nitrate Specifications", by R. J. Sloat, dated June 16, 1965.
- RL-SEP-513, Secret AWD, "Weapons Process Engineering Technology Report - May, 1965", by members of Weapons Process Engineering, R&E, CPD, dated June 1, 1965.
- RL-SEP-514, Unclassified, "Critical Mass Control Specification - Room 170-A, 234-5 Building", by R. J. Sloat, dated June 9, 1965.
- RL-SEP-515, Secret, "Analysis of Neptunium Batches - Purex No. 29 and 30", by M. K. Harmon, dated June 1, 1965.
- RL-SEP-516, Secret, "Re-Usable Shipping Canisters for NPR Fuels of Less Than One Percent Enrichment", by J. H. Warren, dated June 17, 1965.
- RL-SEP-518, Unclassified, "Solvent Extraction Recovery of Americium With Di-butyl Butyl Phosphate", by R. S. Kingsley, dated June 4, 1965.
- RL-SEP-519, Unclassified, "Critical Mass Control Specification - LRL Ingot Pu-240 Content", by R. J. Sloat, dated June 10, 1965.
- RL-SEP-523 RD, Secret, "Redox Neptunium Campaign Flowsheet", by A. L. Boldt, dated June 10, 1965.
- RL-SEP-540, Secret, "Analysis of Neptunium Batch - Purex No. 30", by M. K. Harmon, dated June 8, 1965.

A. PREPARED AND ISSUED (Continued)

RL-SEP-549, Secret, "Chemical Flowsheets for Canister Removal, Decladding and Dissolution of Small Charges of NPR Fuel", by G. L. Hanson, dated June 8, 1965.

RL-SEP-550, Unclassified, "Laboratory Tests of Filtration Characteristics", by M. H. Curtis, dated June 9, 1965.

RL-SEP-556, Secret, "Thorium Recycle Case Studies", by D. E. Braden and W. P. Ingalls, dated June 11, 1965.

RL-SEP-578, Secret AWD, "A-Line Product Characteristics", by A. E. Smith, dated June 15, 1965.

RL-SEP-558, Unclassified, "Solubility of Plutonium (IV) Fluoride in Nitric-Hydrofluoric Acids", by D. M. Creighton, dated June 11, 1965.

RL-SEP-579, Unclassified, "Critical Mass Control Specification - Temperature Measurements of Euratom Ingots", by R. J. Sloat, dated June 21, 1965.

RL-SEP-582, Secret AWD "Measurement Factors for Material Balance Accounting, Weapons Fabrication Operation", by L. M. Knights, dated June 17, 1965.

RL-SEP-585, Unclassified, "Critical Mass Control Specification - Hood 50, Room 179-B, 234-5 Building", by R. J. Sloat, dated June 25, 1965.

RL-SEP-589, Unclassified, "RMA - RMC Button Line Process Specifications and Operating Standards", by R. J. Sloat, dated June 25, 1965.

RL-SEP-599, Secret, "Analysis of Neptunium Batch - Purex No. 31", by M. K. Harmon, dated June 22, 1965.

RL-SEP-603, Secret, "Oxalic Acid Addition to Reactor Hoods 9-A and HC-9B", by R. J. Sloat, dated June 25, 1965.

B. PREPARED FOR SIGNATURE AND ISSUANCE

RL-GEN-21, Secret, "Production - May, 1965", by W. E. Johnson, dated June 16, 1965.

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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.

<u>INVENTOR</u>	<u>TITLE</u>
D. D. Wodrich, L. R. Michels	Device for Handling Irradiated Fuel Elements
T. S. Soine	Cell for Electrorefining Metal Skulls
T. S. Soine, O. H. Koski	Analytical Tool for Determining The Concentration of Cations In An Electrolysis Bath
T. S. Soine J. V. Gilchrist	Graphite Anode For The Electro- winning of Metal From Metal Halides or Metal Oxides
T. S. Soine	Stirred Bed Gas-Solids Reactor

J. H. Warren

General Manager
Chemical Processing Department

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