HW 74505

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
FOR

JULY, 1962

HW--74505

Compiled By
OPERATION MANAGERS

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August 20, 1962

HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON

By Authority of.

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I. SUMMARY

Production through July, as compared with the July 25, 1962 HAP0 Production Forecast (HW-74256), is summarized below:

	<u>Percent of Forecast Achieved</u>	
	<u>July</u>	<u>Fiscal Year To Date</u>
Separated plutonium nitrate	113.1	113.1
Separated uranium nitrate	120.2	120.2
Uranium oxide	99.5	99.5
Plutonium metal buttons	134.3	134.3
Fabricated parts	74.4	74.4

July production was highly satisfactory and all products except fabricated parts exceeded forecasted quantities. Although output of weapons parts for the new 1251 model was below that forecasted, the fabrication rate showed much improvement over that experienced last month.

The marked improvement noted last month in Purex processing operation was sustained throughout July. Particularly impressive was the performance of the final uranium decontamination cycle, which produced uranium product which did not require silica gel treatment. The plant outage time totaled less than six hours.

The HAP0-II-2 cask, which was loaded in May with 130,000 curies of strontium-90, was released on July 6, 1962 for shipment.

Laboratory and plant studies are being conducted to determine the factors contributing to an abnormal deposition of plutonium in the Redox extraction system. The investigation was started when a periodic flush of the system with nitric acid during July yielded 2516 grams of plutonium. Of the total amount recovered, about 94 percent came from the 2D partition column and overflow line.

Final design was completed on the new sectionalized concentrator concept for Purex. The purchase package was transmitted to prospective bidders on July 27, 1962.

A preliminary project proposal was sent to the AEC on July 27, 1962, requesting \$76,000 for design of new encased pipe lines from Purex to a diverter station. These lines will allow routing the waste streams to any one of the existing or new Purex waste tanks without going through a diversion box.

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Project CGC-811, "Additional Plutonium Fabrication Facilities - 234-5 Building," was closed out on July 31, 1962, with exceptions.

AEC Directive HW-542, dated July 12, 1962, authorized \$204,000 for design and construction of an ion exchange system in the 234-5 Building.

A preliminary project proposal was submitted to the AEC on July 3, 1962, requesting design funds for concentrating the non-boiling wastes which are stored in underground tanks. The estimated total project cost is approximately \$500,000.

P. H. Rinker

General Manager
Chemical Processing Department

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II. ACHIEVEMENTS

A. PRODUCTION OPERATION

1. Production Statistics

a. Percent of Forecast⁽¹⁾ Achieved

	<u>July</u>	<u>Fiscal Year to Date</u>
Separated plutonium nitrate	113.1	113.1
Separated uranium nitrate	120.2	120.2
Uranium oxide	99.5	99.5
Plutonium metal buttons	134.3	134.3
Fabricated parts	74.4	74.4

b. Purex

	<u>July</u>	<u>June</u>
Uranium nitrate produced (tons)	776.79	555.25
Average production rate during operation (T/D)	25.2	22.0
Total waste loss (%)		
Plutonium	0.37	0.34
Uranium	0.31	0.31
On-line efficiency (%)	99.4	84.4

c. Redox

Uranium nitrate produced (tons)	4.47	114.44
Average production rate during operation (T/D)	5.0	4.4
Total waste loss (%)		
Plutonium	0.87	0.44
Uranium	1.29	0.25
On-line efficiency (%)	7.1	72.0

d. Uranium Reduction (tons)

Normal UO ₃ loaded	466.42	449.82
Enriched UO ₃ loaded	0	101.11
Normal UO ₃ approved for shipment	298.35	445.56
Enriched UO ₃ approved for shipment	0	98.07
Normal UO ₃ shipped	344.75	449.73
Enriched UO ₃ shipped	49.05	49.03
Normal UNH backlog	680	499
Enriched UNH backlog	78	71

(1) HW-74256, HAPD PRODUCTION FORECAST, dated 7-25-62.

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e. Plutonium Metal Processing

	<u>July</u>	<u>June</u>
Input to Task I (batches)	43	312
Reduction yield (%)	95.3	95.2
Product recovery output (Kgs)	66.56	6.66
Product recovery backlog (Kgs)	1205.63	1120.18
Waste disposal (grams)	395	145

f. Power

	<u>200-East</u>	<u>200-West</u>
Raw water pumped (GPM)	11,794	3,844
Filtered water pumped (GPM)	1,175	892
Maximum steam generated (lbs./hr.)	260,000	94,000
Average steam generated (lbs./hr.)	209,000	47,500
Total steam generated (M lbs.)	155,443	35,343
Coal consumed (tons)	7,859	1,954

July production was highly satisfactory and all products except fabricated parts exceeded forecasted quantities. Although output of weapons parts for the new 1251 model was below that forecasted, the fabrication rate showed much improvement over that experienced last month.

for

E.E. Smith

Manager, Production

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II. ACHIEVEMENTS

B. PUREX OPERATION

1. Operating Continuity

The plant operated at an average rate of 24.6 tons per day. The rate at month end was 26.5 tons per day. Operation was continuous except for two brief outages totaling less than six hours of down time.

Uranium product met specifications except for two batches containing excessive plutonium. Plutonium product failed to meet specifications for about a four-day period early in the month. The accumulation of gamma activity in the final plutonium cycle feed tank contributed to a prolonged gamma burst. Two-thirds of this material was successfully reworked by month end.

2. Processing Operation

One thousand and thirty (1,030) cans of button line supernate were processed.

Silica gel treatment of uranium product was discontinued due to improved performance of the final uranium decontamination cycle. The unit was placed in stand-by condition.

Several cans of out-of-specifications plutonium were successfully reworked through the N Cell ion exchange system. All plutonium product during the rework operation met specifications.

Three strontium recovery runs were completed and the recovered material was transferred to the 003 CR vault. Analyses of the product samples from the last two runs are not yet complete, but the first run recovered approximately 218,000 curies of strontium 90.

The HAPO-II-2 cask, which was loaded with strontium 90 in May, 1962, was released for shipment to Martin-Marietta Company on July 6, 1962.

3. Mechanical Experience

A rotameter failure in a jumper to the co-decontamination cycle caused about a five-hour outage.

The L-10 pump and the J-5 agitator failed. Both were replaced with spare units without interrupting production continuity.

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Exhaust fan No. 3 repairs were completed. Work consisted of renewing all bearings, pillow blocks, and installing a new shaft, both sheaves, belts, and belt guard.

Work on the A-10 crib was completed and the hot tie-in made on July 3, 1962. The A-5 crib was valved out of service.

The J Cell package for continuous neptunium recovery was placed in the canyon. Jumper installation and testing was initiated.

4. Radiation Experience

The total radio-iodine 131 emission for the month was 5.92 curies. Maximum seven-day emission was 1.31 curies.

5. Analytical Experience

Alpha energy analysis capability was improved by the installation of a silicon diode attachment for the 256 multichannel analyzer. Specific alpha emitters can now be accurately determined on sample mounts which contain beta radiation one hundred times greater than the previous limit.

The new laboratory flame spectrophotometer installation was successfully used during July to determine the calcium and barium content of Hot Semiworks samples.

Manager - Purex

PR McMurray/RWM/sc

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II. ACHIEVEMENTS (Continued)

C. REDOX OPERATION

1. Operating Continuity

The Redox Plant process was shutdown from June 29 until the week of July 23, while the majority of personnel took their vacations. The new ion exchange unit was operated throughout the period to successfully process approximately 650 cans of plutonium bearing filtrate from the 234-5 Building oxalate precipitation process. During the week of July 16-22, when personnel having less than three weeks' vacation began to return to work, a 60 percent nitric acid flush of the Redox processing equipment was started. Operation of the plant to process E-metal resumed on July 26.

2. Processing Operations

Normal processing activity in the Redox Plant, following the three week vacation shutdown period, was planned to start on July 23. However, startup was delayed until 7-26-62, because of the necessity for reworking some high product bearing waste solution which had accumulated during the shutdown period and difficulties associated with the resin recharge of the new anion exchange contactor. Recharging of the resin bed in the contactor was started during the July 21-22 weekend to take advantage of the extended shutdown in locating any difficulties that might arise during the leaching and removal of the old resin and the recharging operation. Slow discharge of the resin and displacement of wash materials, due to line restrictions, extended the job until 7-26-62.

E-metal processing was resumed on 7-26-62. However, high plutonium wastes were encountered during startup operations and it was necessary to discontinue virgin feed to the extraction columns on two occasions, for about 24 hours each, to rework the high waste solution. The trouble was determined to be plutonium polymerization in the feed solution caused by an acid deficiency. This was corrected by extended reoxidation in the feed preparation step. Reworking of the off-standard waste limited the plutonium loss to less than 0.20 percent.

A 60 percent nitric acid flush of the extraction columns, overflow lines, and associated vessels was made during the week of

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July 16-22. Approximately 2500 grams of plutonium were recovered. Of this total, 94 percent was picked up in the 2D partition column and overflow line. Studies are continuing in both the laboratory and the plant to determine the cause of the heavy plutonium deposition in this portion of the Redox system.

During the July vacation shutdown, approximately 650 cans of plutonium bearing waste solution from the 234-5 Building were processed through the new anion exchange system. Although decontamination of metallic impurities was satisfactory, the low acidity of the feed and reoxidation of a significant portion of the plutonium resulted in above average waste losses. The waste solution was subsequently reworked with the 60 percent acid flush, as noted above, with no processing difficulties. In addition to the 650 cans processed through the ion exchange unit, approximately 75 cans were processed via the H-4 metal solution oxidation tank when operations were resumed on July 26.

Approximately 300 tons of UNH solution from the Purex Plant were received and stored in the Redox UNH storage area during the first two weeks of July. Efforts were done to insure adequate storage while the UO₃ Plant was shutdown for vacations during the first two weeks of July. By the end of the month approximately 100 tons had been shipped to the UO₃ Plant for final processing.

3. Mechanical Experience

The mechanical efficiency for the month was 100 percent, there being no downtime chargeable to failed or malfunctioning equipment. Six canyon cell jumpers were installed, one as a replacement and five associated with new installations.

Maintenance work this month was confined primarily to shutdown items. Most significant was the complete overhaul of the XLE process air compressors, the inert gas compressors, and repair of the steam generator for the E-2 plutonium ozonator.

Preparatory work was started this month for the installation of an annular dissolver (Mark V) in "A" dissolver cell. The conventional dissolver in "C" cell was removed and transferred to the Equipment Reclamation Facility for decontamination and storage, and the "A" cell dissolver, with a down-draft tower and prototype iodine silver reactor, was installed in "C" cell. The interchange of equipment from "A" to "C" cell was made to preserve the more modern integral units of "A" dissolver, and at the same time take advantage of the use of existing equipment for the Mark V dissolver installation.

In conjunction with the dissolver cell changes, noted above, jumper installations were also made which will eventually provide a routing for sodium nitrate, available in the Redox

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241-SX waste storage tanks, to the dissolvers. It is planned to use reclaimed sodium nitrate from the waste tanks as a hydrogen suppressant during routine removal of the aluminum jackets from feed metal slugs, instead of commercial sodium nitrate.

4. Waste Handling and Decontamination

Equipment valued at \$110,000 was received from the processing plants for decontamination, repair or inspection during the month. Equipment valued at approximately \$103,000 was returned to CPD customers, representing a savings of approximately \$58,000 over the cost of new replacement equipment.

A total of 297 manhours was charged to the decontamination and/or repair of railroad, automotive and heavy equipment. The following is a breakdown of the major items decontaminated:

<u>Item</u>	<u>Operation Charged</u>
Well Cars No. 45, 99	CPD
Fordson Loader	P&GM
Dump Truck	P&GM
Lowboy Trailer	P&GM
Hanford Jumper Heads (5)	Minor Construction
Cam Pump and Base	IPD
Shipping Cask	HLO
Reactor Tube Boring Equipment	IPD
Pulse Column Cartridge	Purex
HAPO Strontium Shipping Cask	FEO
PRTR Tube Caps	HLO

5. Radiation Experience

Five skin contamination cases (maximum 20,000 d/m) and three radiation occurrences were recorded in the Redox Operation during the month. All skin contamination was readily reduced to non-detectable and none of the radiation occurrences were significant.

The Bore-Tun Company completed drilling of the laterals under the 110 and 111-SX waste tanks and completed the first of three vertical caissons (located between the 109 and 115-SX tanks) on July 26. To date, no significant ground contamination has been detected. However, a surface dose rate of 5 r/hr was detected on two condensate recycle lines which were uncovered at a depth of four feet in one of the caissons. An effort is currently being made to relocate the caisson.

6. Analytical Experience

Three customers in the Hanford Laboratories Operation were provided with multi-channel gamma analyses of samples to be used in the Atomic Energy Commission's nation-wide program for the study of "Irradiation Effects on Structural Materials". As previously reported, these samples are to be used to establish

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the ground rules and standard conditions since the Hanford Atomic Products Operation has been selected as the hub and directing site for this program and will coordinate the efforts, direction and data for all participating laboratories. The program is fast becoming a major user of the Redox Analytical Control services and technical abilities in the field of multi-channel analysis. The preliminary work entailed in providing standard bases and normalizing pertinent data has considerable magnitude from both a workload and technical requirements standpoint. To date, inter-site calibration data have been submitted for several isotopes as encountered in the first of the samples received from HLO. These first samples are only a minor portion of the proposed samples of monitoring materials to be employed throughout the program. Some of the benefits hoped to be obtained from this program are the irradiation effects on graphite and stainless steel and other metals, plus assimilation of enough empirical data to be able to more accurately calculate neutron fluxes and atomic cross sections.

In an attempt to resolve the difficulties encountered during efforts to identify phosphorus 32 (among other activities present) on a series of samples submitted by the Coolant Systems Development Operation, it was found that the routine phosphomolybdate precipitation followed by multi-channel analysis was not adequate because of insufficient decontamination. Adaptation of another procedure, utilizing a solvent extraction technique which operates on the basis that phosphomolybdic acid is extractable from an aqueous solution by a mixture of 1-butanol and chloroform, proved successful and significantly reduced the phosphorus precipitation time.

Manager - Redox**DECLASSIFIED**

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II. ACHIEVEMENTS (Continued)

D. FINISHED PRODUCTS OPERATION

1. Operating Continuity

Model 1251 assemblies were fabricated at increasing rates during the month. Some interruptions were experienced in the fabrication casting operations as a result of a combination of feed shortage and mechanical difficulties. The production of unfabricated plutonium exceeded schedule. Recovery activities were limited to the burning and dissolution of skulls and the operation of the incinerator. The uranium reduction facilities resumed normal operations on July 13 following the annual vacation shutdown.

2. Processing Operation

a. Plutonium Fabrication

Information on plutonium fabrication is presented in Document HW-74575 entitled "Chemical Processing Department, Finished Products Operation, Z Plant Monthly Report, July, 1962" which is classified "Secret, Atomic Weapon Data, Production Rate and Stockpile Quantity Information."

b. Plutonium Processing

Operation of the plutonium preparation facilities was satisfactory during the month. Production rates improved significantly and product quality returned to normal. The principal problem during the month involved the control of contamination resulting from failure of gloves in Hood 9-B (calciner-fluorinator hood). The failures have been traced to excessive heat in the upper levels of the hood, and new and improved heat shields are being secured to correct the condition. Also, a small fire occurred in the same hood during a panel change when a rag dropped onto the calciner and smoldered. No damage occurred, but contamination was spread during efforts to extinguish the fire. The new heat shields will eliminate the cause of this fire. 445 443

In recovery, additional facilities in the form of laboratory-type (glass) dissolvers, were activated to provide additional capacity for the dissolution of the plutonium oxide resulting from the burning of skulls and other metallurgical scrap. The product from these dissolvers was successfully blended with the primary plant product as feed for the button line.

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b. Plutonium Processing (Continued)

Operation of the incinerator was resumed in early July, but production continued to be limited by the lack of capacity in the sorting and leaching portions of the operation.

c. Uranium Reduction

The uranium reduction plant resumed activities in mid July following a three week shutdown for employee vacations. All six calciners were used on the depleted stream in order to reduce the large inventory of UNH. Operation was satisfactory.

3. Mechanical Performance

Fabrication equipment functioned satisfactorily during the month. Three machining complexes are now in use for the production of Model 1251 assemblies. Some difficulties were experienced in the conversion of lathe 41-M1 but these were resolved by month end.

Plutonium processing equipment operated well during the month. The principal difficulty involved the continued plugging of the off-gas lines from the calciner in Hood 9-B.

Equipment performance at the uranium reduction plant was satisfactory except for the corrosion failure of the off-gas scrubber of the "L" calciner. The scrubber was replaced by a spare, and additional spares were ordered in anticipation of future failure of the other five. The X-2 feed tank was cleaned, inspected, expanded to its original shape (by filling with water), and reinspected. It is now in limited service pending further study by engineering personnel.

4. Radiation Experience

Radiation and contamination control statistics reveal conditions to be normal except at Hood 9-B (calciner-fluorinator hood) where hood glove failures have resulted in contamination control difficulties.

Two cases of possible plutonium deposition resulted from minor injuries sustained in the process hoods.

5. Analytical Experience

	<u>June</u>	<u>July</u>
Number of Samples Received	1,688	2,279
Number of Determinations	16,486	21,614
Total Metallic Impurities, Buttons	1,325 ppm	1,100 ppm
Total Carbon Content	480 ppm	615 ppm
Buttons Rejected	15.0%	1.4%
Pu 240 - NRF Buttons (by Mass. Spec.)	7.74%	----
Pu 240 - Normal Buttons (by Mass. Spec.)	6.21%	6.12%

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6. Quality Control

Detailed quality control procedures are being written in preparation for the implementation of the Quality Assurance Program at Hanford.

W. J. Gartin

Manager
Finished Products

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II. ACHIEVEMENTS (Continued)

E. POWER AND GENERAL MAINTENANCE OPERATION

1. Operating Continuity

Steam, water and emergency electrical services were furnished the production facilities, in a manner sufficient to sustain continuity of operations for the entire period covered by this report.

2. Inspection, Maintenance and Repair

Delivery of the Purex J-Cell Package for continuous Palm recovery was made July 23, 1962. The two associated tanks and two pulse generators were shipped the following day. One of the pulse-column cartridges (3-A Column) was installed in the Package before shipping; however, the other cartridge (3-B Column) could not be installed because the plastic-covered, stainless-steel plates were not available. This cartridge will be installed remotely at a later date. To date, 26 pipe jumpers for the Palm project have been shipped to Purex, with no difficulties of installation being reported.

Fabrication of four spare silica-gel process vessels, for use in the Purex final uranium clean-up facilities, was completed during the month. The lead-shielded, stainless-steel vessels are 42" high by 24" diameter, and are charged with silica gel. The uranium stream is passed through the vessel for removal of small quantities of fission products.

Repair and modification work on the spare concentrator for Purex was essentially complete at month's end. All defective welding by the original vendor has been replaced by CPD welders, and the work has passed X-ray test. Pressure testing, insulating and sheathing constitute the remaining work on the vessel.

As indicated below, the Pipe Fabrication Shop completed 33 jumpers in addition to extensive modifications to five existing jumpers for the Purex Facility.

NPR Fuel Processing Project (CGC-929)	12 jumpers
Purex Reliability Project (CGC-895)	2 jumpers
Palm Project	2 modifications
Purex Replacements	14 jumpers
Purex	3 modifications
Redox Replacements	4 jumpers
Redox Spare Parts	<u>1</u> jumper
Total	38

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Shop tests on a 40" Bird centrifuge revealed the motor insulation to be inadequate for service to which the unit would be subjected. The motor was sent to Spokane for rewinding with Class H insulation, which will correct the deficiency. The centrifuge was a T-Plant type that had been modified for use at Purex for fission-product recovery.

Work on the Purex Palm Project is nearing completion. All required materials are on hand; however, final completion must be geared to the August shutdown. Status of the different phases of the work at month's end is shown below.

Pipe and Operating Gallery Piping	98%
Aqueous Makeup Equipment	98
Sampler Installation	97
Electrical Work	97
Instrument Work	95

Installation of the Flo-Turn Forming Machine and associated equipment in Room 233 at Finished Products Operation was completed. Included was the fabrication and installation of a large hood with a specially constructed floor of 3/4" stainless-steel plate to accommodate the Flo-Turn Forming Machine, installation of two hydraulic pumping units, an electric overhead traverse hoist, connecting dry-air supply and exhaust systems, and providing a 440-volt electrical power supply complete with electrical controls for the above equipment.

In progress at month's end was the installation of Stokes Vacuum Furnace No. 5 in Room 233 at the Finished Products Operation. The overall status of the work is approximately 60 percent complete at this time.

Two Hasteloy filter components were fabricated for the Finished Products Operation's fluorination off-gas assembly. One filter was completed on an emergency overtime basis as required to replace a failed in-service unit. The other new unit will be retained as a spare.

Approximately 600 cubic yards of contaminated earth was removed from the compound north of the 275-EA Building, in preparation for a two-inch cover of crushed rock, the purpose being to eliminate the necessity of a radiation monitoring check-out of automotive equipment required to enter that particular area. The contamination on the roof of the 275-EA Building has been sealed with an aluminum roofing compound, and released by RMJ. The source of the contamination is attributed to several radiation instances at the Purex Facility, the principal of which was the No. 2 trap pit incident of July 1961.

At the Redox Facility some 30 cubic yards of contaminated earth was removed from 204-S Area (UNH storage) and replaced with 40 yards of crushed stone. The contamination spread developed from a leaking pressure gauge on a UNH storage tank (151-S).

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Third-party inspections were performed on No. 3 and No. 4 boilers and on three air-receiver tanks in the 200-West Area Power House. The report indicates all five units are in good condition.

A new 6,000-GPM turbine-driven water pump, for installation in the 282-E Pump House, has arrived at the job site. The unit will replace an existing 3,000-GPM pump, to assure an adequate raw-water supply to the Purex Facility in case of an electrical outage. Installation will coincide with the next planned shutdown of the Purex Facility.

T. G. LaBrecque

Manager
Power and General Maintenance

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II. ACHIEVEMENTS (Continued)

F. FACILITIES ENGINEERING OPERATION

1. Purex

a. Process Design Engineering

Essential Waste Routing System - Purex

Process design engineering on piping changes in the Purex essential waste routing system was completed. The changes allow by-passing of diversion boxes when moving the high-level wastes or the crude strontium stream. This work was approved as a scope revision to CAC-970 - Purex Essential Waste Routing System - and its effect was factored into the scope of CAC-945 - 241-AX Tank Farm - Phase I. The net increase, as estimated for the two projects, was \$48,000.

"N" Cell Sump

Process design engineering work was completed covering the changes needed to permit remote operation of the Purex cell sump clean-out system for recovery from a critical incident should one occur in this area. Minor piping changes are needed to permit the "N" cell sump to be emptied remotely from PR via a vacuum transfer to L-11. In L-11 the sump material can be sampled and transferred back to the head-end of the process.

OWW Concentration

Process design engineering work was completed covering facilities needed for the concentration of Purex organic wash waste in the 242-T Evaporator Facility. Included are the changes needed for routing of OWW from 202-A to 242-T via the 244-CR Vault.

Neutron Counter - TK-E6

Design was completed of a neutron counter jumper installation in TK-E6, the HAF make-up tank. The design is based on the use of coaxial connector inserts in the jumper connector, with new connector heads to be installed in the cell.

Spare Concentrators (Sectionalized Concept)

Final design was completed on the new sectionalized concen-

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trator concept for Purex. The purchase package including new fabrication specifications, new welding specifications, and new x-ray specifications, was transmitted to prospective bidders on July 27, 1962. This bid package calls for a pre-bid conference with all bidders, and a pre-award conference with the apparent low bidder. By means of the strict requirements of this bid package and integration in these conferences, it is expected that HAPO will receive a better fabricated unit because of pre-arranged understanding of the intent and type of fabrication required.

b. Project Engineering

CGC-821 - Project Palm - Purex

The "J" Cell package was installed in the Purex canyon on July 23, and the two pulse generators and two tanks were installed remotely into the package on July 24. Jumpers are now being installed.

CGC-965 - In-tank Waste Solidification - 200-E Area

A preliminary project proposal requesting design of facilities for concentrating non-boiling wastes in the underground storage tanks was transmitted to the Atomic Energy Commission on July 3, 1962. The estimated total project cost is about \$500,000.

CAC-970 - Essential Waste Routings - Purex

A preliminary project proposal requesting \$76,000 for design of new encased pipe lines from Purex to a diverter station was transmitted to the Atomic Energy Commission on July 27. These lines will allow routing the waste streams to any one of the existing or new Purex waste tanks without going through a diversion box.

c. Manufacturing Engineering

Canyon Jumpers

Three new jumpers were completed for a high temperature jet routing from Tank E-3 to the E-2 Centrifuge. This will be used in conjunction with fission product recovery and also as an alternate routing of waste to the tank farm. One new jumper design was completed and issued for sparging the concentrator overflow chamber.

Methods Study Film Program

A film has been made of the removal of the "J" Cell package from the 200-East Pipe Shop and the installation of the basic package in the Purex Canyon. This film serves both as a record of the installation and as a basis for handling during future maintenance.

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2. Special Separations Processing

a. Process Design Engineering

Redox Electrical Connector

A thorough review of the explosion-proof status of the Redox electrical connector was made. The estimated time and cost involved in testing and obtaining approval of the National Board of Fire Underwriters is not justified. A summary of the development program was prepared for record purposes.

F-5 Concentrator

Preliminary process design engineering drawings, defining a new F-5 concentrator design were issued for comment. The new design features a larger boil-up tank, a shorter column, and tube bundle of stainless steel stripping similar in design to the outside boiling units being procured in titanium for Purex.

E-13 Radiation Monitor

Fabrication of an ion chamber was completed and calibration data taken at low levels. Higher level calibrations will be made on an identical second chamber when accelerator time is available. Jumper fabrication is near completion for installation on the E-13 ozonator vessel.

b. Project Engineering

CAC-928 - Leak Detection-High-level Waste Tanks-Purex & Redox

All laterals in the existing caisson are complete. The first new caisson at SX Tank Farm was completed on July 30.

3. Finished Products

a. Process Design Engineering

Isostatic Press

Bids for the 100,000 psi pumping system were reviewed and the low bid of \$9,270, by Harwood Engineering Company, was accepted. Delivery is expected in 14 to 16 weeks. A pre-bid meeting on the isostatic press was held on July 25 with vendor representatives. Bids are to be submitted by September 4, 1962, for delivery by May 1, 1963.

Floturn Machine

Three different designs of Floturn blanks were tested during

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the month. The success with the final blank demonstrated satisfactory performance as far as the 81 Model is concerned. Designs were placed in the shops, for a blank template, mandrel, and blank holder for the 79-C Model. Plans for installation are now directed toward using the Floturn on plutonium during August, 1962.

b, Project Engineering

CGC-811 - Additional Pu Fabrication Facilities-234-5 Bldg.

The project was closed-out on July 31, with exceptions. Funds being returned to the Commission total \$125,000; accruals total \$121,659. Scope revisions and project proposal revisions mentioned in previous reports have been cancelled.

CAC-880 - Plutonium Reclamation Facility - "Z" Plant

Design of the stripping column ("CC" Column) is being modified to include an additional disengaging section. This modification, at a moderate cost of \$2,000 - \$3,000, will allow a product of higher concentration without sacrificing capacity or incurring higher waste losses.

CGC-978 - RMC Button Line Filtrate Handling Facility - "Z" Plant

Atomic Energy Commission Directive No. HW-542, dated July 12, authorized \$204,000 for design and construction of an ion exchange system and associated work with a directive completion date of February 15, 1963.

The authorization included an additional \$6,000 for transferred capital property.

4. General

a. Process Design Engineering

Re-cycled Air Sparger

A second model of the hermetically-sealed agitator has been fabricated and tested for use in the 234-5 Building. It was developed for use with flange sealing techniques as part of the glove box elimination program. The tests have shown the agitator to be very efficient up to eight feet of liquid depth, which is adequate for most requirements of the plant. To attain the maximum sparging action required for a 30-foot column, the motor speed of the drive unit will be increased from 1750 rpm to approximately 3500 rpm.

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Fission Product Shipping

The initial impact absorption design verification drop tests were made on July 11, 12, and 13 at the University of Texas. Completion of this series of tests marked the end of the first phase of the test program; verification of the original design against the design criteria. Subsequent drops will be at higher impact velocities aimed at defining limits of impact absorption capability with this buffer design.

Studies and tests are being continued at HAP0 to determine behavior of the internal cask components during heating and cooling cycles.

b. Project Engineering

Project Cost Information - as of 7/22/62:

Total Auth. Funds - 16 active projects	\$ 11,309,000
Total Cost-to-date	8,157,000
Commitments & Open Work Releases	818,000
Unencumbered Balance	2,334,000
Costs Charged to Above Projects - 6/24/62 to 7/22/62	584,000

Cost Savings

On Project CGC-897 - Fission Product Concentrates Storage-200-E Area - the original design for replacement of man-hole flanges on the top of existing contaminated vessels, with new flanges of a larger size, required decontamination of the tanks before modification could be accomplished. By changing the design to permit all welding to be done from the top side, the major portion of decontamination work could be eliminated. Only clean-up of the top side of the tank and filling of the vessel with water to shield out radiation was required. The net saving for the two vessels modified in this way was \$4,000.

HP Shaw

Manager
Facilities Engineering

HP Shaw/WWC/alr

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JULY, 1962II. ACHIEVEMENTS (Continued)G. RESEARCH AND ENGINEERING OPERATION1. Purex Process Technologya. Solvent Extraction

Process operations continued throughout the month with low product losses and excellent fission product decontamination. Early in the month, the plutonium product temporarily exceeded gamma activity specification limits when an accumulation of "crud" was displaced from the 2A Column Feed (2AF) Tank.

Increases in the 2A Column scrub flow to 50 - 75 per cent above the flowsheet value used since the nozzle-plate cartridge was installed resulted in a 2 - 3 fold improvement in the 2A Column decontamination performance.

Because of the improved 2D Column performance, the fission product gamma ratio of the Final Uranium Cycle product was within specifications (<2.0) without silica-gel treatment during the entire month. However, during a brief period when both "rework" uranium and recovered solvent were being recycled to the process simultaneously, plutonium contamination in the uranium product was excessive. Suspension of both rework activities resulted in a sharp decline in the plutonium contamination and within a week it was down to tolerable levels. Rework of the solvent was resumed at a slower rate without further problem.

Seventeen cans of out-of-specification plutonium were successfully reworked through the Plutonium Ion Exchange system (N-Cell). A ferrous sulfamate valence adjustment step served to hold the plutonium recycle from N-Cell during the rework period to well within allowable operating limits. All the plutonium produced during the rework operation was within specifications.

b. Neptunium Recovery

During July, neptunium accumulation in the Backcycle Waste System (3WB Stream) showed considerable improvement over recent months. Closer operational control in the First Decontamination Cycle reduced the average loss via the HA Column effluent to less than 20 per cent. Improved performance of the Final Uranium Cycle, since start-up last month, reduced carryover to uranium product stream from about forty to less than five per cent.

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c. Solvent Treatment

Initial results from conversion of the No. 2 Solvent System to sodium carbonate-potassium permanganate washing of the solvent in the Batch Wash Tank (TK-R1) followed by a dilute nitric acid wash in the 20 Pulse Column are very satisfactory. Improved performance of the Second Uranium Cycle 2D Column and the Solvent Treatment 20 Column can be attributed to this changeover. In addition, solvent losses from 20 Column operation have been reduced approximately 17 per cent.

The use of one per cent sodium hydroxide in place of 2.5 weight per cent sodium carbonate in the No. 1 Solvent System Turbomixer (TK-G7) has had no apparent effect on solvent decontamination.

d. Waste Management

Late in the month, high ruthenium activity levels in the recovered acid were successfully reduced by the addition of .005 M sodium nitrite to the No. 1 Waste Concentrator Feed stream (IWF). An initial 10-fold drop was followed by a slight increase in gamma activity with the final overall ruthenium content in the recovered acid decreased by a factor of about three over pre-nitrite treatment.

Approximately 470,000 gallons of supernate in the Purex 241-A-103 Waste Storage Tank was pumped to the 241-A-105 Tank in preparation for water leaching and sluicing tests on the 132,000 gallons of high-activity waste sludge remaining in the tank.

A sample of coating waste sludge on the bottom of 241-C-101 Waste Storage Tank was taken for analysis and product loss studies. The sludge had the color and consistency of soft mud and was obtained with a push type sampling apparatus.

e. Fission Products

Solids centrifuged from the concentrated high activity waste (IWW) were studied in a series of in-plant leaching tests using successive water, 4 M nitric acid and 5 M caustic-0.5 M tartaric acid washes. Preliminary results indicate that as much as 25 per cent of the strontium and plutonium in the IWW waste may be associated with the solids.

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2. Redox Process Technology

a. Coating Removal

A coating removal test was made simulating the use of dissolved waste sludge, approximately 3.5 M sodium nitrate and 0.3 M sodium hydroxide, as a suppressant for hydrogen. In this test the jacketed slugs were covered with a solution of 3.1 M sodium nitrate and 0.5 M sodium hydroxide and the dissolver contents were heated to 80 C from which point the heat of reaction raised the temperature smoothly to boiling. The reaction was easily controlled and no operating problems were encountered during the entire coating removal step. Similar tests are planned using higher concentrations of sodium hydroxide in the sodium nitrate solution to determine maximum practical initial concentration of sodium hydroxide.

b. Solvent Extraction

A 57 percent nitric acid flush of the extraction columns, overflow lines, and associated vessels was made during July. A total of 2516 grams of plutonium was recovered of which 2371 grams came from the 1A Column and overflow line. Plutonium deposition in this portion of the Redox system is an erratic phenomenon which is limited primarily by maintaining the acidity of the organic effluent (1AP) stream above 0.02 M HNO_3 . Recent data on deposition in the 1A Column and overflow line are tabulated below:

<u>Date of Flush</u>	<u>Grams of Plutonium Recovered from 1A</u>
September, 1960	7690
January, 1961	100
May, 1961	43
October, 1961	588
January, 1962	254
March, 1962	1115
July, 1962	2371

The only apparent change made in the 1A Column flowsheet during 1962 was the increase of the flow ratio of the 1A scrub stream (0.4 M HNO_3 , 1.3 M ANN) from 20 to 40 on 3-14-62. This change was made to increase the acid concentration in the organic phase in the upper portion of the column and should have retarded deposition. Study in the laboratory and plant is continuing to determine the factors which contribute to the deposition.

Plutonium polymer, formed when two completed dissolver cuts were held in contact with the uranium heel for 5 and 28 hours, was not destroyed by the normal two-hour feed oxidation which has effectively oxidized polymer on all previous occasions. Reoxidation of the extraction feed

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solution, HAF, for periods ranging from four to twelve hours was not completely effective, permitting HAW losses as high as 4.3 percent. Oxidation of the polymer was completed in the waste concentrator, permitting approximately 94 percent recovery during reworking of the off-standard waste.

c. Anion Exchange

A total of seven kilograms of plutonium contained in Task I recycle was processed through the anion exchange system during the July shut-down. The plutonium in the recycle solution was reduced, by the addition of 3 mols of ferrous sulfamate per mol of plutonium, acidified to 2.6 M HNO_3 and concentrated in the continuously operated XAF Concentrator to give the desired plutonium and nitric acid concentrations. Decontamination from metallic impurities was quite adequate as indicated below:

	<u>Feed Solution</u> <u>Impurity, ppm Pu</u>	<u>Product Solution</u> <u>Impurity, ppm Pu</u>
Aluminum	12,800	Not detectable
Iron	700,000	2,640
Manganese	>20,000	20
Sodium	>20,000	400

Waste losses, which averaged approximately 9 percent during the first week of processing, rose sharply toward the latter part of the processing period to give an over-all loss of 21 percent. The initial losses are attributed to the fact that the feed was only 4 to 5 M HNO_3 , rather than the desired 7 M HNO_3 . The later higher losses were apparently caused by reoxidation of a substantial portion of the plutonium to the hexavalent state. Laboratory studies of one sample of Task I recycle containing a relatively high concentration of salts revealed that, despite the complexing effect of 7 M HNO_3 , seven percent of the plutonium was oxidized to the hexavalent state in 10 minutes. By comparison, during normal processing less than 1 percent of the plutonium is oxidized during the 100-minute hold-up in the XAF Concentrator.

d. Waste Storage

A core sample was obtained of the sludge remaining in the 108-SX tank after dissolution of approximately two feet of solid material, principally sodium nitrate. The upper 12 inches of the sludge layer were quite soft with only the bottom 2 inches giving any significant resistance to drilling. Inspection of the sample revealed that bottom 1 - 1-1/2 inches of the core were not removed from the tank. There were approximately 3 inches of firm solids at the lower end of the sample tube, but only residue on the walls of the tube in the portion occupied by the soft sludge. Photographs of the sludge were obtained

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in the Radio-metallurgical Laboratory. The solids are being analyzed for chemical and radioactive constituents and will be subjected to dissolution tests to determine whether the sludge can be dissolved by reagents compatible with mild steel.

Since the sludge was readily penetrated, another sludge sample will be taken using a simplified one-piece coring tip which should permit sampling of the solids in contact with the tank bottom.

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3. Finished Products Chemical Technology -

a. Metal Finishing Operation

1. Button Line

Two buttons produced during June with below specification densities, but reasonable reported impurity content, have been examined by the Plutonium Metallurgy Operation of Hanford Laboratories Operation. The first, with an analysis of 164 ppm iron in the original sample from the bottom of the button, was found to have an iron content of over 5000 ppm in each of the four samples taken from internal cross-sections and in a sample taken from the top of the button. Spectrographic analyses of similar samples from the second button, however, revealed the impurity content to be relatively uniform in the greater portion of button, with significantly higher values in the metal near the top. Non-volatile impurities (excluding carbon) ranged from 680 to 2125 ppm, and carbon and magnesium ranged from 260 to 580 ppm and 250 to greater than 5000 ppm, respectively. The maximum values in all cases were in the upper portion of the button. X-Ray diffraction data, hardness testing, and metallographic examination indicated that the top 20 percent was primarily beta, with some delta phase plutonium.

Scouting tests are being made to determine the effect of process variables on the carbon content of buttons. Thus far, no significant effects on carbon concentration in the metal have been noted after checking cake wash variations, calciner temperature, retention time, air flow, and oxygen partial pressure in hydrofluorination. The cake wash was tested over the range of one to five liter per hour (approximately seven cake volumes), and the calciner discharge temperature from 350 to 400° C, with retention times between 24 and 32 minutes, and air flows of 0.2 to 0.7 cfm. The increase in calciner discharge temperature reduced the carbon content of the calciner product from about 50,000 ppm to about 5000 ppm, however, there was no significant change in carbon in the metal. Variations in oxygen partial pressure from 0.018 atmosphere to 0.053 atmosphere during hydrofluorination also resulted in no effect on the carbon content. During this series of experiments, carbon ranged from 90 to 810 ppm on the control runs, and from 120 to 610 ppm on the test conditions.

Sixty-seven kilograms of dissolved oxide from burned skulls were blended with separation plant feeds and processed to metal during the month. The density of the buttons and ingots produced was not adversely affected, as indicated in the following table. No oxide recycle was processed during June

	<u>Density Units</u>	
	<u>June</u>	<u>July</u>
Average, all acceptable buttons	XX.24	XX.22
Average, all ingots	XX.38	XX.40
Average of ingots made without miscellaneous metal added	XX.40	XX.39
Average of buttons going into above ingots	XX.21	XX.27

Complete analytical data are not yet available, however, no significant increase in impurity content due to recovery of the skull material has been noted.

b. Uranium Reduction Operation

Uranium trioxide produced with two percent ammonia and 4000 ppm sulfur (as H_2SO_4) added to the UNH prior to calcination is currently being evaluated at the Oak Ridge Gaseous Diffusion Plant pilot plant. Thermal balance and processing data obtained at this site thus far indicate that high yields to UF_4 can be obtained from the UO_3 calcined at $230^\circ C$. The particle size of the milled UO_3 (10 microns) was too small for good fluidization, and the water and nitrate content (1.4% and 2.0%, respectively) was somewhat higher than desirable.

Process testing, to improve reactivity, will be continued.

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4. Process Chemistry -

a. Purex Process Assistance

Efforts to identify the location and composition of the organic material which is necessitating the permanganate wash of R Cell organic continued during the month. Procedures for concentrating various water samples by boiling down were abandoned in favor of extraction techniques wherein 20 liters of the water are slowly passed through 150 ml of 30% TBP-diluent. Uranium transfer rate studies of this material are then compared to laboratory solvent and are proving to be a more rapid and sensitive method of determining the presence of interferences. Application of this technique to a complete set of Purex water samples is now underway.

b. Redox Process Assistance

High waste losses encountered while processing particular batches of Task I supernates in the Redox anion exchange unit were a result of two conditions: (1) insufficient acid in the feed solution, (2) the presence of hexavalent plutonium in the column feed.

Both of the above conditions were a result of concentrations of salts not normally found in such quantities in the supernate material. Inability to reach 7.0 M HNO_3 through concentration of the supernates in the Redox plant was due to high salt concentrations interfering with normal operational procedures. The presence of hexavalent plutonium was unavoidable since the extraneous salts altered the oxidation potential such that heat oxidized up to 25% of the plutonium to the hexavalent state even at 7.0 M HNO_3 . Normally, greater than 99% of the plutonium is found in the tetravalent state after reduction by ferrous sulfamate and subsequent continuous concentration at 7.0 M HNO_3 .

Cations found in considerable quantities by spectrographic analysis of the concentrated supernates were: Na, K, Mn, Fe, and Al.

The plutonium content of used resin was determined by a stripping technique and also by destruction of the resin with subsequent plutonium analysis. A procedure was provided to Redox Analytical Control by which the plutonium content of used resin may be determined on a routine basis.

c. Laboratory Assistance

A procedure for separating and measuring the organic contaminant in the Purex process water was developed. This method involves extraction on activated carbon, stripping with hot chloroform, and scanning with the infra red spectrophotometer. Five significant peaks were observed in the infra red spectrum; however, no identification of the organic component has been made. As suggested by previous qualitative tests,

the cation effluent contained the most impurity, while the anion effluent was somewhat lower. The sanitary water had no detectable organic component.

The use of plastic containers for compositing dissolver solution samples was evaluated by monitoring the plutonium concentration over a 30 day period. There was no change in Pu content during this test. In comparison to dri-filmed glass, plastic was of equal quality. The use of ordinary glass containers has been discontinued.

A sample of OWW (organic wash waste) from Purex was analyzed and found to contain approximately 7% solids by volume which were identified as MnO_2 . There was approximately a 0.5% organic phase present. Filtration of the sample permitted approximately a 15 fold concentration before solids again were apparent in the system.

The factory representative was on site during the latter part of July placing the gas chromatograph in service. This work should be completed on his second visit during the week of August 6.

Fe, Ni, Ti, and AlCo flux monitors which had been irradiated in a Vallecitos reactor were analyzed for gamma activity at the 222-S laboratory. These flux monitors are to be used as counting calibration standards among the eight presently participating member sites of the Irradiation Standards and Procedures Committee of the Irradiation Effects on Structural Materials Program. The flux monitor standards have been sent to ANL, EMI, BNL, GE-NMPO, ORNL, and Phillips - MTR. The flux monitors had surface field readings of up to five roentgens. (Assistance in the design and procurement of shipping containers for this material was provided by L. H. Hewitt of the C.P. - Nuclear Materials group.) Analytical data generated by these sites will be returned to HAP0 and effort will be made to correlate all of the data into an acceptable statement of disintegration rate. The achievement of this goal is basic to the success of other projects and measurements in the program.

A trip to ANL and ORNL was undertaken to sound out members of the Irradiation Standards and Procedures Committee on the advisability and techniques of using sulfur flux monitors and neptunium-237 fission monitors. In addition, the gamma analytical systems to be used for program related work were appraised for the degree of accuracy likely to be forthcoming and for their overall capabilities and limitations.

The RIDL Digital Magnetic Tape Recorder, Model 52-35, has been received and placed in service. A file of magnetic recordings of standard gamma spectra has been started and will be available in the future for purposes of isotope identification, spectrum stripping, or as a record of calibration performance.

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5. 234-5 Developmenta. Direct Calcination Of Plutonium Nitrate

Reactive plutonium dioxide has been prepared continuously in the modified screw calciner apparatus. The preparation rate indicated the possibility of ready scaleup to production-sized equipment.

A rate of 60 g Pu/hr was successfully maintained with a 12-inch heated zone, and maximum temperature was 250 C. Feed solution was 380 g/l Pu, 4 M HNO_3 , and $\text{SO}_4^{2-}/\text{Pu}$ was 0.5. The product (-140 +300 mesh fraction) was chlorinated with phosgene to 99.8 percent PuCl_3 in the thermo-balance. This result indicates satisfactory reactivity.

The "oxide" prepared by this method contains 67 percent volatiles as determined by the thermobalance. Qualitatively, this material is observed to evolve NO_2 for about one minute after being subjected to phosgene at 450 C. The "oxide" is not stable to storage; i.e., the container pressurizes due to evolution of gases.

The objective of these studies is the preparation of pure, reactive plutonium dioxide through direct calcination of plutonium nitrate feed stocks in geometrically-safe apparatus at production-scale rates. Preparation of reactive plutonium dioxide on a kilogram scale will be attempted under conditions essentially identical to those just described.

b. Electrorefining Of Plutonium Metal

Two continuous runs were made, one operating for 138 amp hours and the other for 300 amp hours. Cathode current efficiency was 55 - 60 percent.

In the first run, the cathode was below the anode to limit physical cycling of reduced Pu back into the anode. The anode efficiency was 100+ percent and the cathode efficiency was 55 percent, with most of the unaccounted-for plutonium in the form of a metal fog in the bottom of the cell.

The second run was a duplication of the first, except that it was a longer run to determine whether or not the metal fog would keep increasing. The run was about three times the length of the first, and resulted in about three times the metal fog. During the later stages, the cathode efficiency was better than 100 percent, indicating that some consolidation of metal fog previously formed was taking place. Preliminary analytical data indicate that the concentration of plutonium in the melt increases with time, and approaches the undesirable condition reported last month; i.e., more than eight percent plutonium in the melt, which results in black solids.

The data strengthen the theory that most of the Pu^{+++} is being reduced by alkali metals. The problem of the unconsolidated metal may be the same phenomenon encountered in bomb reductions and other alkali metal

reductions when not enough heat is obtained to give a consolidated product. There are two possible solutions. One is to determine the reason for the unconsolidation, and the other is to find a way to deposit plutonium at the cathode without utilizing the alkali metal reduction; for example, by using a lower cathode current density.

c. Plutonium Recovery From Fabrication Oil

A run was made demonstrating that 10 volumes of oil can be processed to a throw-away value (<0.05 g/l Pu) per volume of 10 M HNO_3 used.

A one-liter sample of "fab oil" was received and filtered through a medium glass frit. This filtered oil sample had the desired SpG of 1.4 and contained 0.1 g/l Pu. One volume of stripping agent, originally 10.7 M HNO_3 , was contacted 10 times with equal volumes of fresh filtered oil for 30 minutes each. Plutonium removal was quantitative. A second run similar to the one described above will be made using oil containing 1 g/l Pu (usual Pu concentration in "fab oil").

Samples of lard oil - carbon tetrachloride (cold fab oil) were contacted with 10 M and 5 M HNO_3 . The oil was then scanned in the infra-red spectrophotometer by Chemical Research personnel. It was found that the lard oil did not nitrate under these conditions, but that nitric acid is very soluble in the fab oil.

d. Drying Of The Recuplex R&B Hood Floor Sludge

Methods are being investigated for converting the R&B hood floor sludge to a form safe for storing. Low-temperature drying is promising.

Ten- and 100-gram samples of the floor sludge were dried on a hot plate at 60 C for one to two hours. During the drying, traces of NO_2 fumes were seen. A dry, rusty-colored solid containing eight percent Pu (by weight) resulted.

Several 10-gram samples were heated from 20 - 150 C. The samples dried out as the temperature reached 60 - 70 C, as described above. At 100 C, the sludge began to glow red and gave off large volumes of grey-black smoke. This burning continued for five minutes until all of the sludge had been incinerated. The temperature continued to rise to 150 C. No further change in the sludge was observed. A black residue resulted.

e. Recuplex Incident

A special study to establish the contents and composition of the Recuplex process vessels at the time of the accidental nuclear excursion has been completed. Actual results were compared with the expected compositions.

R. E. Tomlinson
for Manager
Research and Engineering

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JULY, 1962

II. ACHIEVEMENTS (Continued)

H. FINANCIAL OPERATION

1. Production Cost

The reassignment to HLO of fund allocations totaling \$400,000 was made in July, \$375,000 for critical mass control and \$25,000 for other work.

The physical inventory of essential materials in the Hot Semi-Works and Decontamination facilities was observed in July which completes this year's physical inventory of essential materials in the custody of CPD.

CPD's investment in inventories at June 30, 1962 compared with budgeted amounts is shown below:

(in thousands)	<u>Balance 6-30-62</u>	<u>Control Allocation</u>	<u>Surplus (Deficit)</u>
<u>Inventories</u>			
Essential Materials	\$ 770	\$ 880	\$ 110
Spare Parts & Standby	1 934	1 778	(156)
Special Materials	<u>120</u>	<u>268</u>	<u>148</u>
Gross Inventories	<u>2 824</u>	<u>2 926</u>	<u>102</u>
<u>Reserves</u>			
Essential Materials	62	58	4
Spare Parts & Standby	899	440	459
Special Materials	<u>-0-</u>	<u>153</u>	<u>(153)</u>
Total Reserves	<u>961</u>	<u>651</u>	<u>310</u>
<u>Net Investment</u>	<u>\$1 863</u>	<u>\$2 275</u>	<u>\$ 412</u>

2. Personnel Accounting

Considerable detail relative to numbers of people working in the 200 East and West areas was developed in anticipation of information needed in the arbitration hearing of the "furlough" cases which resulted from the April criticality incident.

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3. Financial Analysis

In collaboration with Facilities Engineering and Finished Products personnel, capital and operating cost estimates were developed for physical blending of plutonium at Z-Plant. These estimates were made at the request of HOO-AEC and involved 13 different production cases.

4. General Accounting*

As of June 30, 1962 fifteen active projects had incurred costs of \$7,856,913 against authorized funds of \$11,085,200. Outstanding commitments totaled \$711,123.

During July, Directive No. HW-542 was received from the AEC, Project CGC-978 - RMC Button Line Filtrate Handling Facility - Z Plant, authorizing funds of \$204,000.

Four (4) appropriation requests were approved during July authorizing a total expenditure of \$97,570. These appropriation requests were for:

<u>Number</u>	<u>Description</u>	<u>Operation</u>	<u>Authorization</u>
36001	Titanium L-12 Product Concentrator	Redox	\$18 000
36002	Inspection Glove Box	FPO	70 000
36003	"D" Cell Valve Tank, Hot Semiworks	Purex	5 370
36004	Solid State Beta Detection Unit	R&EO	<u>4 200</u>
Total			<u>\$97 570</u>

*Funding approvals only. May differ from costs stated in other sections of this report which include non-fund equipment transfers.

L. B. Christopher
for Manager - Finance

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CHEMICAL PROCESSING DEPARTMENT
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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>6-29-62</u>	<u>7-29-62</u>	<u>6-29-62</u>	<u>7-29-62</u>	<u>6-29-62</u>	<u>7-29-62</u>
General Manager's Group	11	11	1	1	12	12
Financial	14	13	15	16	29	29
Research & Engineering	62	64	28	28	90	92
Facilities Engineering	61	60	23	23	84	83
Power & General Maintenance	39	39	246	247	285	286
Production	5	5	4	4	9	9
Redox	51	51	201	201	252	252
Purex	64	64	247	249	311	313
Finished Products	<u>53</u>	<u>53</u>	<u>261</u>	<u>261</u>	<u>314</u>	<u>314</u>
Total	<u>360</u>	<u>360</u>	<u>1 026</u>	<u>1 030</u>	<u>1 336</u>	<u>1 390</u>

B. PERSONNEL CHANGES

No personnel changes during the month of July.

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C. TRIPS

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To Other G.E. Components</u>		
R. B. Britton	Detroit, Michigan	Employee relations functions. (7/6/62)
	New York, New York	" (7/9/62)
	Schenectady, N.Y.	" (7/11-12/62)
<u>To AEC and Other AEC Operational Contractors</u>		
W. H. Zimmer	Argonne National Lab. Lemond, Illinois	Discuss standardize counting techniques for use at intersite neutron destruction flux monitors. (7/25/62)
	Oak Ridge National Lab. Oak Ridge, Tenn.	Ditto above (7/26/62)
S. J. Beard S. G. Smolen	Union Carbide Nuclear Co., Oak Ridge National Lab., Oak Ridge, Tenn.	Technical discussions and tour laboratory facilities. (7/30-8/1/62)
	The Martin Company Quehanna, Pa.	Technical discussions pertinent to fission product program and tour Quehanna facility. (8/2-3/62)
<u>To General Industry</u>		
L. B. Bradley H. W. Stivers	Seattle, Wash. Tacoma, Wash.	Structural details--241AX Tank Farm. (7/5/62)
<u>To Colleges and Universities</u>		
C. W. Smith	University of Texas Austin, Texas	Fission product shipping casks. (7/11-13/62)

D. VISITORS

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From Other G.E. Components</u>		
Leroy Foley John Larsen	Manufacturing Services Schenectady, N.Y.	Schedule installation of numerical input system. (7/2/62)
Dr. L. R. Fink	General Electric Co. Atomic Products Div. Palo Alto, Calif.	Waste management and weapons fabrication. (7/26/62)

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<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From AEC and Other AEC Operational Contractors</u>		
Guy Spoonemore John B. Dietzman Thomas A. Steele William P. Miller Joseph T. Callahan, Jr.	AEC Fellowship Students	Radiation monitoring - Purex Plant tour. (7/5-6/62)
R. E. Thorne	U.S.AEC, Albuquerque Operations Office, Albuquerque, N.M.	Discuss Quality Assurance, Purex process and tour. (7/13/62)
Col. Frank Rose, Jr.	U. S. Army	"
Col. Wilbur Kahn	U. S. Air Force	"
Dr. R. E. Wilson, Commissioner Gen. A. W. Betts, Director - Division of Military Application	U.S.AEC, Washington, District of Columbia "	Waste management and weapons fabrication. (7/26/62)
<u>From General Industry</u>		
R. A. Koffinke	Bird Machine Co. South Walpole, Mass.	Test runs on 48" centrifuge. (7/2-3/62)
C. Luft	DuBois Chemical Co. Walla Walla, Wash.	Decontamination chemicals. (7/13/62)
R. W. Kupp	S.M. Stoller Associates New York, N.Y.	Cost factors in the storage of radioactive waste solu- tions. (7/26/62)
<u>From Foreign Governments and Agencies</u>		
Eric Hinchcliffe	Atomic Weapons Research Establishment Aldermaston, England	Plutonium fabrication. (7/24-25/62)
Sir Roger Makins Sir Claude Pelly	Atomic Energy Authority United Kingdom	Waste management and weapons fabrication. (7/26/62)

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CHEMICAL PROCESSING DEPARTMENT
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SAFETY AND SECURITY

<u>Operation</u>	<u>FEO</u>	<u>Fin.</u>	<u>FPO</u>	<u>P&GM</u>	<u>Purex</u>	<u>Redox</u>	<u>Prod.</u>	<u>Rel. Prac.</u>	<u>R&E</u>	<u>Total CPD</u>	<u>YTD</u>
Dis. Injuries											3
Ser. Accidents											1
Med. Treat.											
Injuries	1		9	13	5	3				31	248
Rad. Occur.			11		2	3				16	120
Contam. Wd.			3							3	5
Pu Dep.			1*							1	7
Fires			1		1					2**	12
Sec. Viol.									1	1	7

* Sustained when part turned in lathe while operator was holding it. No % mpbb has been determined as yet.

** Finished Products - Processing, 234-5 Building, Room 228 - Rag left on calciner in Hood 9-B, ignited from residual heat inside calciner. Damage - \$146.79-
#496 75

Purex - Monitoring and Fission Products, 200 East Burial Grounds - Approximately two hours before fire, some waste cartons were dumped in burial grounds containing some organic material and acid soaked rags which ignited from spontaneous ignition.

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V. REPORTS

A. PREPARED AND ISSUED

- HW-72399 OUO, "Preliminary Project Proposal, In-Tank Waste Solidification - 200 East Area, Project CGC-965", dated June 21, 1962, by L. W. Finch.
- HW-73610 OUO, "Preliminary Project Proposal, Purex Essential Waste Routings System, Project CAC-970", dated July 16, 1962, by L. W. Finch.
- HW-73963 RD, Secret, "Process Flow Sheet - Power-Roll Forming (Floturn Process) For Alloyed and Unalloyed Plutonium", dated June 11, 1962, by A. E. Smith.
- HW-73907 PTL, Secret, "B-Plant Waste Management Flowsheets, Part 1", dated June 22, 1962, by G. Rey and B. F. Campbell.
- HW-74000 PTL, Secret, "New Sectionalized Purex Concentrators, Part I - Design Report", dated July 16, 1962, by L. R. Michels and W. R. Kendall.
- HW-74000 PT2, Secret, "New Sectionalized Purex Concentrators, Part II - Detail Design Drawings", dated July 16, 1962, by W. R. Kendall and L. R. Michels.
- HW-74062 Unclassified, "Review of Recuplex Vessel Status Prior to the Nuclear Excursion", dated July 2, 1962, by H. W. Crocker and H. H. Hopkins, Jr.
- HW-74105 OUO, "Project Proposal, RMC Button Line Filtrate Handling Facility - Z Plant, Project CGC-978", dated July 2, 1962, by L. W. Finch.
- HW-74154 Unclassified, "In-Plant Neutron Multiplication Test No. 4", dated June 29, 1962, by R. E. Isaacson and R. L. Stevenson.
- HW-74164 Secret, "Progress Report - Finished Products Fabrication Technology Operation - June, 1962", dated July 3, 1962, by A. E. Smith.
- HW-74184 RD Secret, "Purex Plant Production Schedule - July, 1962", dated July 6, 1962, by D. McDonald.
- HW-74185 RD Secret, "Redox Plant Production Schedule - July, 1962", dated July 6, 1962, by D. McDonald.

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HW-74186 RD Secret, "UO₃ Plant Production Schedule - July 1962", dated July 6, 1962, by D. McDonald.

HW-74187 RD Secret, "234-5 Plant Production Schedule - July, 1962", dated July 1, 1962, by D. McDonald.

HW-74189 Confidential, "Critical Mass Control Specification - Oxidizing Plutonium Skulls in Room 2247", dated July 16, 1962, by L. M. Meeker.

HW-74202 Unclassified, "Scope Revision No. 1 - Purex Essential Waste Routing System, (Project CAC-970)", dated July 13, 1962, by E. Doud.

HW-74209 Secret, "Plutonium Blending at Z Plant", dated July 16, 1962, by E. O. Swain.

HW-74222 Confidential, "Critical Mass Control Specification - Dissolving Plutonium Oxide in Room 149 of 234-5 Analytical Laboratory", dated July 16, 1962, by L. M. Meeker.

HW-74258 Secret, "Critical Mass Estimate for a Reflected Array of Castings", dated July 24, 1962, by E. D. Clayton and R. L. Stevenson.

HW-74289 Confidential, "Critical Mass Control Specification - Task III-RMC Line", dated July 20, 1962, by L. M. Meeker.

HW-74297 Secret A.W.D. "Ch. 18, Production Capacity Study No. 4", dated July 16, 1962, by J. H. Warren.

HW-74362 Confidential, "Critical Mass Control Specification - Dissolving Plutonium Oxide in Room 161 of 234-5 Building", dated July 27, 1962, by L. M. Meeker.

HW-74426 Unclassified, "Purex N-Cell Sump Stabilization", dated July 27, 1962, by W. A. Graf.

HW-74465 Secret, "Analysis of Plutonium Samples (XXVI) on Inter Plant Exchange Program", dated July 30, 1962, by O. F. Beaulieu.

HW-74473 RD Secret, "CPD Daily Production Reports, April 1, 1962 - June 30, 1962", dated July 31, 1962, by R. E. Roberts

B. PREPARED FOR SIGNATURE AND ISSUANCE

HW-74152 Secret, "Production - June, 1962", dated July 2, 1962, by W. E. Johnson.

HW-74256 Secret, "HAPO Production Forecast, July 1, 1962 - June 30, 1967", dated July 25, 1962, by W. E. Johnson.

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HW 74303 Confidential, "1962 EIVR-7 Meeting", dated July 17, 1962, by
W. E. Johnson.

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VI. PATENT SUMMARY

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

INVENTOR

TITLE

NONE

P. H. Reinker

General Manager
Chemical Processing Department

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END

**DATE
FILMED**

4 / 13 / 93