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HW 74804

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
FOR

HW--74804

AUGUST, 1962

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Compiled By
OPERATION MANAGERS

September 21, 1962

HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON

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

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

	<u>Percent of Forecast Achieved</u>	
	<u>August</u>	<u>Fiscal Year To Date</u>
Separated plutonium nitrate	106.5	110.6
Separated uranium nitrate	105.0	114.5
Uranium oxide	112.7	109.1
Plutonium metal buttons	65.5	107.8
Fabricated parts	107.5	92.5

August production exceeded forecasted quantities for all products except plutonium metal buttons. For the fiscal year, however, button production exceeds the forecast. At the Uranium Reduction plant, uranium oxide production exceeded the previous record monthly output, established in December 1956, by almost four percent. Significantly, the earlier record was accomplished when the uranium oxide plant was operating on a seven-day work week, whereas August performance was achieved on a five-day work week.

The Purex plant operated at an average rate of 22.3 tons per day until August 13, when it was shut down to recover the neptunium inventory and to perform maintenance work. During the operating period, the plutonium product exceeded specifications on two brief occasions. Otherwise, performance was highly satisfactory.

Four Oak Ridge National Laboratory casks were loaded with a total of 177,000 curies of cesium-137, completing the fourth successful cesium recovery campaign at the Purex plant. The casks were released to the AEC for shipment on August 24, 1962.

Approximately 200,000 gallons of water were pumped into the Purex 241-A-103 waste storage tank during August to start sludge leaching studies. No appreciable reduction in sludge depth has yet been detected.

As reported last month, laboratory and plant studies are being conducted to determine causes for the incipient accumulation of plutonium in the Redox extraction system. Current tests involve (1) the addition of sulfamic acid to the 1A precycle column to decrease the possibility of plutonium reduction in the scrub section; (2) introducing part of the aqueous scrub stream near the bottom of the scrub section to maintain acid concentration in the extractant sufficient to prevent plutonium accumulations from starting through mechanisms such as polymerization. Approximately two or three weeks of stable operation will be required to evaluate the effectiveness of these changes.

AEC Directive HW-544, dated August 21, 1962, authorized \$50,000 for design of a prototype waste solidification facility at the 241-BY-101 and 102 tanks. Design will be performed by Bovay Engineers.

Low bid for the Cesium Load-Out Facility at 241-C Tank Farm, Project CAC-950, was \$76,640 compared to the fair cost estimate of \$80,000. The contractor has poured footings and is currently setting reinforcing steel for the wall of the load-out building.

Construction and material procurement for the RMC Button Line Filtrate Handling Facility, Project CGC-978, are continuing on an expedited basis. Construction is proceeding on a 10-hour day, with Saturday work by crafts as required.

P. H. Linker

General Manager
Chemical Processing Department

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS

A. PRODUCTION OPERATION

1. <u>Production Statistics</u>	<u>August</u>	<u>Fiscal Year to Date</u>
a. <u>Percent of Forecast⁽¹⁾ Achieved</u>		
Separated plutonium nitrate	106.5	110.6
Separated uranium nitrate	105.0	114.5
Uranium oxide	112.7	109.1
Plutonium metal buttons	65.5	107.8
Fabricated parts	107.5	92.5
b. <u>Purex</u>	<u>August</u>	<u>July</u>
Uranium nitrate produced (tons)	271.05	776.79
Average production rate during operation (T/D)	22.3	25.2
Total waste loss (%)		
Plutonium	0.70	0.37
Uranium	0.38	0.31
On-line efficiency (%)	54.3	99.4
c. <u>Redox</u>		
Uranium nitrate produced (tons)	138.50	4.47
Average production rate during operation (T/D)	8.4	5.0
Total waste loss (%)		
Plutonium	0.53	0.87
Uranium	0.19	1.29
On-line efficiency (%)	72.0	7.1
d. <u>Uranium Reduction (tons)</u>		
Normal UO ₃ loaded	646.73	466.42
Enriched UO ₃ loaded	99.86	0
Normal UO ₃ approved for shipment	797.31	298.35
Enriched UO ₃ approved for shipment	99.87	0
Normal UO ₃ shipped	598.42	344.75
Enriched UO ₃ shipped	99.87	49.05
Normal UNH backlog	356	680
Enriched UNH backlog	81	78

(1) HW-74256, HAPO PRODUCTION FORECAST, dated 7/25/62

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e. Plutonium Metal Processing

	<u>August</u>	<u>July</u>
Input to Task I (batches)	266	43
Reduction yield (%)	96.1	95.3
Product recovery output (Kgs)	77.29	66.56
Product recovery backlog (Kgs)	1069.61	1205.63
Waste disposal (grams)	211	395

f. Power

	<u>200-East</u>	<u>200-West</u>
Raw water pumped (gpm)	7,568	4,984
Filtered water pumped (gpm)	810	1,025
Maximum steam generated (lbs./hr.)	225,000	120,000
Average steam generated (lbs./hr.)	103,000	71,278
Total steam generated (M lbs.)	77,049	53,031
Coal consumed (tons)	3,932	2,843

August production exceeded forecasted quantities for all products except plutonium metal buttons. For the fiscal year, however, button production exceeds the forecast. At the Uranium Reduction plant, uranium oxide production exceeded the previous record monthly output, established in December 1956, by almost four percent. Significantly, the earlier record was accomplished when the uranium oxide plant was operating on a seven-day work week, whereas August performance was achieved on a five-day work week.

R.E. Smith
for Manager, Production

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (continued)

B. PUREX OPERATION

1. Operating Continuity

The plant operated at an average rate of 22.3 tons per day from August 1 to August 13 when it was shut down for a neptunium recovery run and for scheduled maintenance work. Operations were continuous throughout this period except for one twenty hour outage.

Uranium product quality was within specifications, and the silica gel facility remained in stand-by status during the period. For two brief periods, the plutonium produced was out-of-specifications. Rework of this material was interrupted by the plant shutdown. All other plutonium met specifications.

2. Processing Operation

A neptunium recovery run was conducted between August 14 and August 20. The recovery was lower than anticipated due to the high neptunium content of the 2A extraction column waste stream during the decontamination phase. This material was collected for recovery in the next run.

One strontium recovery run was completed and the semi-refined material was transferred to the 003 CR vault. At the conclusion of this run the Head End equipment was flushed and converted to cesium recovery. The four STT casks in the current series were loaded with a total of 177,000 curies of cesium and were released to HOO for shipment to ORNL on August 24.

3. Mechanical Experience

The first cycle feed pump (HAF) failed August 9, causing a twenty hour outage.

Performance of the plutonium ion exchange unit became increasingly erratic just prior to the shutdown. The unit was overhauled during the outage.

All trap assemblies and spare lines servicing A, B & C dissolvers and heaters in Trap Pit #1 were replaced with stainless steel piping. Similarly, the trap assemblies and spare lines in Trap Pit #2 servicing the vessel vent heater (F-2) and the primary feed make-up tank E-6 were replaced.

Extensive maintenance work was also carried out in other sections of the plant during the three week outage. In addition, jumper installations and tie-in work for Purex Palm Project (CGC-821) and Purex Reliability Project (CGC-825) were continued.

Excavation of the two leak detection caissons in the 241-A Farm was completed on August 23. Construction of the cesium loadout building in C Tank Farm began.

4. Radiation Experience

The total radio-iodine 131 emission for the month was 3.06 curies, with a maximum seven-day emission of 2.44 curies.

PR Mc Murray
Manager - Purex

PR McMurray/SGS/de

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

C. REDOX OPERATION

1. Operating Continuity

Despite extended interruptions to virgin feed processing, the Redox Processing Operation achieved 92.3 percent of scheduled production for August, 1962. The average production rate was 8.3 tons per day for the operating time. High plutonium wastes caused by plutonium polymerization in the feed metal solution the first part of the month, an operating error in which sodium hydroxide was inadvertently added to the waste accumulator instead of the waste neutralizer, and a large leak in the backcycle waste concentrator coil outlet, forced extended shutdown for special handling of large amounts of waste solutions. The mechanical efficiency this month was 97 percent.

The over-all waste losses were approximately 0.20 percent higher than normal on plutonium this month because of the large amounts of high product waste solutions that required reworking. Discards were 0.19 percent and 0.53 percent for uranium and plutonium, respectively. Quality was satisfactory on both uranium and plutonium final product streams.

2. Processing Operations

The coil outlet line of the D-14 backcycle waste concentrator developed a serious leak on 8-13-62. Operations continued, however, pending fabrication and receipt of a new jumper on 8-15-62. It was subsequently found that a leak in the D-14 pump outlet line had also occurred and had permitted a significant loss of product to the cell floor. Before operations could be resumed, after replacement of the jumper on 8-15-62, it was necessary to rework all of this plutonium-bearing solution. This resulted in 95 hours of lost processing time on virgin metal feed solution.

Processing operations were interrupted for 24 hours on 8-9-62 when a process operator added 5740 pounds of sodium hydroxide solution to the D-13 waste receiver instead of the D-8 waste neutralizer tank. A special jet assembly was fabricated and installed in the D-13 tank so that the caustic solution could be transferred direct from the D-13 waste receiver to the D-9 waste sampler. This was needed in order to by-pass the D-12 waste concentrator and prevent any solids formation in the concentrator tower due to the reaction of aluminum nitrate and sodium hydroxide.

A total of 505 recycle containers of Task I supernatant solution was received during the month. The solution was processed through Redox for the recovery of the plutonium.

The conventional dissolver in "C" cell was activated the latter part of the month and is being used as a spare dissolver to handle dissolution of special test charges without interrupting the regular E-metal dissolving operation. One special charge was processed for conversion ratio determination through the dissolver at the end of the month.

3. Mechanical Experience

The metal solution feed pump in the F-7 position continued to be a problem from leakage at the pump flange, despite all corrective efforts. The only apparent solution is to change the F-7 vessel. The hold-down studs in the present vessel have been sheared off and the pump cannot be securely fastened in place. The spare F-7 vessel has been ordered into the shop for testing and mock-up. Two repaired pumps were installed in this position during the month.

One additional pump failure occurred when the H-1 pump in the feed makeup tank developed a leak at the vapor bushing on top of the base plate flange. This was an old-type closed-throat pump which was installed on 6-8-62. The new unit is a U. S. pump with the discharge head down in the tank. This should give much better performance in this position.

The XAS Chempump in the ion-exchange contactor enclosure failed on 8-2-62 and had to be replaced. This is one of the new pumps which was installed in June, 1962 on the Product Recovery Project, CGC-913. Other pump troubles were also encountered with the mechanical seals on the acid feed pump to the contactor.

Work on the installation of "cold-side" piping and instrumentation as part of the project for providing backup filters for the dissolvers (Project CGC-930) is nearing completion. The remaining work of making the necessary tie-ins and removing some existing piping will have to be done during a shutdown period.

Work on the installation of A Cell "cold-side" piping and instrumentation for the new Mark V dissolver continued on schedule; however, since the P&GM shop work on the dissolver is ahead of schedule, the rate of completion of the work in the Redox Plant will be increased in order to get the benefit of the new dissolver at the earliest possible date.

Trolley lights on the 60-ton crane were reinstalled after two of three inoperative light sockets were repaired. The third socket is scheduled for replacement in the first week of September. The new "Economy Man Lift" worked exceptionally well in getting men safely up under the trolley to do this work. This new hoist

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lifts and lowers the workmen in a matter of seconds, and thus is a real improvement since it has taken as much as two eight-hour shifts to get scaffolding up between the two girders of the crane bridge to do the work. It is also an improvement over the old hand-operated hoist which did not extend high enough and also had a tendency to stick while it was being lowered. New brushes were installed on the 60-ton travel motor-generator and a faulty periscope optic was replaced.

4. Radiation Experience

Recent extensive process equipment work in D Cell has caused increased contamination and dose rate levels on the CMP (crane maintenance platform) and on exterior surfaces of the crane itself. The contamination levels are appreciably higher than they have been for the last four months. Smears of surface areas are five times as contaminated as they were after the last decontamination of the CMP and crane. Nevertheless, adequate radiation protection control is being maintained, and the crane maintenance platform will be thoroughly decontaminated only after the major portion of the in-cell work has been accomplished.

A leak in the heat exchanger of the H-4 feed oxidizer vessel resulted in abnormally high radiation in the 216-S crib weir box. On the first of the month, radiation readings of 550 mrad/hr at one foot were detected. Replacement of the tube bundle eliminated the problem.

Dose rates up to 5 r/hr were measured in the silo sample gallery as a result of a partial vacuum created when steam was allowed to condense in a line from the 1-A column. Several flushes were made to reduce the dose rates but the attempts thus far have not been completely successful, with rates as high as 100 mr/hr still being measured at the 1-A column sampler.

5. Analytical Experience

Analytical assistance was provided to the Kaiser Engineers at 100-N Area in connection with various vendor acceptance tests performed on the coagulators and filters in the water treatment facility. A contradiction between stated specifications and routinely reported results was called to the attention of appropriate personnel in Reactor Process Development and Reactor Operations.

Assistance was provided to Development and Corrosion Chemistry, HLO, through analyses of purity and activation products on samples of the promethium¹⁴⁷ isotope before and after irradiation at ORNL. Assistance was also continued on the program of "Irradiation Effects of Structural Materials" by analysis of foils which had been irradiated by the Phillips Petroleum Company at Arco, Idaho, and several other sets of flux monitors irradiated in "The Quickie Test Hole", KE Reactor, Hanford.

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A considerable increase in work load (approximately 30 percent) from the Uranium Oxide Operation has resulted primarily due to the fact that a new customer is now receiving the E-metal powder. Ways and means are being sought to effect a reduction in this added burden of work.

A new system for determining the analytical charges to the Finished Products Operation has been put into effect. Each analysis has been identified and weighted according to a point system related to the manhours needed for the analysis. This permits accurate manhour charges to be made from a simple analysis count.

The new standard calibration data for gamma analysis on multi-channel analyzers have been completed and submitted to Electronic Data Processing, C&AO. The data will be converted to key punch cards and introduced to the IBM 7090 computer to establish a new master matrix. At the present time the multi-channel analyzers have been calibrated for 24 isotopes. However, in order to improve analytical capability to analyze any variety of isotopes found in customers' samples, it will be necessary to establish the calibration for 25 to 35 additional isotopes. The isotopes subsequently calibrated can be added to the memory of the computer without complications.

6. Waste Handling and Decontamination

Equipment valued at approximately \$45,000 was received from customers for decontamination and repair, or inspection and burial. Equipment valued at approximately \$50,000 was returned to customers, representing savings of approximately \$35,000.

In preparation for a full-scale leak test of the 113-SX tank, Redox and Facilities Engineering personnel completed the monitoring of the laterals under the tank in 8-2-62. No radiation was detected. The leak test is expected to begin next month with the transfer of recovered sodium nitrate solution from the 114-SX tank into 113-SX.

The facilities of the Waste Handling & Decontamination Operation in the 271-T Building were inspected by members of the HAPO Education, Communication and Community Relations Operation during the month, in preparation for an expected visit by Mr. Lloyd Nickerson of General Electric's Institutional Programming and Mr. John Leinbach of the Batton, Barton, Durstine and Osborne advertising agency, who have the responsibility for the commercial portions of the new General Electric television program.

Manager - Redox

DISCONTINUED

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (continued)

D. FINISHED PRODUCTS OPERATION

Operating Continuity

Model 1251 assemblies were fabricated at increasing rates, with no significant interruptions during the month. The production of unfabricated plutonium was curtailed for ten days during a scheduled shutdown for major maintenance. Recovery activities continued to involve the burning and dissolution of skulls and the operation of the incinerator, with dissolution activities shutdown at month end because of a shortage of product storage containers. Uranium reduction operated at record rates with some slight interruptions because of shortages of feed for the "enriched" stream and shipping containers for the "normal" material.

2. Processing Operations

a. Plutonium Fabrication

Information on plutonium fabrication is presented in Document HW-74898 entitled "Chemical Processing Department, Finished Products Operation, Z Plant Monthly Report, August, 1962" which is classified "Secret, Atomic Weapon Data, Production Rate and Stockpile Quantity Information."

b. Plutonium Processing

Operation of the plutonium processing line was satisfactory to mid month, at which time a scheduled shutdown was taken for ten days to install a heat shield on the calciner and to replace faulty hood panels. Operation following startup was intermittent because of drum filter difficulties and contamination control problems at some of the panels.

Recovery area activities continued to involve deactivation procedures in Recuplex. The laboratory-type (glass) dissolvers in Rooms 149 and 161 performed exceptionally well during the month. This performance, in addition to the off-site shipment of some off-standard buttons, resulted in a reduction in the backlog of recoverable scrap, the first such reduction since September, 1961. Incinerator operation was normal with the lack of sorting and leaching capacity continuing to limit production.

c. Uranium Reduction

The Uranium Reduction Plant performed exceptionally well

c. Uranium Reduction (continued)

throughout August. A new monthly production record was achieved. The previous record (established in December, 1956) was achieved while the plant operated on a seven-day work week basis, whereas the new record was on a five-day basis.

3. Mechanical Performance

Fabrication equipment operation was satisfactory during the month. Two lathes in Hood HC-24-C are being tooled to perform preliminary facing of parts.

Plutonium preparation equipment operated satisfactorily during the month except for the vacuum drum filter in Hood 9-B. Two new hood panels and a calciner heat shield were installed during the month. During the planned shutdown the calciner was dismantled and inspected, and was determined to be in good condition.

UO₃ Plant equipment performed well except for corrosion failure of two of the four inch downcomers from the L Cell off-gas scrubber, and the fracture of a ceramic bushing on one of the two transformers supplying power to the calciners.

4. Radiation Experience

Radiation and contamination control statistics reveal a significant improvement in performance over previous months.

5. Analytical Experience

	<u>July</u>	<u>August</u>
Number of Samples Received	2,279	3,093
Number of Determinations	21,614	19,908
Total Metallic Impurities, Buttons	1,100ppm	735ppm
Total Carbon Content	615ppm	445ppm
Buttons Rejected	1.4%	0.6%
Pu ²⁴⁰ - NRF Buttons (by Mass.Spec.)	----	7.67%
Pu ²⁴⁰ - Normal Buttons (by Mass. Spec.)	6.12%	6.07%

W. J. Garton
 Manager
 Finished Products

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II. ACHIEVEMENTS (Continued)

E. POWER AND GENERAL MAINTENANCE OPERATION

1. Operating Continuity

There were no outages of steam, water or emergency electrical services that affected continuity of operations of production facilities during the period covered by this report.

2. Inspection, Maintenance and Repair

All necessary repairs and modifications to the spare concentrator for the Purex Facility have been completed. Pressure testing was completed, and at month's end 80% of the insulation had been applied. Only the application of stainless-steel sheathing remains to be done.

A new cartridge was installed in the R-2 second-cycle organic cleanup column at Purex. The unit replaced the original installation which had been in service for a seven-year period and was considered to have encountered damage by radiation. A new nozzle was installed in the bottom disengaging chamber of the subject column for housing a float for determining the interface location.

A second dissolver off-gas filter was made ready for the Redox Facility. The filter is to be installed in "A" cell, along with the NPR dissolver, when mockup of the cell equipment is complete. Presently, all vessels for the mockup are in place, as are the majority of the NPR Project jumpers. Yet to be completed are the alterations to three project jumpers that have undergone design changes.

New pumps were assembled and made ready for installation in the E-12 position (uranium sampler tank) and the F-7 position (feed tank) at the Purex Facility.

Field installation work continued on all phases of the Purex Palm Project, with all shutdown tie-in items being completed. All functional work on this project is now essentially complete. Only minor cleanup items, such as lagging, painting and a small amount of sheetmetal work, remain unfinished at month's end.

Work continued on the installation of the #5 Stokes Vacuum Furnace and associated equipment in Room 233 at the Finished Products Operation. This equipment will be used by Research and Engineering to develop improved methods for casting plutonium shapes, and to make castings for the Flo-Turn Lathe. The overall status of this work is approximately 70% complete. The scheduled completion date

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is September 15, 1962; however, this date is being revised because more time will be required to make corrections in the electrical wiring of engineered equipment purchased off-site.

Installation of a high-level cave and associated equipment in the 292-T Building (Fission Product Volatilization and Test Facility) was in progress at month's end. A small lead-shielded cave and an open-faced hood are being replaced with a larger shielded cave and hood, which were fabricated on-site. The equipment will be used in a research-and-development program intent on oxidizing highly irradiated fuel elements, under high temperature, to determine the fission-product release. The work is an estimated 90% complete at this time.

A tool designed for the remote removal of dowel pins from electrical heads in the processing cells was fabricated in an effort to resolve an urgent problem at the Purex Facility. Many of the electrical heads are not usable due to the dowel pins remaining in the wall receptacles as the connectors are removed. The situation is hindering installation of the Palm Project cell-pipe connectors. The tool, designed to push the dowels out through the bottom of the receptacle, is awaiting operability tests at this time.

Jumper fabrication for the month set a new high. A total of 52 jumpers (cell-pipe connectors) were fabricated to meet requirements indicated below.

NPR Fuel Processing Project (CGC-929)	16 jumpers
Purex Reliability Project (CGC-895)	4 "
Secondary Containment Project (CGC-930)	5 "
Purex Replacement	17 "
Redox Replacement	<u>10</u> "
Total	52 jumpers

Fifty-three obsolete jumpers were dismantled to reduce the Spare Parts inventory. All salvable parts were retained for future use.

A concrete box, loaded with failed and obsolete cell-pipe connectors, was removed from the Purex Facility and buried in the industrial burial garden in 200-East Area. Weight of the box was an estimated 42 tons gross, and three D-8 caterpillar tractors were required to correctly position the box in the burial trench.

Excessive radiation-exposure rates imposed a considerable hardship on General Maintenance forces while attempting to provide a stable work crew on a round-the-clock basis during a jumper change in No 2 trap pit at the Purex Facility. The F-8 condensate jumper had developed a leak, permitting contaminated materials to drain into the trap pit. Exposure rates were in excess of 500 rad at the beginning of the job; however, with considerable flushing and the use of lead shielding and rubber mats, these readings were reduced to 0.5 rad. With the readings at this level, the job proceeded without incident.

The raw-water reservoir in 200-East Area was lowered for inspection during the recent planned shutdown of the Purex Facility. Considerable

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algae and mud were observed on the bottom sloping sections. The algae was raked out on the ledges and removed.

Third-party inspections were performed on No. 4 and 5 boilers in the 200-East Area Power House and on the air receivers in 283-E and 284-E Buildings. The official report had not been received at month's end; however all units inspected were verbally reported to be in satisfactory condition.

Two sections of obsolete steam lines were removed and excessed during the month. They consisted of 300' of 4" line extending from the 2707-E Change House to the 272-E Shops Building and 1600' of 3" line that originally supplied the 241-T Tank Farm Area.

Installation of the new 6,000-GPM, turbine-driven, raw-water pump in the 282-E Pump House was completed. Acceptance tests were not complete at month's end, however. The new unit, in replacing the originally installed 3,000-GPM unit, will assure increased raw-water pumping capacity for the Purex Facility.

T. S. LaGrutte

Manager

Power and General Maintenance

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

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II. ACHIEVEMENTS (continued)

F. FACILITIES ENGINEERING OPERATION

1. Purex

a. Process Design Engineering

New Sectionalized Concentrator

A pre-bid conference at HAP0 concerning procurement of the sectionalized Purex concentrators was attended by representatives of three firms. Considerable interest was shown by the fabricators in the new design and related specifications assembled to give maximum life to this equipment.

Titanium Tube Bundle Vibration Tests

A series of experimental runs was made on the titanium tube bundle test unit. A preliminary analysis of the data indicates a maximum vibrational amplitude and frequency of 50 mils and 10 cycles per second, respectively, over the range of heat fluxes expected in the Purex concentrators. As was expected, this is well below the limiting amplitude of 125 mils.

Tunnel Ventilation

Design was completed for a filtered exhaust for the existing Purex burial tunnel.

1 BXP Neutron Counter

The 1 BXP neutron probe jumper (J-6102-T46) has been redesigned to overcome the leakage problem in the electronic package. Also, the electronic package itself was improved by the use of a Film Capacitor Company's power pack as a high voltage supply.

b. Project Engineering

CGC-895 - Reliability Improvements - Purex

All tie-ins were completed during shutdown and August 31, 1962 has been established as beneficial use date. Several canyon jumpers and the D3-D4 vessel are to be installed during a later shutdown.

CGC-948 - Strontium Storage & Waste Disposal-Hot Semiworks

A low bid of \$9,650 was submitted for the waste crib, test well, and emergency water tie-in, compared with the fair cost estimate

of \$10,700. The emergency water tie-in was made on August 29, and work has been started on the crib excavation and the test well.

CAC-950 - Cesium Load-out Facility-241-C Tank Farm

Low bid for the Cesium Load-out Facility was \$76,640 compared to the fair cost estimate of \$80,000. The contractor has poured footings and is setting wall re-steel for the load-out building.

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

AEC Directive HW-544, dated August 21, 1962, authorized \$50,000 for design of a prototype waste solidification facility at the 241-BY-101 and 102 tanks. Design will be performed by Bovay Engineers.

2. Special Separations Processing

a. Process Design Engineering

In connection with the proposed XAS scrub revisions intended to increase the efficiency of the L-18 Ion Exchange Column, design for a new scrub preheater has been completed.

F-5 Concentrator

A new process design scope for the concentrator has been completed. Detailed design is being initiated.

E-13 - Radiation Monitor

The installation of an ionization chamber-type gamma monitor has been completed in the E-13 ozonator vessel. Operational results to date are satisfactory, with a reduction in radiation level being indicative as ruthenium is driven off. This monitor is expected to provide a good determination of the end point of the ozonating process.

b. Project Engineering

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

All caissons in both tank farms are now complete, as are all but two laterals in the SX farm. The contractor is installing the iron work in the first caisson in the SX farm.

CGC-929 - NPR Fuels Processing Facilities

Design for all work was completed on August 17, 1962. All jumpers have been fabricated and mock-up of a dissolver cell is complete. The equipment is ready for shipment to Redox.

3. Finished Products

a. Process Design Engineering

Recovery of Plutonium

Design was completed for conversion of the Recuplex Facility decontamination hood to a glove box for drying RB Hood floor sludge. All vessels have critically-favorable dimensions. Scoping studies were also started on a prototype facility for reclaiming plutonium from fabrication line cutting oils.

RMC and RMA Button Lines

Design changes have been made to drawings for components of these lines to handle new production models.

Three drawings were completed for the Floturn molds and templates for the 79-C model. The Floturn machine was re-tooled for the 79-C shape, and it tested satisfactorily on aluminum. However, satisfactory molds for plutonium have not been fabricated. Two castings, known to be dimensionally incorrect, were rolled on August 21. The Floturn machine performed satisfactorily, but the condition of the machining blanks indicated the need for additional refinement of the molds.

b. Project Engineering

CGC-912 - Waste Treatment Facility - "Z" Plant

Modification No. 8 to the Phase II contract, has been approved. This modification extends the contractor's completion date by thirty-four (34) days to September 23, 1962, to allow for delays caused by the recent strike.

The hood piping design has been revised to reflect changes necessary to improve maintenance access in the west end of the hood.

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

Construction and material procurement are continuing on an expedited basis. Construction is proceeding on a 10-hour day with Saturday work by crafts as is required, to improve the scheduled beneficial use date of November 15.

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2. General

a. Process Design Engineering

Fission Product Shipping

The data from drop tests of model shipping casks are being analyzed. Tests will be resumed in October with casks having aluminum buffers instead of rubber. The problem of solid state growth of Woods metal is being studied, and the most probable solution appears to be use of aluminum castings and a filler of low-melting alloy containing indium. Design is proceeding on these bases.

Leak Detection for Non-boiling Waste Tanks

Detail cost studies were made of nine alternate combinations of the "Data-Gage" liquid level gauging system. The scope was revised to provide manual office controls in 200-E and 200-W Areas, 95 transmitter-gauge head assemblies, and field wiring to tanks containing non-boiling and boiling wastes. The estimated project cost of the proposed alternate was \$413,000, including \$89,600 for contingencies and escalation, and \$25,000 for design. The proposed system provides the most flexible basic system. An operator can dial the office console in either area to determine the liquid level of any tank in either of the 200 Areas.

An "urgent" requirement has been placed on the installation of the "Data-Gage" system in the 113-SX Tank. Delivery on-site is anticipated the week of September 13, and actual installation of the gauge in 113-SX is scheduled for the following week.

b. Project Engineering

Total Authorized Funds -	
16 active projects	\$ 11,309,000
Total Cost-to-date	8,490,000
Commitments and Open Work Releases	1,004,000
Unencumbered Balance	1,815,000
Costs Charged to Above Projects	
7/22/62 to 8/19/62	333,000

Manager
Facilities Engineering

HP Shaw/WWC/alr

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

AUGUST, 1962

II. ACHIEVEMENTS (Continued)

G. RESEARCH AND ENGINEERING OPERATION

1. Purex Process Technology

a. Head End

During the August run period, the final dissolver rinse (prior to charging) was increased from 400 to 1000 gallons of demineralized water in an attempt to reduce the amount of plutonium lost via the coating waste solution. This change required increasing the recovered nitric acid concentration (vacuum fractionator product) from 50 to 57 weight per cent in order to absorb the extra rinse water which was used to dilute the 57 per cent acid to 50 per cent acid during dissolution. Initial results failed to show any improvement in waste losses, but the test will be continued during the next run period.

b. Solvent Extraction

The generally excellent level of overall Purex Plant performance experienced during recent weeks continued until an emergency shutdown on August 9 caused by the HA Column feed pump failure. The decontamination performance of the First Cycle continued excellent while the losses via the aqueous waste stream (HAW) dropped from an average of 0.08 per cent to 0.02 per cent. Performance of the Final Uranium Cycle continued very good with all product meeting specifications without silica-gel treatment and "waste" losses to the Backcycle Waste System remaining normal.

Start-up of the Solvent Extraction System after the brief shutdown on August 9 was characterized by above-normal activity in the product streams from all three cycles; however, the activity was well purged from the system by the time the plant was shut down.

The "in-plant" program to investigate the effect of a number of process variables on the plutonium decontamination performance of the Final Uranium Cycle was concluded with shutdown of the plant. The principal conclusions are summarized below:

- (a) The effect of the acidity in the 2D Column was negligible over the range from 0.7 to 1.0 M in the 2DW stream.
- (b) Rework of solvent recovered from the No. 2 Solvent System increased the plutonium level in the Final Uranium Product about two-fold.

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- (c) Lowering the 2D Column temperature by reducing the 2DF feed temperature from 60 to 50° C and 2D solvent temperature from 42 to 39° C reduced the plutonium level about five-fold.

c. Neptunium Recovery

Excellent neptunium accumulation continued in the Backcycle Waste System until shutdown. No equipment failures or process upsets were experienced during the neptunium isolation and decontamination run. However, unusually high "losses" to the 2A Extraction Column waste stream (2AW) were experienced during the decontamination portion (Phase II) of the run. The reason for the high losses has not as yet been determined. Recovery efficiency for the isolation run was 67 per cent. The 2AW "losses" were backcycled, and will be available for future recovery.

d. Waste Management

Approximately 200,000 gallons of 160° F water were pumped into the Purex 241-A-103 Tank on top of the solid sludge to start the sludge water leaching studies. Radiation surveys of the scheduled samples show a ten-fold increase in gross radiation over a three-week period; however, measurements indicate no appreciable reduction in sludge depth as yet.

A sample of the solid layer on the bottom of the Purex 241-A-102 Tank was taken to compare two-cycle waste sludge with the three-cycle waste sludge sample. The rotary core drill penetrated through 25 of the 27 inches of sludge, and no detectable soft under-layer was found to exist in the 241-A-102 sludge as in the 241-A-103 sludge.

e. Fission Product Recovery

Between August 12 and 22, four Oak Ridge National Laboratory casks were loaded with cesium-137 to represent the fourth successful cesium recovery campaign at Purex Plant.

2. Redox Process Technology - [REDACTED]

a. Solvent Extraction

The Redox process was started up on the new neptunium recovery flowsheet following completion of Project CGC-913, on 5-23-62. Since that time approximately 2100 grams of neptunium have been fed into the Redox process, of which 220 grams have been discarded in waste, for an over-all neptunium recovery factor of 89.5 percent. Contributing to the neptunium losses during this period were numerous startups and shutdowns, as well as a considerable amount of rework necessitated by process leaks and extraction waste losses. During the last two weeks of August, the Redox process was operated continuously except for the weekend shutdowns, at rates as high as 10 tons per day, and the neptunium recovery factor for this period of steady-state operation was 94.0 percent. The 6.0 percent neptunium loss, which was based on laboratory analysis of neptunium in the concentrated salt waste batches, represents an average of only a factor of two above the lower analytical detection limit.

Two 1A Column flowsheet changes were made which were designed to prevent deposition of plutonium(IV) polymer in the 1A Column and overflow line. The first flowsheet change was the addition of sulfamic acid to the LAA stream to give a composition of 1.3 M $\text{Al}(\text{NO}_3)_3$, 0.40 M HNO_3 , and 0.05 M NH_2SO_3 . The sulfamic acid in the LAA stream reacts with and destroys any nitrous acid formed in the scrub section of the 1A Column, thereby eliminating one potential for reduction of plutonium from the hexavalent to the tetravalent state. The second flowsheet change was the splitting of the LAA stream with half of the stream entering the 1A Column eight feet from the bottom of the twenty-foot scrub section, and the remainder entering at the normal entry point at the top of the scrub section. Essentially all of the acid in the LAA stream extracts into the organic phase in one stage. By introducing a portion of the LAA stream into the column near the bottom of the scrub section, the organic phase throughout the scrub section is maintained at a minimum acid concentration of 0.02 M HNO_3 . An acid concentration of 0.015 M HNO_3 in hexone is sufficient to keep any tetravalent plutonium from polymerizing and depositing (HW-60524, "Plutonium Stability in Hexone Solutions", C.A. Colvin and J.S. Buckingham, 10-31-61). Approximately two or three weeks of stable operation will be required for evaluation of the results of these changes.

b. Tail-End Ozonation Treatment

An ionization chamber, sealed in a stainless steel tube, was installed in the E-13 uranium ozonator vessel. Flexible electrical leads from the chamber were pulled through a spare utility wall nozzle to avoid the need for coaxial connectors. The monitor is intended to permit (1) evaluation and optimization of variables affecting the rate of ruthenium removal, and (2) rapid determination

of the ozonation end-point. Preliminary investigations employing the monitor indicated that the rate of ruthenium removal was increased if the periodic acid oxidant was added after a two-hour period of ozonation rather than at the beginning of the ozonation. Despite somewhat higher background readings than were anticipated, it appears that the monitor will give a more reliable indication of the end-point and effectiveness of the ozonation than do the E-13 samples which are frequently contaminated due to the relatively high initial activity.

3. Finished Products Chemical Technology

a. Metal Finishing Operation

1. Button Line

Oxide from burned skulls has been processed through the button line by dissolving the impure plutonium oxide in a mixture of nitric and hydrofluoric acid, complexing the residual fluoride ion with aluminum and blending the resulting solution with Purex and Redox feeds to achieve a reasonable aluminum concentration prior to precipitation. Statistical data indicate that feeds with a blend of about ten percent dissolved skull solution can be processed without significantly affecting button densities. A test batch of dissolved oxide, processed with neither aluminum complexing nor blending, produced ten buttons with densities comparable to those obtained from unblended Purex and Redox feeds. The residual fluoride ion was complexed with aluminum after precipitation and filtration to protect subsequent recovery operations from excessive corrosion.

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4. Process Chemistry - O. F. Beaulieu

a. Purex Process Assistance

Investigation of water samples in connection with the Purex 2D extraction performance continued during the month. Five different water streams were sampled and 20 liters of each was contacted with 100 ml of laboratory solvent (30% TBP-E2342 spray base diluent) at 30-40 C. Transfer rate studies were made on the resulting organic phase. The distilled water sample lowered transfer rates by four per cent which was corrected by carbonate washing. The four Purex water samples (sanitary, cation effluent, anion effluent, and process water) lowered transfer rates by 10-12 per cent and required both carbonate and permanganate washing to restore normal rates.

b. Redox Process Assistance

108-SX Sludge Samples. A sample of the bottom 4-5 inches of sludge from the 108-SX tank was delivered to the laboratory for investigation. The sample was not crystalline but of a mastic nature. It was 40 to 50 per cent soluble in hot water. An additional 40 to 50 per cent was soluble in hot oxalic acid, leaving approximately 15 per cent of the original sample as insoluble residue. Extensive chemical and radio-analytical work is continuing.

c. Neptunium Purification

Approximately 1700 grams of neptunium associated with 118 grams of Pu, 100 grams of U, 0.12 curies of ZrNb, and 0.02 curies of Ru were received from the Purex plant. The material was divided into two batches for processing. The first batch was processed using hydrazine and ascorbic acid as reducing agent. Presumably due to an inadequate wash cycle the Pu content of the product is high and the material is being held for reprocessing. The second batch is being processed with a more normal flowsheet.

d. Fission Product Assistance

Substitution of hydroxyacetic acid for tartaric acid as a complexing agent for iron in the strontium sulfate precipitation step was examined in the laboratory on traced synthetic solutions. Using hydroxyacetic acid to iron mole ratios of 0.5, 1, and 2 all gave a negligibly lower strontium recovery than tartaric acid at an acid-to-iron mole ratio of 1. There were no observable physical differences between the precipitates from the hydroxyacetic acid complexed solutions and the tartaric acid complexed solution, nor was there any difference in the amount of iron carried with the precipitates. As hydroxyacetic acid costs only one-seventh as much as tartaric acid (mole basis) and tartaric acid amounts to 80 per cent of the essential materials cost of strontium head end, considerable cost savings may be achieved by replacing tartaric with hydroxyacetic acid.

e. Laboratory Assistance

Promethium Separation. A rapid separation of promethium-147 from the rare earths, cerium, and praseodymium using ion exchange was developed. The rare earths, including five mg of neodymium carrier, were adsorbed on a short column (~ 0.1 ml) of Dowex 50x8 in the ammonium form. The blue neodymium band was used as visual indication that the promethium was all eluted with 0.20 M (AHLBA). A 2.5 ml fraction containing 96 per cent of the promethium was obtained. Decontamination from the remaining fission products was accomplished using a HDEHP extraction cycle. (AHLBA = alpha hydroxy iso butyric acid.)

UNH Additives. In support of the UO_3 reactivity studies, a 60 per cent UNH solution, containing 0.05 lb/gal HNO_3 , was adjusted to 2.2 per cent in NH_3 with no insoluble solids formation. On concentration to a 100 per cent UNH solution, no further solids were formed and the NH_3/U ratio remained constant.

X-ray Spectrometry. The X-ray spectrometer has been calibrated to determine Bi and Pb simultaneously in L-6 samples. This analysis was used to provide back-up for the 234-5 Spec Lab and to provide analyses at the higher concentrations which would give improved accuracy and precision over the plus or minus factor of 2 by emission spectrographic methods. A number of L-6 tank and L-6 load-out thief samples were analyzed and this information helped to isolate the sampler as the source of contamination.

The X-ray spectrometer has been used to evaluate the effect of varying concentrations of Np on the determination of Pu. Plutonium may be analyzed in the presence of five times as much Np with 100 per cent recovery. At factors of Np/Pu of 15:1 the Pu recoveries were 5 per cent high; at 20:1 to 30:1 the Pu recoveries were about 25 per cent high.

A working curve has been prepared for the X-ray fluorescence determination of the phase stabilizing chemical in delta phase plutonium. The curve covers the concentration range of interest to the process plant. Future efforts will be directed towards analysis of this material in production metal to provide in situ information on precision and accuracy.

Chemical Assay. The use of ceric sulfate as a primary standard in the analysis of plutonium metal has been initiated in Z plant on an evaluation basis. After a three months period of comparison against the use of plutonium metal as a standard, the method will be adopted or rejected as the evidence indicates.

Thermobalance. A sample of PuO_2 plus additives was chlorinated in the thermobalance for a chloride conversion of 99.8 per cent. However, the high-fired oxide resulting from the experiment indicated 66 per cent volatile material based on the high-fired weight. This is an excessive amount of volatiles which has not as yet been explained. Subsequent to the test, the thermobalance heating element failed and repairs are underway.

Zirflex Process. A thorium titration has been evaluated in the laboratory and has been accepted as a method of analyzing the ammonium fluoride that will be used in zirflex decladding. A method for ammonium nitrate is presently being evaluated.

Gamma Spectrometry. Calibration of gamma sources in the range 0 - 4 Mev was started on the RIDL 400 channel analyzer. These calibrations are completely interchangeable with the RIDL 0 - 2 Mev range calibrations and the RCL 0 - 2.5 Mev range calibrations, except below 0.4 Mev. Where this conflict occurs, the lower range calibrations will be used.

Gamma calibrations have been completed on $BaLa^{140}$, Cs^{134} , Nb^{95} , and $ZrNb^{95}$.

The Redox gamma analytical facility was asked to participate in the analysis of duplicate uranium fission foils, together with Argonne National Laboratory and Los Alamos National Laboratory. The foils of depleted uranium and of uranium-235 were irradiated by ANL at Idaho Falls.

5. 234-5 Development

a. Electrolytic Reduction Of Plutonium Trichloride

The effect of incompletely-chlorinated feed on the frothing characteristic of an Li-KCl melt was demonstrated.

The first run was made to determine whether feed quality affected the frothing due to anode gases. Oxide content was the suspected cause. Plutonium trichloride feed with 1 percent, 10 percent, and 25 percent water-insolubles was used. At 820 C with 25 amps, the 1 percent feed had little effect, the 10 percent feed produced a skin and light frothing. The 25 percent material produced a heavy froth which was barely contained in the crucible. The run was made with an anode basket to isolate this area. The results verified that oxide causes the froth, but also showed that with an LiCl-KCl melt, this effect can be contained.

A second run was made with a 7 percent insoluble feed and a restricted cathode area. Heavy frothing was retained in the anode basket. A high percentage of black solids was formed in this run, which indicates that high cathode current density ($> 5 \text{ amps/cm}^2$) is disadvantageous.

b. Ceramic Development

An electrolytic cell for continuous purification of plutonium metal has been developed and successfully tested.

The cell (IS-20) has been made of magnesia-10 percent titania with a varying percentage of coarse fraction. The most commonly used formula (Mix 41) contains 23 percent -100 +200 MgO, 67 percent -200 MgO, and 10 percent finely-milled TiO_2 . This yields a ceramic of about 2.5 to 3 volume percent of open voids as measured with the Aminco-Winslow Porosimeter. The body of the Mix 41 cell is about 2.9" O.D. x 4" long. At the bottom, the cell diameter decreases to about 7/8", forming a drain about 1 1/2" long. The preferred wall thickness is about 3/32". A cell made from this container uses an external weir for continuous product removal. Normally, an anode cup is used to hold the feed. Cells have been produced with both tantalum and ceramic tubes of various designs cemented into the bottom drain tube. Having no internal vent tube, the entire cell volume is usable for melt and electrodes.

In the past seven months, eight electrolytic and four electro-winning runs have been performed successfully in these cells, one continuous refining run proceeding for about 15 hours. Both chloride and fluoride melts and mixtures of the two have been used with no indication of failure by the ceramic. In half or more of the runs, the cell withstood freezing and remelting.

c. Incinerator Support

Experiments are being conducted to further define the incinerator

processing conditions.

Recent tests show that plutonium tetrafluoride converts to plutonium dioxide in the incinerator when moisture is present. Small samples (3 g) of plutonium tetrafluoride were heated in a tube furnace at 800 C for eight minutes to simulate the conditions in the incinerator. With moisture present, provided by bubbling air through water and into the furnace, the plutonium tetrafluoride was converted to plutonium dioxide. No conversion took place when moisture was absent. Since combustion leads to water vapor in the incinerator, it is concluded that the conversion does occur. This information is needed to gain a better understanding of the plutonium inventory in the incinerator as revealed by neutron count.

d. Recovery Of Plutonium From Ash

Approximately 99 percent of the plutonium in incinerator ash samples was recovered by leaching in 10 M HNO_3 - 0.2 M HF.

Three samples of incinerator ash were each leached in 10 M HNO_3 - 0.2 M HF for one hour. From 97.2 to 99.7 percent of the plutonium dissolved in the acid mixture. One sample of ash from the off-gas cyclone was leached. The plutonium and ash dissolved completely.

e. Clarification Of Incinerator Scrubber Solution

The addition of casein glue to the basic scrubber solution followed by acidification results in complete coagulation and separation of fly ash.

Incinerator scrubber solutions contain fly ash and entrained plutonium which must be recovered. The following steps, based on treatment of actual scrubber solutions, are required for clarification of the scrubber solutions:

1. Add dissolved casein glue (1.0 to 2.5 grams of glue per liter of scrubber solution) to the basic scrubber solution. Agitate the mixture.
2. Add enough 13 M HNO_3 (120 to 200 ml per liter of scrubber solution) to acidify the solution and coagulate and separate the fly ash. Acid addition must be slow to control foaming. The ash separates rapidly at the completion of the nitric acid-caustic, carbonate reaction, thus serving as a good end point indicator.
3. Decant the scrubber solution, sample, and transfer to the sump.
4. Remove the fly ash (together with entrained plutonium particles) and recycle to the incinerator or transfer to the ash leaching equipment.

H. S. Frank

Manager
Research and Engineering

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

AUGUST, 1962

II. ACHIEVEMENTS (Continued)

H. FINANCIAL OPERATION

1. Production Cost

A Purex continuous Brandy Startup account was established in August and approximately \$114,000 of operating cost and \$66,000 depreciation was charged to this account.

A number of reports were revised for improved clarification and a new report developed during the month. Revised reports included the Isotope Inventory, Overtime Transfers, Essential Material Variance, and Prototype Cost reports. A work order cost report was developed for the Redox and Purex analytical control groups to aid in controlling increasing costs of these two components.

Studies completed during the month at the request of HOO-AEC were as follows:

- a. Change in funding requirements resulting from the Criticality Incident and the subsequent Recuplex shutdown.
- b. Decrease in out-of-pocket costs of the Fission Products Program in FY 1964 assuming (a) one half reduction in Sr-90 production and (b) total reduction.
- c. Projected department manpower requirements through FY 1966.

Approximately \$203,000 in Spare Parts were excessed or otherwise disposed of in July and August in connection with the Spare Parts cleanup program.

CPD's investment in inventories at July 31, 1962 compared with budgeted amounts is shown as follows:

(in thousands)	Balance 7-31-62	Control Allocation	Surplus (Deficit)
<u>Inventories</u>			
Essential Materials	\$ 766	\$ 832	\$ 66
Spare Parts & Standby	1 878	1 400	(478)
Special Materials	120	100	(20)
Gross Inventories	<u>2 764</u>	<u>2 332</u>	<u>(432)</u>
<u>Reserves</u>			
Essential Materials	62	62	-0-
Spare Parts & Standby	<u>853</u>	<u>350</u>	<u>503</u>
Total Reserves	<u>915</u>	<u>412</u>	<u>503</u>
<u>Net Investment</u>	<u>\$1 849</u>	<u>\$1 920</u>	<u>\$ 71</u>

2. Personnel Accounting

One patent award for a CPD employee was received in August and qualifications of two employees for awards were reviewed.

3. Auditing

In connection with the annual inventory of frozen lunches, tests were made of disbursements to determine the propriety and compliance with HAPO OPG 3.2.5. Time cards for individuals receiving lunches indicated that appropriate periods of time had been worked.

4. Financial Analysis

At the request of HOO-AEC, costs were developed for handling and packaging analytical samples of SS Materials for shipment to an off-site laboratory for verification analyses. Additionally, current analytical practices and experience were outlined for consideration prior to implementation of such a program.

5. General Accounting*

As of July 31, 1962, sixteen active projects had incurred costs of \$8,185,402 against authorized funds of \$11,289,200. Outstanding commitments totaled \$626,554.

During August, Directive No. HW-544 was received and authorized \$50,000 for design on the "In-Tank Waste Solidification" project.

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Six (6) appropriation requests were approved in August authorizing expenditures of \$53,700. These AR's were as follows:

<u>AR Number</u>	<u>Description</u>	<u>Section</u>	<u>Amount</u>
26043	Fission Product Gamma Ratio Analyzer	FEO	\$11 000
36006	Transistorized Personnel Monitors	Purex	10 000
36007	Canyon Pump	Redox	10 000
36009	Ventilation Fac. Burial Tunnel	Purex	9 700
26042	Pu Gamma Assay Meter	FEO	8 000
36008	Controlled Atmosphere Thermobalance	R&E	<u>5 000</u>
Total Funds Authorized			<u>\$53 700</u>

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

Manager - Finance

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CHEMICAL PROCESSING DEPARTMENT
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AUGUST, 1962

III. PERSONNEL ACTIVITIES

A. FORCE SUMMARY

<u>Operation</u>	<u>Monthly Salaried</u>		<u>Weekly Salaried</u>		<u>Total</u>	
	<u>7-29-62</u>	<u>8-31-62</u>	<u>7-29-62</u>	<u>8-31-62</u>	<u>7-29-62</u>	<u>8-31-62</u>
General Manager's Group	11	11	1	2	12	13
Financial	13	13	16	15	29	28
Research & Engineering	64	64	28	27	92	91
Facilities Engineering	60	61	23	23	83	84
Power & General Maintenance	39	39	247	250	286	289
Production	5	5	4	5	9	10
Redox	51	50	201	202	252	252
Purex	64	64	249	248	313	312
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>1 030</u>	<u>1 033</u>	<u>1 390</u>	<u>1 393</u>

B. PERSONNEL CHANGES

R. J. Sloat was appointed Manager - Finished Products Chemical Technology, Research & Engineering. He fills the position vacated by the recent appointment of L. M. Meeker as Specialist - Personnel Administration Studies, Production Operation.

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C. TRIPS

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To AEC and Other AEC Contractors</u>		
L. L. McGregor	Dow Chemical Co. Rocky Flats Plant Denver, Colorado	Consultation on dimensional and mass standards (8/6-7/62).
C. W. Smith J. H. Warren	AEC, Washington, D.C. Martin Nuclear Co., Baltimore, Maryland	Shipment of fission products (8/13-14/62).
R. E. Tomlinson	Argonne National Lab. Lemont, Illinois	To attend meeting of Advisory Council of the Annual Review of Reactor Technology (8/21-22/62).
R. C. Hollingshead	Los Alamos Scientific Lab., Los Alamos, N.M.	Meeting of I.M.O.G., Basic Machine Tool Sub-committee. (8/22-24/62).
R. E. Olson	ALOO-Albuquerque, New Mexico	Attend I.M.O.G. Meeting. (8/21-23/62).
<u>To General Industry</u>		
H. H. Hopkins, Jr.	Consolidated Mining Engr. Corp., Trail, British Columbia	Discuss purification of metal and inorganic chemistry. (8/24/62).
C. W. Smith	General Aluminum Fdry. Spokane, Washington	Fission Products Casks. (8/21/62).
<u>To Conventions and General Meetings</u>		
L. L. McGregor	Boulder, Colorado	To attend 1962 Standards Laboratory Conference (8/8-10/62).

D. VISITORS

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From AEC and Other AEC Contractors</u>		
M. DeSesa	National Lead of Ohio Fernald Plant, Dayton, Ohio	Discuss UO_3 process and specifications (8/2/62).
W. L. Lennemann	AEC, Division of Production, Washington, D.C.	Waste Disposal Facilities. (8/9/62).

D. VISITORS (continued)

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From AEC and Other AEC Contractors</u> (continued)		
Wallace Howard Dr. Henry Lowenhaupt	AEC, Washington, D.C.	Purex Plant Tour (8/15/62).
R. M. Baker R. W. Butler	Bendix Corp., Kansas City Div., Kansas City, Mo.	IMOG Committee Meeting. (8/21-22/62)
C. R. Barncord J. D. Gilson	Sandia Laboratories Livermore, California	" " "
L. J. Fasulo R. E. Rhoades	Dow Chemical Co., Rocky Flats Plant, Denver, Col.	" " "
H. M. Fraga	Los Alamos Scientific Lab. Los Alamos, New Mexico	" " "
J. A. Giltner	ACFI, Union Carbide Nuclear Co., Albuquerque, N.M.	" " "
J. F. Hammerstran	Sandia Corp., Albuquerque, N.M.	" " "
J. W. Noble	Mason & Hanger, Silas Mason Co., Pantex Ordnance Plant, Amarillo, Texas	" " "
D. E. Wendeln	Mound Laboratory, Monsanto Research Corp., Miamisburg, Ohio	" " "
L. G. Whitten	Y-12 Plant, Union Carbide Nuclear Co., Oak Ridge, Tennessee	" " "
<u>From General Industry</u>		
H. W. Birkeland	Anderson, Birkeland & Anderson, Tacoma, Washington	Tank Design - 241-AX (8/13-15/62)
Bill Cross	Dunham-Bush, Inc. Seattle, Washington	Purex Crane Air-conditioning. (8/15/62)
Dean Pine	Worthington Co., Seattle, Wash.	Testing of Turbine Pumps at 282-E (8/30-31/62)

DECLASSIFIED

HW-74804

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From Other Government Agencies</u>		
Walter Grant	Wright-Patterson Air Field Dayton, Ohio	Purex Plant Tour (8/22/62).
<u>From Colleges and Universities</u>		
Geo. Watt	University of Texas Austin, Texas	General Process Discussions (8/21-22/62)

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IV. SAFETY AND SECURITY

<u>Operation</u>	<u>FEO</u>	<u>Finance</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			10	21	9	11			2	53	302*
Rad. Occur.			2		6	5				13	133
Contam. Wd.					1					1	6
Pu Dep.			4**							4	11
Fires					1***					1	13
Sec. Violation			1	1					3	5	12

* Injury occurred 7-29-62, but not reported until August; therefore, carried only on YTD total.

** These cases occurred separately due to loss of containment such as hood glove ruptures, failure of a rubber glove on an employee's hand, and liquid splashing when a piece of transfer tubing became loosened. Confirmed deposition in each case was less than 1% of the MPBB.

*** Purex - Fission Product Recovery, East of 222-B Building, 200 East Area - Weldor employee for Central Heating and Plumbing contractor was cutting with torch to lower steam lines. Sparks ignited weeds. Damage - \$10.00.

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V. REPORTS

A. PREPARED AND ISSUED

- HW-70726, Rev. 1, Unclassified, "Cost Model of Steam Generation in the 200 Areas", dated August 15, 1962, by L. M. Heerwagen, R. W. E. Peterson, A. C. Morgenthaler, and W. E. Kaufer.
- HW-73099 REV, Secret, "Proposed Inspection Methods for Certification of MC-1251 Parts While Confined in the Machining Fixture", dated July 31, 1962, by A. E. Smith.
- HW-74350, Confidential, "Recovery of Plutonium From Fabrication Oil", dated August 1, 1962, by R. S. Kingsley.
- HW-74365, Unclassified, "Process Design Basis for Equipment Mezzanine and Electrical Power Supply, RMA Fabrication Area-234-5 Building", dated July 27, 1962, by D. D. Wodrich.
- HW-74475 RD, Secret, "Purex Plant Production Schedule - August, 1962", dated August 6, 1962, by D. McDonald.
- HW-74476 RD, Secret, "Redox Plant Production Schedule - August, 1962", dated August 6, 1962, by D. McDonald.
- HW-74477 RD, Secret, "UO₃ Plant Production Schedule - August, 1962", dated August 6, 1962, by D. McDonald.
- HW-74478 RD, Secret, "234-5 Plant Production Schedule - August, 1962", dated August 6, 1962, by D. McDonald.
- HW-74494, Confidential, "Critical Mass Control Specification - Storage of Pu-Bearing Dry Recovery Materials - Army Ammunition Storage Igloos T-101, T-102, and T-105", dated August 7, 1962, by L. M. Meeker.
- HW-74496, Confidential, "Critical Mass Control Specification - Storage of Pu Solutions for Recovery - Army Ammunition Storage Igloo T-106", dated August 10, 1962, by L. M. Meeker.
- HW-74497, Confidential, "Critical Mass Control Specification - Storage of Miscellaneous Items Containing Pu for Recovery - Army Ammunition Storage Igloo T-107", dated August 15, 1962, by L. M. Meeker.

- HW-74498, Secret, "Progress Report - Finished Products Fabrication Technology Operation - July, 1962", dated August 3, 1962, by members of the Finished Products Fabrication Technology Operation.
- HW-74510, Secret, "Statistical Statements and Associated Data for 234-5 Building Final Product Shipped During the Second Quarter of Calendar Year 1962", dated August 8, 1962, by A. E. Smith.
- HW-74519, Secret, "Quarterly Summary Report and Associated Data for 234-5 Building Final Product Shipped During the First and Second Quarters of Calendar Year 1962", dated August 3, 1962, by A. E. Smith.
- HW-74543, Secret, "Topical Outline for US-UK Technical Exchange Meeting - Process Experience in the Hanford Purex Plant", dated August 6, 1962, by J. P. Duckworth, B. F. Judson, and H. C. Rathvon.
- HW-74555, Unclassified, "A Comparison of Arsenious Oxide and Pu for the Standardization of Ceric Sulfate", dated August 6, 1962, by P. F. Raney.
- HW-74588, Unclassified, "Process Design Basis for A Degreasing and Briquetting Facility, RMA Fabrication Line - 234-5 Building", dated August 9, 1962, by M. E. Borgeson.
- HW-74608, Confidential, "Scheduled Shutdown - Purex Plant, dated August 10, 1962, by J. H. Warren.
- HW-74639, Confidential, "Critical Mass Control Specification - Vault 106 - Storage 'Bird Cages' Containing Pu Buttons", dated August 22, 1962, by L. M. Meeker.
- HW-74647, Secret, "Chemical Processing Department Waste Status Summary - January 1, 1962, through June 30, 1962", dated August 6, 1962, by R. E. Roberts.
- HW-74649, Unclassified, "The Redox Gamma Analytical System", dated August 15, 1962, by W. H. Zimmer.
- HW-74698, Secret, "Fabrication Capability Program", dated August 30, 1962, by A. E. Smith.
- HW-74722, Unclassified, "Trip Report - Oak Ridge National Laboratory and Martin's Quehanna Facility - July 30, 31, and August 1-3, 1962", dated August 27, 1962, by S. J. Beard.
- HW-74792, Confidential, "Z Plant Filtrate Ion Exchange Facility (CGC-978) Start-up Flowsheet", dated August 31, 1962, by C. J. Berglund.

B. PREPARED FOR SIGNATURE AND ISSUANCE

- HW-74504, Secret, "Production - July 1962", dated August 1, 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.

<u>INVENTOR</u>	<u>TITLE</u>
C. E. McMahon, Redox Operation	An Electrically Controlled Jet System, For Remote Or Automatic Jet Operation.

P. H. Reinken

General Manager
Chemical Processing Department

END

**DATE
FILMED**

4 / 13 / 93