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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
FOR

HANFORD

AUGUST, 1961

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OPERATION MANAGERS

September 21, 1961

By....

Date...

HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

AUGUST, 1961

I. SUMMARY

Production through August, as compared with the June 28, 1961 HAPO Production Forecast (HW-69958), is summarized below:

	<u>Percent of Forecast Achieved</u>	
	<u>August</u>	<u>Fiscal Year To Date</u>
Separated plutonium nitrate	119.4	108.9
Separated uranium nitrate	121.8	111.7
Uranium oxide	100.5	100.3
Plutonium metal buttons	191.7	152.6
Fabricated parts	125.5	114.4

August production performance was highly satisfactory and forecasted quantities were either achieved or exceeded for all products. Three new monthly production records were established during August.

The production of plutonium metal buttons exceeded the previous record high by 44 percent.

Plutonium Recovery (Recuplex) output exceeded the previous record by 43 percent.

Fabrication of the current model of weapon parts exceeded the previous best achievement by 19 percent.

Purex processing continued at a capacity factor of 3.0 to 3.3 until the scheduled shutdown on August 25, 1961 to recover the neptunium inventory and to perform maintenance repairs. Severe electrical storms caused three brief power outages; however, effects on the process were minor. Except for two batches of uranium product and three of plutonium product, specification material was produced all month.

The nozzle plate cartridge in the Purex Second Uranium Cycle Scrub Column (2D) was replaced to improve operating stability of this column during start-ups. The new cartridge has 10 percent free area as compared with 6 percent free area in the old unit.

Redox plutonium final product averaged 1250 parts per million of iron during August. This is a factor of ten improvement since the titanium deentrainment tower was installed on the plutonium final concentrator.

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In the first attempt to pump concentrated high-level liquid waste (Sp. Gr. 1.57 at 191° F) from a 241-SX underground waste storage tank, 12,000 gallons of solution were successfully transferred to another underground storage tank before the preheated transfer line plugged with frozen solution. The plug was readily dissolved (at month-end) with hot water and preparations were made to continue the transfer. This is the first step in a program to determine if the supernate and sludge in a waste storage tank, which has contained self-boiling wastes, can be removed and if the tank can be reused for self-boiling wastes.

A heavy equipment operator was fatally injured on August 14, 1961 while preparing to unload a caterpillar tractor from a transport trailer. The boomer chain, which lashed the tractor to the trailer deck, was removed prematurely, allowing the tractor to roll backward. The employee was crushed by the tractor draw bar as the unit fell to the ground.

P. H. Reinker

General Manager
Chemical Processing Department

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

AUGUST 1961

II. ACHIEVEMENTS

<u>A. Production Statistics</u>	<u>August</u>	<u>Fiscal Year to Date</u>
<u>a. Percent of Forecast(1) Achieved</u>		
Separated plutonium nitrate	119.4	108.9
Separated uranium nitrate	121.8	111.7
Uranium Oxide	100.5	100.3
Plutonium metal buttons	191.7	152.6
Fabricated parts	125.5	114.4
<u>b. Purex</u>		
Uranium nitrate produced (tons)	634.63	480.18
Average production rate during operation (T/D)	25.0	25.3
Total waste loss (%)		
Plutonium	0.36	0.38
Uranium	0.20	0.11
On-line efficiency (%)	90.0	72.3
<u>c. Redox</u>		
Uranium nitrate produced (tons)	126.79	126.66
Average production rate during operation (T/D)	8.7	9.2
Total waste loss (%)		
Plutonium	0.27	0.21
Uranium	0.12	0.17
On-line efficiency (%)	63.4	66.0
<u>d. Uranium Reduction (tons)</u>		
Normal UO ₃ loaded	626.44	504.7
Enriched UO ₃ loaded	101.2	96.7
Normal UO ₃ approved for shipment	652.70	399.07
Enriched UO ₃ approved for shipment	96.81	96.72
Normal UO ₃ shipped	501.24	449.59
Enriched UO ₃ shipped	145.11	49.29
Normal UNH backlog	204	264
Enriched UNH backlog	157	127

(1) HW-69958, HAPO PRODUCTION FORECAST, dated June 28, 1961

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e. <u>Plutonium Metal Processing</u>	<u>August</u>	<u>July</u>
Input to Task I (batches)	476	259
Reduction yield (%)	98.44	99.3
Product recovery output (Kgs)	262.54	119.36
Product recovery backlog (Kgs)	449.2	510.6
Waste disposal (grams)	786	902
f. <u>Power</u>	<u>200-East</u>	<u>200-West</u>
Raw water pumped (gpm)	11 984	5 103
Filtered water pumped (gpm)	1 354	995
Maximum steam generated (lbs./hr.)	220 000	96 000
Average steam generated (lbs./hr.)	189 000	60 990
Total steam generated (M lbs.)	122 536	39 527
Coal consumed (est. tons)	6 322	2 091

August production performance was highly satisfactory and forecasted quantities were either achieved or exceeded for all products. Three new monthly production records were established during August.

The production of plutonium metal buttons exceeded the previous record high by 44 percent.

Plutonium Recovery (Recuplex) output exceeded the previous record by 43 percent.

Fabrication of the current model of weapon parts exceeded the previous best achievement by 19 percent.

J. H. Warren
Manager - Production

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CHEMICAL PROCESSING DEPARTMENT
PUREX OPERATION

AUGUST, 1961

II ACHIEVEMENTS (Continued)

B. PUREX OPERATION

1. Operating Continuity

The plant continued to operate this month at a capacity factor of 3.3 except for two periods totaling eight days at a 3.0 capacity factor. The rate reduction was due to a plugged off-gas silver reactor and an operating error in routing dissolver solution to a coating waste tank.

Three power outages, caused by severe electrical storms, were experienced during the month. The outages were brief and caused only minor upsets in the process.

Uranium product met specifications except for two batches. Additional uranium was recycled directly to E-6 (feed makeup).

A neptunium run began on 8-26-61 and was in progress at month's end.

Plutonium waste losses were normal; however, uranium losses were above normal due to process interruptions which caused flooding of the second uranium extraction column.

2. Processing Operation

Operating experience during the neptunium recovery run was highly satisfactory.

Rework of plutonium through N Cell ion exchange unit continued in a satisfactory manner and a total of 30 cans of high gamma material was reprocessed.

Because of the accidental transfer of dissolver solution to D-2 coating waste tank, it was necessary to install temporary jumpers and route this solution to the D-3 tank where it was recovered by blending off into E-6 feed tank. Due to the error, two cold uranium batches (K-6) were processed instead of normal feed.

The 2D (final uranium extraction) column continued to show a strong tendency to flood. A decision was made to replace the column cartridge (6 percent free area) with one having 10 percent free area.

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There were no fission product runs during the month. A total of 163 kilocuries of Sr-90 concentrate were transferred to the 002 CR tank containing aged strontium concentrate. Subsequently 46 kilocuries of 002 tank contents were transferred to the Hot Semiworks for purification.

STT #44 (Shielded Transfer Tank) was loaded with 36 kilocuries of cesium, then given the usual pre-shipment leak tests. Additional STT's are currently being loaded with Cs-137. Seven hundred gallons of tank 103-A supernatant solution were shipped to the 300 Area High Level Cells for technetium and cesium research.

3. Mechanical Experience

Installation of the equipment associated with the formaldehyde project is nearing completion. The four process vessels and nearly half the jumpers have been installed.

Modifications on the F-11 West and F-6 East tube bundle condensate systems were made. The associated trap pit jumpers were modified to eliminate the steam traps and valves. Diaphragm-operated valve jumpers were installed in the canyon as a replacement for traps. A special jumper was installed on the 151-A Diversion Box, which enables water flushing the drain line from the Pipe Gallery.

Failed equipment transfers included two burials at the Equipment Burial Ground. Two process steam tube bundles, a process pulse column cartridge, fifteen jumpers, and miscellaneous waste materials were buried.

The 241-A-106 Tank, newly activated on 7-20-61, started boiling during the week of 8-28-61.

The D-5 pump was replaced with a new spare unit subsequent to excessive upper seal leakage.

Fabrication and installation of a filter on the vent riser of 151-A Diversion Box catch tank was completed.

4. Radiation Experience

The total radio-iodine 131 emission was 20 curies for the period. The maximum seven-day emission was 7.5 curies.

There were ten Radiation Occurrences, including one Radiation Incident, and seventeen cases of skin contamination.

Two Facilities Engineering inspectors received a whole body exposure over the local operating control limit while inspecting a newly installed pipeline which had been prematurely placed in service.

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Process solution leakage into the 151-A Diversion Box has resulted in contamination and radiation control problems in the surrounding area. High radiation levels and poor visibility preclude making a careful inspection of the diversion box for leaks. Several jumpers were reimpacted in an attempt to correct the leakage. Two new jumpers are being made ready for installation if the leaks continue. A series of hot water and chemical flushes were carried out through the box sprays to help improve working conditions at this diversion box.

5. Analytical Experience

Previously reported Sr-90 recoveries on Hot Semiworks recovery run #6 were adjusted during August. Re-evaluation of analytical data resulted in determining 85-90 percent Sr-90 recovery on the run. Extensive analytical work was performed on Hot Semiworks samples in order to clarify discrepancies between analytical and heat balance results on Run #5. Precipitating solids in process vessels were found to be the source of the problem.

6. Events Influencing Costs

In order to test a new diluent (Soltrol) in Purex process, the entire plant inventory of organic was removed from the plant and stored for later use.

Flushing and new diluent charging activities were in progress at month's end.

Manager-Purex

RR McMurray:EAF:gt

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

AUGUST, 1961

II. ACHIEVEMENTS (Continued)

C. SPECIAL SEPARATION PROCESSING AND AUXILIARIES OPERATION

1. Operating Continuity

Processing operations were conducted as scheduled until August 24 at which time the two-stage pump in the E-3 plutonium sampler tank failed, necessitating a plant shutdown for replacement of the failed unit. Operations were resumed on 8-28-61, and although a second pump failure occurred on 8-29-61, processing conditions were such that the scheduled production for the month was achieved.

2. Processing Operations

E-metal processing was resumed on 8-2-61 after an extended shutdown at the end of July for planned equipment changes. Except for the normal week-end shutdowns, processing was continuous until 8-24-61. On this date the new combination pump and agitator in the E-3 plutonium sampler tank failed. A new unit was installed during the normal week-end shutdown and operations were again resumed on 8-28-61. However, a second failure occurred on 8-29-61 after only 28 hours of operation. At month end a modified reconditioned unit was being prepared for installation.

Processing performance on waste losses and product decontamination was satisfactory throughout the month. Waste losses were 0.12% and 0.27% for uranium and plutonium respectively. However, some start-up and canyon sump rework material was higher than normal in gamma activity and required additional processing and blending of final products in order to produce specification material.

Approximately 84 tons of UNH, with a high gamma ratio, were received from the Purex Plant for reprocessing through the silica gel system to reduce the gamma content to within shipping specifications. For reasons not yet determined the gamma ratio on this material was very slow to reduce and four passes through the silica gel system were required before shipping specifications were met.

3. Mechanical Experience

The F-8 feed tank pump developed a leak around the shaft above the mounting flange and was replaced with a reconditioned pump on 8-5-61.

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The failed pump had been in operation for approximately 1400 hours since it was originally installed on 6-19-59.

A coil leak in the E-13 uranium ozonator tank developed during the month and a reconditioned unit was installed on 8-12-61. The replacement unit is equipped with a new coil designed to overcome the effects of erosion caused by the action between the coil and coil supports during expansion and contraction. Visual inspection of coil failure in the Decontamination and Equipment Reclamation Facility has disclosed that this is a major cause of equipment coil failures.

During July a new prototype two-stage pump, which functions both as a pump and an agitator, was installed in the E-3 plutonium sampler tank. However, on 8-24-61 the new pump-agitator failed and a new spare unit was installed on 8-26-61. On 8-29-61 this replacement unit also failed, after only 28 hours of operating time. Subsequent investigation has revealed that the failures occurred in the upper roller bearings located just above the tank flange. At month end the original pump, with temporary modifications to overcome the difficulty, was being prepared for installation.

Advantage was taken of the down time, encountered as a result of the E-3 pump failures, to overhaul the 291-S Building steam turbine which drives the emergency exhaust ventilation fan for the Redox Plant. A new intermediate shaft and couplings and a new governor valve were installed. New bearings were also installed in both the fan and turbine. The job was completed without incident and operation to date has been satisfactory.

4. Waste Handling and Decontamination

Equipment valued at approximately \$25,164 was received from the processing plants for decontamination, repair or inspection during the month. Equipment valued at \$44,378 was returned to customers. A savings of approximately \$16,855 over the cost of new replacement equipment was realized through the equipment decontamination program during the month.

A total of 289 man-hours was charged to the decontamination of railroad, automotive and heavy equipment. The following is a breakdown of the major items decontaminated:

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<u>Item</u>	<u>Operation Charged</u>
Well Cars No. 43 and 99	Transportation
Flat Cars No. 3615 and 3622	WHDO
Power Wagons No. 1H-4971 and 1D-4496	HLO
Compressor No. 16245	Purex
Sedan No. 1A-6340	Transportation
Pickup No. 1C-233	Purex
Motor Crane	P&GM
Evacuation Buses 1D-6674 and 6767	Purex
Flat Bed Trailer	HLO
Generator	HLO
Clam Shell	Transportation

A titanium tube bundle from the Finished Products Operation, which contained approximately 65 grams of plutonium, was successfully decontaminated in the 221-T Decontamination and Equipment Reclamation Facility in preparation for engineering studies to determine the cause of failure. A plastic enclosure built around the large decontamination thimble was effective in containing most of the contamination during the cleaning operation and the job was completed without incident. The plutonium recovered was subsequently removed to underground storage.

Burial of the original Redox multipurpose dissolver, which failed during April of 1960, was completed without benefit of a burial box and without incident on 8-4-61. The dissolver was pre-cleaned, sprayed with "Fabrifilm" (a plastic resin by Turco Products Company) and moved to the burial garden on a flat car. Some spot contamination was encountered during the transfer from the flat car to the burial hole, but this was localized in the immediate area and easily cleaned up. The transfer was considered a success, and pending an evaluation of costs, more burials of this type are predicted for the future.

5. Radiation Experience

Six skin contamination cases were recorded during the month. All except one were readily reduced to non-detectable. The one exception involved a puncture wound in a "Controlled Injury Zone". Initial whole body monitoring results indicated that the employee involved received a deposition of less than 5 percent of the maximum permissible limit for plutonium. The wound was successfully excised and the deposition reduced by 75 percent. The employee has been placed on a bioassay sampling schedule for further evaluation.

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Three radiation occurrences were experienced during the month. Two resulted from the skin contamination cases mentioned above and the other involved a plutonium contamination spread from the greenhouse in the 233-S Concentration Building during efforts to resolve a vacuum loss in the L-1^h vacuum vessel system. Cleanup of the area was completed without incident.

Chas. S. Smith
Manager - Special Separation
Processing and Auxiliaries

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

AUGUST, 1961

II. ACHIEVEMENTS (Continued)

D. FINISHED PRODUCTS OPERATION

1. Operating Continuity

During the first two weeks of August approximately thirty-five percent of the fabrication output was directed to development work related to the dimensional stability problem. Following this period, operations were normal and a record output for the current model was achieved. Operations in plutonium processing and plutonium recovery were essentially uninterrupted and new production records were established for both units. Uranium oxide production was normal but the schedule for load out of the enriched material was not achieved because of the lack of shipping containers.

2. Processing Operations

a. Plutonium Fabrication

Information on plutonium fabrication is presented in Document HW-70995, entitled, "Chemical Processing Department, Finished Products Operation, Z Plant Monthly Report, August, 1961", classified "Secret, Atomic Weapon Data, Production Rate and Stockpile Quantity Information".

b. Plutonium Processing

Performance of the Button Line facilities was excellent in August. Gross production exceeded the previous record output by almost forty-four percent. Plutonium quality remained good with no buttons being rejected.

Efforts to reduce the total plutonium scrap inventory by concentrating on metal dissolving resulted in an adequate supply of concentrated feed to the Recuplex columns. This, coupled with good performance of the equipment, resulted in a new recovery output record which was more than forty-two percent greater than that in any previous month.

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c. Uranium Reduction

Production of normal UO_3 was as scheduled. Production of enriched UO_3 was temporarily interrupted by the failure of a portion of the furnace elements in the G calciner. Processing of this material was transferred to the H calciner but a shortage of shipping containers resulted in curtailment of loadout and consequent failure to meet the production schedule. All shipping commitments were met in spite of the shortage.

3. Mechanical Performance

Plutonium preparation and plutonium fabrication equipment performed well this month requiring only routine maintenance and minor repairs.

Plutonium recovery equipment performed satisfactorily. The only major maintenance item was the replacement of the H-3 (stripping) column bellows. Numerous minor repairs continue to require excessive maintenance effort in this facility.

Several major equipment failures occurred in the Uranium Reduction Plant. Two pumps for the H-3 tank and one hammer mill required replacement. One of the bottom furnace elements of the G calciner failed and replacement is in progress at month end.

4. Radiation Experience

Radiation and contamination control statistics indicate general control to be satisfactory.

Film badge results covering the period from 7-14-61 through 8-10-61 for a laboratory employee indicated an exposure of 2100 mr. Investigation of her off-the-job activities and her on-plant activities revealed no source which could have caused the high film badge reading. Although the reading was thought to be erroneous, the exposure has been added to her record for 1961 on the basis that a conservative course of action seemed appropriate in this case.

Two incidents of internal deposition of plutonium were investigated. One involved a Minor Construction employee who received an estimated 10% of MPL during the removal of Hood 27 of the old RMA Fabrication Line. The other case involved a Process Operator who received an estimated 5% of MPL when a seal failed on a plastic bag containing plutonium powders.

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A new correction factor has been adopted for use with the CP (Cutie Pie) instrument. This change, which was instigated by FP0, Control Operation, will result in more accurate measurements for Z Plant work. The principal benefit will involve maintenance work where hand exposure is the controlling factor. Complete details of the change are reported in Document HW-70797, "Unclassified".

5. Analytical Experience

	<u>July</u>	<u>August</u>
Number of Samples Received	2,044	2,148
Number of Determinations	16,903	21,706
Total Metallic Impurities, Buttons	513 ppm	582 ppm
Total Carbon Content, Buttons	500 ppm	400 ppm
Buttons Rejected	3.0%	0.0%

A neutron counter for the determination of Pu^{240} content of buttons has been assembled. Calibration was in progress at month end so that Pu^{240} determinations could be established for buttons shipped in September.

W. J. Garton
Manager,
Finished Products

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CHEMICAL PROCESSING DEPARTMENT
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III. ACHIEVEMENTS (continued)

E. POWER AND GENERAL MAINTENANCE OPERATION

1. Operating Continuity

An electrical outage occurred on August 22 which limited raw-water pumping capacity at the 282-E Building (pump house and reservoir), to the extent that Purex operation could not be sustained. The outage was caused by lightning striking a power pole. Electrical difficulties were corrected and raw-water service returned to normal in approximately 30 minutes.

2. Inspection, Maintenance and Repair

Seven wooden burial boxes were fabricated for the Purex Facility, six of which were required for disposal of trap equipment currently being replaced. The remaining box was necessary for burial of 20 grossly contaminated pipe jumpers.

Two failed concentrator tube bundles were removed from the Purex Facility and buried without incident. These units weighed 7.5 tons each and were contained in a concrete burial box weighing an estimated 20 tons, for a gross weight of approximately 35 tons.

Burials performed for the Redox Facility included a box containing 20 first-cycle waste-stream jumpers from which radiation levels exceeded 1000 m/r per hour at 40 feet. The high radiation levels presented no particular difficulties, however, since a burial trench of new design was utilized, which enabled backfilling operations to be accomplished with a minimum of exposure to personnel.

Seventeen cell-block covers were removed from the 221-T Canyon, to provide additional work area for the Waste Handling and Decontamination Operation. The blocks were stored underground with bails protruding, in case a need developed for them at some future time.

Fabrication of a multipurpose dissolver for the Redox Facility is in progress. All required construction material has arrived on the plant site, and the vessel was an estimated 20 per cent complete at month's end.

Progress continued on the fabrication of a J-cell package designed for use in the continuous Birch recovery program at Purex. The package will house two critically safe solvent-extraction columns, two pulse generators, two storage tanks and a complex piping system.

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A new silver reactor for the removal of radioactive iodine from Purex off-gas was modified and made ready for installation.

Fabrication and installation of an environmental hood for the Hanford Laboratories Operation's 231-Z Facility was completed. The hood is designed for studying temperature effects on plutonium shapes.

A newly designed all-stainless-steel cartridge, containing 10 per cent free area, was assembled for use in the final uranium decontamination column (K-2) at the Purex Facility. The new unit will replace an existing 6 per cent free-area cartridge, which was installed in June 1961. The 6 per cent free-area unit had proved to be unstable and led to frequent column flooding.

Two 8' diameter by 22' high black-iron burial capsules were fabricated for use in disposing of two obsolete ruthenium caustic scrubbers (J-2 and H-5) from the Redox Plant.

Installation of three Purex Palm Samplers is again in progress, following a four weeks' delay for sampler-piping design changes. Included in the remaining work is the installation of sampler piping, completion of the sampler enclosures of concrete and heavy shielding, and installation of the hoods and Gilmont samplers.

A 16-gauge sheetmetal burial box was fabricated for use in disposing of the Redox H4-H5 vapor tower. This is a ruthenium-laden tower, which requires special handling. The tower will be housed in the sheetmetal box, which in turn will be placed in a concrete box for burial.

Progress continued on the installation of a hydrofluoric-treatment column and associated equipment in the solvent extraction hood in the Finished Products Operation's Recuplex Facility. Work was an estimated 80 per cent complete at month's end.

Four army ammunition bunkers were outfitted with banks of high-efficiency air filters, in order to make the bunkers useable for plutonium waste storage.

Extensive alterations of the closure seals on the new second HAPO Type II Cask were completed. The original seals were "Snap-Tite" fittings, which tended to leak on the first HAPO I and II Casks. The new fittings are miniature blank connectors designed for positive sealing. The casks are used for Strontium shipments to Oak Ridge.

Twenty-nine pipe jumpers were fabricated, of which 26 were for the Purex Facility. Nine of the Purex jumpers were for replacement of the concentrator steam-trap system with in-canyon jumpers containing DOV's for condensate control; eight were for the formaldehyde project; three for diversion-box changes; two for the Palm Project; and the remaining four for normal replacement. The three Redox jumpers were for normal replacement.

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A portable shielded enclosure was constructed for the radiation protection of the operator of the Purex Tank Farm gantry crane. The enclosure consisted of 1/2" lead shielding all around, with a water-filled window for viewing.

Eight evacuation buses were declared in excess of Department needs and returned to the Transportation and Maintenance Operation. Average annual costs chargeable to the Chemical Processing Department were \$1,150 per bus. Thus, an appreciable savings will be realized. The excessing of these buses will not hamper the Department's evacuation program, as the 25 remaining buses and available project automotive equipment are considered adequate to meet any emergency.

T. E. LaSalle

Manager
Power & General Maintenance

TGL:ap

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

August, 1961

II. ACHIEVEMENTS (continued)

F. FACILITIES ENGINEERING OPERATION

1. Purex

a. Process Design & Development Engineering

Concentrator Condensate Disposal

The new diaphragm-operated control valves are being received. They will provide steam condensate removal service from the tube bundles of all five major Purex concentrators. Jumpers are now being fabricated for condensate disposal from both tube bundles on H-4 and one bundle each on F-6 and F-11 concentrator.

High-level Wastes

Engineering for the 241-AX Tank Farm included determination of scale factors for designing a model waste tank system dynamically and geometrically similar to existing and proposed high-level waste tank systems. Design of the model system was completed and a work order issued for construction of the model to be used to define the tank and circulator geometry for the 241-AX Tank Farm.

Product Monitor - LBXP Stream

The neutron counter was placed in operation, following moisture sealing and detector replacement. Although the detector and electronic equipment now appear to be operating properly, there is an unexpected slow cycling of the count rate. Study of the monitor is continuing.

b. Project Engineering

CGC-821 - Project Palm - Purex

Fabrication of the J-Cell package was started in CPD shops on August 24. A re-estimate of total project cost indicated the total cost would exceed the project authorization

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funds, and a project proposal revision requesting a \$175,000 increase in authorized funds has been prepared. The award of the fixed-price contract for the construction of the purification facilities has been deferred until additional funds can be authorized.

CAC-925 - 216 Crib Replacement (Purex)

Construction of the crib was completed by the fixed-price contractor on August 9. Tie-in to the existing waste lines was made August 25.

c. Manufacturing Engineering

Sealing of Trap Pit Cover Blocks

Evaluation was completed on alternate applications for sealing the joint openings in the Purex trap pit cover blocks. A liquid neoprene into which a muslin strip is embedded was applied to the trap pit covers.

Centrifuge Lubrication

Lubricating oils for Purex centrifuges are being tested at 272-E Mockup Building. The Union Carbide 1800XY-26 appears to be the best for centrifuge service at the temperatures reached in fission product processing. Radiation tests are also being made on these lubricants.

Titanium Tube Bundles

Invitations to bid have been issued for the fabrication of a titanium bundle made to H-4 design and two titanium bundles for F-6 and F-11 service. Design and fabrication are requested for the latter two.

2. Special Separations Processing

a. Process Design & Development Engineering

In-line Plutonium Monitor

Designs for the installation of detectors were worked out for in-line neutron monitors on the 233-S ion exchange equipment. This information is now being used in detail design.

High-level Waste - Leak Detection

The three-inch diameter air tube for the pneumatic air system was installed and test runs completed at the 113-SX

caisson. The entire length of the tube and 90° bend (180 linear feet) was installed in about an hour without difficulty. The three-inch carrier was sent and retrieved from ground level to the far end of the tube without hanging up.

b. Project Engineering

CGC-913 - Project Birch - Redox

Detail design has been completed. A work authorization was issued to construct the underground lines and partitions for the instrument room in the 233-S Building. A re-estimate based on 100 percent detail design is being prepared.

CGC-921 - Railroad Tunnel Airlock and Decontamination Facilities - Redox

A project proposal requesting installation of a railroad tunnel airlock and well car decontamination facility at Redox was transmitted to HOO-AEC on August 7, 1961.

3. Finished Products

a. Process Design & Development Engineering

Incinerator

A chopper feed hopper has been designed to improve the control conditions in the chopping hood. A prototype ash discharge valve has been installed on the off-gas cyclones for test and evaluation. A design has been completed for final installation. Critically-safe vacuum cleaners are being purchased for the sorting glove box, pulverizer glove box, and the canning glove box. Design is continuing on equipment to prevent back-fire on the incinerator belt.

Fabrication Line Tooling

Tooling for the 45 model is complete and much of it has been successfully tested on stand-in material. The prototype Floturn machine, temporarily installed in 272-W Building, was successfully test-operated by a vendor service engineer. Several ingot molds of tantalum were floturned, using HAP0-produced tooling. Design of a hood for installation of this machine in RMA has been started.

Flange Sealing Techniques

Techniques for flange sealing have been started for varying

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operating conditions including use of carbon tetrachlorides, tributyl phosphate, and for thermally "hot" aqueous solutions. A hydraulic pressure test was made on the test facility. The "O" ring gaskets held without leakage for all pressures up to 200 psig. Flange sealing techniques were determined to give positive contamination control when using fluorescent powders as a stand-in for contamination.

Button Neutron Monitor

The design of a portable counting chamber assembly was completed, and the drawings are out for bid on fabrication. To permit interim study work on isotope ratio measurements, electronic equipment was assembled and supplied for use with an old laboratory cask.

CGC-944 - Metal Control Facility - 234-5 Building

A preliminary project proposal requesting design funds for a facility to meet the new quality specifications was transmitted to HOO-AEC on August 25, 1961.

4. General

a. Process Design and Development Engineering

High-level Wastes

Core drilling methods and costs have been completed for obtaining and testing contamination concrete specimens from the domes of radioactive waste storage tanks. It has been estimated that \$60,000 will be required to complete the program.

Fission Product Storage

The Hot Semiworks and Purex are being studied as possible locations for a storage facility for purified strontium-90 in quantities up to two megacuries.

b. Project Engineering

CAC-943 - New Separations Plant - Design

A project proposal requesting authorization of preliminary engineering and Title I design associated with a new separations plant was transmitted to HOO-AEC on August 21, 1961.

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c. Manufacturing Engineering

Burial Box Construction

Construction and leak testing were essentially completed on five concrete burial boxes, the first to be built by a fixed-price contractor. Bids are being obtained for construction of a concrete box for burial of jumpers now stored in Purex Plant Diversion Boxes. A fair-cost estimate is being obtained for fixed-price construction of a large wooden box for storage of a Purex K-2 Column.

Manager - Facilities Engineering
2704-E Building - 200-E Area

HP Shaw/WWC/alr

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

AUGUST, 1961

II. ACHIEVEMENTS (Continued)

G. RESEARCH AND ENGINEERING OPERATION

1. Purex Process Technology - D. J. [REDACTED]

a. Solvent Extraction

Except for several brief periods of unstable operation which followed startups after power outages, the overall solvent extraction uranium decontamination performance was excellent. However, because of column flooding, during the startup periods, six per cent of the uranium product was not suitable for silica gel treatment and was reprocessed through the Final Uranium Cycle prior to month end. Uranium product gamma ratios ranged from 2.7 to 6.5 after solvent extraction but were reduced to $\frac{1}{2}$ 2.0 by silica gel treatment.

Low overall plutonium decontamination, two to four fold below normal, was partially due to poor 2A Column decontamination performance plus radioactive solids in the plutonium product. (The solids have been tentatively identified as resin fines from the Plutonium Ion Exchange Unit.) The majority of the plutonium product batches ranged from 1 to 4×10^{-11} ZrNb/AT with an average of 2.9×10^{-11} .

A high concentration plutonium and uranium solution, which had been previously removed from the Backcycle Waste System (3WB) and refluxed 21 days after being stored for several months, was successfully reworked when blended 1:15 with virgin uranium feed. A slight "tonic" effect was noted in the form of improved decontamination, but no adverse process effect was apparent when the rework heel was repeatedly diluted with 12 M HNO_3 and the dilution processed.

Plutonium losses via the HA Column effluent (HAW) were generally 0.1 per cent or less. The plutonium concentration of the IBX Column organic effluent doubled (to 0.8 per cent) following a rate increase from $\text{CF} = 3.0$ to $\text{CF} = 3.3$ but was reduced to 0.6 per cent by a small increase in the IBX Column L/V. The 2A Column effluent (2AW) plutonium recycle rose two-fold higher than normal (1.5 - 2.0 per cent), but was controlled by small increases in the 2AF acidity and 2AX flows.

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Although the decontamination performance of the 2D Column six per cent free area, nozzle plate scrub section cartridge was satisfactory, the column flooded during each startup despite efforts to prevent it. Thus, during the plant shutdown, the cartridge was replaced with a ten per cent free area, nozzle plate cartridge designed to improve the operating stability of the column.

b. Neptunium Recovery

Neptunium accumulation in the Backcycle Waste (3WB) System was normal during the uranium processing period with 85 per cent of the neptunium in the uranium feed retained in the system. For two brief periods associated with 2D Column flooding, the instantaneous neptunium loss to the uranium product was extremely high (>100 per cent of the neptunium in virgin feed).

After plant shutdown, a neptunium isolation and decontamination run was made utilizing the standard hydrazine-ferrous sulfamate flowsheet. Ninety-two per cent of the accumulated neptunium in the system was decontaminated and loaded out for purification.

c. Plutonium Concentration

Out-of-specification plutonium continued to be reworked through the Plutonium Ion Exchange Unit without abnormal plutonium recycle in the XA Column effluent. For the most part no chemical adjustment was required to convert the PuVI to PuIV because samples indicated essentially all the PuVI initially present at the time of loadout had self-reduced to PuIV. Eight weeks had elapsed since the cans were loaded out. One can containing 22 per cent PuVI reworked satisfactorily following a valence adjustment (PuVI $\rightarrow$ PuIV) with ferrous sulfamate.

A noticeable decrease in ion exchange decontamination was observed near the latter part of the run period. Investigations showed the presence of solids which were identified as resin particles in the plutonium product. The gamma activity of the solids was a factor of twenty greater than that of the solution. Possible routes for resin to enter the plutonium product are currently being investigated.

d. Waste Treatment and Acid Recovery

Waste volumes sent to underground storage tanks averaged 68, 598, and 87 gallons per ton of uranium processed for neutralized high level waste (IWW), solvent washes (OWW) and cell drainage, respectively.

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While the capacity of the No. 2 Waste Concentrator remained constant at a restricted 75 per cent of the normal capacity, the capacity of the No. 1 Waste Concentrator slowly dropped during the entire run period until it reached 50 per cent of normal capacity. As yet the reason for this reduction in capacity is unknown. Laboratory tests on a sample of the concentrated waste (IWW) produced no foaming, although recovered acid showed a slight foaming tendency.

Two attempts to sample the twenty inches of hard sludge in the bottom of Tank 241-A-103, failed when the sample tube (one-inch double extra strong pipe) broke at the point it was threaded into the push rod. Indications are that in each attempt the sample tube entered the sludge at an angle and broke as the pressure was applied by the hydraulic ram. Currently, the use of a rotary-type core sampler is being investigated.

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2. Redox Process Technology - [REDACTED]

a. Dissolution

Although operation of the Mark V multipurpose dissolver has been generally satisfactory since its installation, the problem of rapid evolution of non-condensable gases during the heating period at the start of a cut, which caused loss of dissolver vacuum and decreased silver reactor temperature, has been of some concern. A modified dissolution procedure, adopted early in the month, which added 400 pounds per hour of low-pressure steam (35 psig) to the dissolver vapor space during the heating of the dissolver contents from 60 C to 102 C, has successfully corrected both of the above conditions. It is now possible to bring the dissolver contents to boiling without the danger of vessel pressurization. Also, maintenance of a uniform silver reactor inlet temperature will insure better radio-iodine control.

b. Neptunium Recovery

The present concept of the ultimate Redox neptunium recovery flowsheet (Project CGC-913) includes the use of the HS Column as a "bottle" column by which the neptunium will be removed either continuously or batchwise, from the internal accumulation and recycle stream (D-14) without interfering with normal plant operation. This concept was successfully demonstrated, on a test basis, during June, 1961. However, two additional test runs, made during July and August, 1961, were unsuccessful. The test made during July lasted for six hours and "bottled" only 10 per cent of the available neptunium, or about 20 per cent of that in the first test. It is believed that much of the reduced and "bottled" neptunium was re-oxidized by dichromate ion extracted from the feed stream, and was lost from the column with the organic waste stream. The duration of the test run made this month was reduced to two hours to prevent loss of "bottled" neptunium in this manner; however, this run was even less successful because the reducing stream was introduced into that portion of the column containing the solution which had been oxidized. Further tests will be made introducing the reducing stream into the top of the column via the chemical addition line, and will be aimed at determining the effect of run duration and acid concentration on "bottling" neptunium, as well as demonstration of successful technique.

c. Plutonium Concentration

During February, 1961, the stainless steel plutonium concentrator tower (L-3) was found to be the source of the high iron, chromium, and nickel concentrations found in the final plutonium product stream (L-6). At the end of last month a new de-entrainment tower made of titanium, and containing a tantalum demister section, was installed as a replacement for the stainless steel unit. The impurities in the L-6 plutonium nitrate solution were markedly reduced during August, with iron

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averaging only 1250 parts per million parts of plutonium, a factor of 10 below both current process specifications and the former impurity level in the product stream.

d. Tail-End Treatment

The tower of the ozone sparge vessel (E-13) was removed late in July and a new larger capacity vent jet was installed. Operation during August has been very satisfactory and has allowed an increase in solution temperature together with a 30 percent increase in the ozone sparge rate. Not enough data are available, as yet, to allow evaluation of performance, but an increase in processing capacity is indicated.

e. Waste Storage

Pumping of the 114-SX waste storage tank contents (Sp.Gr. 1.57 at 191 F) to the 103-SX tank was begun on August 21. This was the first attempt to pump waste of this concentration from any 241-SX waste storage farm tank. Although the approximately 900 feet of 3-inch diameter transfer was started, the transfer was stopped after two hours when the line plugged with frozen solution. At this point, 12,000 gallons of waste had been transferred. After removal of the flexible jumper joining the lines from the 114-SX and 103-SX tanks in the 252-SX transfer box, the plug was easily dissolved with warm water.

All work in the Chemical Processing Department shops on the sludge core sampler being built to sample the sludge in the 108-SX tank was stopped pending evaluation of a proposed core drilling sampler to be supplied by a commercial concern and tested in the Hanford Laboratories Operation during the coming month.

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3. Finished Products Chemical Technology -

a. Uranium Reduction Operation

The electric furnace of one continuous calciner (G Cell) failed when sand from the shell-to-furnace seal sifted into the furnace and insulated a portion of one heating element. The temperature at that point became sufficiently high to melt the element. The remaining eight heating elements appeared to be in excellent condition. Furnace repairs, which will include an improved seal between furnace sections, are under way. This was the first furnace failure since startup during late 1956.

b. Metal Finishing Operation

1. Recuplex

The installation and preliminary cold testing of the prototype dissolver for continuous dissolution of slag and crucible material has been completed. Actual dissolution tests were initiated at month-end; however, performance data are not yet available.

Performance with the new flow sheet, designed to process only high-concentration plutonium feeds, continued to be excellent, with total output approximating 26 times that of the nominal design rate. Operation on this flow sheet requires backlogging the dilute feeds (slag and crucible, difficult to dissolve materials, etc.) for recovery at a later date at low throughput rates.

2. Tasks I, II, and III

Production rate tests for Tasks I and II (precipitation through hydrofluorination) continued during the month with tests being made at rates up to 2500 grams of plutonium per hour. Performance to date has been satisfactory. At rates ranging from 1700 to 2500 grams of plutonium per hour with feed concentrations ranging from 115 to 185 grams plutonium per liter, the filtrate contained approximately 0.2 percent of the feed plutonium.

A test to determine the value of compacting reduction charges, with vibrations, prior to firing was completed. No significant change in process performance or metal purity was detected.

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4. Finished Products Fabrication Technology -

a. GE 312 Computer Test

The replacement typewriter was received on August 9, 1961, and immediately placed on line for testing. After about one day, it was discovered that the original difficulty was not strictly in the typewriter, but partly in it, and partly in the output circuitry from the computer main frame. The faulty boards and relays were replaced and operability was restored. Some mechanical difficulties were corrected on the typewriter carriage and since that time the typewriter performance has been good.

Reliability of the overall input-output system is still not as good as it should be. Intermittent and frequent failures of the high speed punch and reader have made program debugging difficult, if not impossible, at times.

In spite of this, progress has been good and on line testing of the system by October 1, looks feasible, providing the current equipment problems are corrected, and reliability is increased.

At one point during the month it appeared that a fourth compilation would be required to rearrange the memory areas to make room for debugging patches. Elimination of some redundant sections made this unnecessary in the immediate future, however, it may be desirable to do so before going on line or sometime thereafter. The present arrangement is not optimum from the standpoint of flexibility between memory areas but appears to be good enough to finish debugging.

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5. Process Chemistry -

a. Purex Process Assistance1. Commercial Magnesium for Purex Solvent Washing

Two commercial sources of magnesium compounds were tested for use in the $Mg(OH)_2$ solvent washing procedure. Magnesium hydroxide slurries were prepared from the test samples and Zr, Nb decontamination tests were carried out using plant unwashed solvent (1CW). Decontamination using the commercial products was comparable to that obtained with reagent grade material.

2. Evaporation of Organic Wash Solutions

Laboratory work in support of the proposed use of the 242-T Evaporator for the concentration of Purex organic wash solutions (OWW) has been completed. The rate at which the evaporation can be carried out was found to be governed by foaming conditions and the extent to which these can be controlled. When the organic, normally associated with the OWW (about 5 vol.%), is present during concentration foaming occurs. In this case, foaming can be controlled by air sparging at a high rate, reducing heat input, or a combination of the two. However, when the organic concentration is maintained at 2-3 vol.% in the concentrator feed solution, foaming is negligible and the evaporation can be carried out at maximum heat input. When there is no free organic, severe foaming occurs requiring a one-third reduction in heat input to control the evaporation.

b. Redox Process Assistance1. Sodium Nitrate Salting

The current Redox acid pre-cycle introduces sufficient sodium nitrate into the process so that its contribution as a salting agent must be considered. Distribution coefficients for uranyl nitrate and nitric acid were determined between hexone and aqueous sodium nitrate - aluminum nitrate salt solutions. These data are reported in HW-70847 by C. A. Colvin and R. S. Strong.

c. Neptunium Purification

Three reject elements from PMO containing an estimated 113.9 grams of neptunium were dissolved in nitric acid using mercury as a catalyst and will be reprocessed with the next run.

Attempts to dissolve the ruthenium contaminated anion resin (Dowex 21K) in the primary ion exchange column in the 222-S Building ion exchange facility were unsuccessful. Mixtures of hot nitric acid and either manganous ion or permanganate ion were tried. Approximately half of

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the resin was dissolved and washed from the column; the remainder was softened, but had to be removed from by column by removing the top plate and dumping the column. Contaminated resin could be removed from an ion exchange column by degrading the resin with hot acid and permanganate and flushing the degraded resin through a large dump valve located near the bottom of the column.

d. Analytical Assistance

1. X-ray Fluorescence

The X-ray spectrometer has been set up to handle liquid samples. The liquid system has been used successfully for determining lead in synthetic fission product feed solutions and thorium in neptunium nitrate solutions.

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6. 234-5 Development - [REDACTED]

a. Direct Calcination Of Plutonium Nitrate

A redesign of the calciner is under way, aimed at minimizing the entrainment problem.

Entrainment from the present model remained severe, despite changes in the agitator blade clearance, increased vapor space above the bed, and increased sulfate to plutonium ratio. A mock-up of a vertical calciner shows promise and this concept is being followed up.

b. Neutron Emission From Fluoride And Chloride Compounds

Precise remeasurements show that the neutron emission rate from plutonium tetrafluoride is 43 times that from plutonium trichloride.

c. Electrolytic Reduction Of Plutonium Trichloride

Two runs in a redesigned cell showed negligible corrosion. The formation of unidentified black solids is causing increased difficulty.

A new cell configuration under test uses an external weir dam with no internal riser or vent tube. A tantalum cathode was used. In the two runs in which metal formed, 594 g of plutonium were produced. The absence of corrosion is significant. However, the geometry results in a much less severe test than in the standard cell.

Black solids have formed in recent runs, which result in plugging or electrical shorts. These are thought to be finely-dispersed plutonium metal fog, stabilized by an oxide film. A run was made with a specially-purified melt containing magnesium fluoride. This salt should tend to dissolve the oxide film. The run was completed successfully although observation of the cell contents still showed some black solids. Analytical efforts are under way.

d. Dissolution Of Plutonium Metal Turnings

Turnings dissolution rates held up at over four grams per minute in one liter of solution ranging above 200 g/l Pu.

Integral dissolution tests employed 10 M HNO_3 - 0.5 M HF. Clean turnings dissolved in less than one liter of solution with some foaming. Aged turnings did not foam but resulted in some undissolved oxide. Product concentration in this case varied up to

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165 g/l. For continuous operation, conditions are sought which will minimize metal holdup or oxide formation.

e. Pyrochemical Recovery

An equilibrium constant of 0.6 was measured for the reaction
 $3\text{MgCl}_2 + 2\text{Pu} = 2\text{PuCl}_3 + 3\text{Mg}$.

A plutonium button was dissolved in magnesium chloride for this test. Steady-state was reached at 58 weight percent PuCl_3 after one hour at 920 C. The solution was stirred throughout. The reaction can be displaced to the right by volatilizing magnesium.

f. Incinerator Scrubber Solution Process

Filter media were demonstrated which result in a clear filtrate.

Use of "Dicalite 4200" or filter pulp will permit the scrubber solution to be filtered. Using the average rate for filter pulp, the 180 liters of scrubber solution could be filtered through a 10-inch diameter cake in 12 minutes. The cake can be recycled through the incinerator. The clear filtrate then can be cribbed or processed with sump water.

R. E. Tomlinson

Acting Manager
Research and Engineering

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

AUGUST, 1961

II. ACHIEVEMENTS (Continued)

H. FINANCIAL OPERATION

1. Production Cost

Special analyses and studies were conducted during the month and requested information forwarded to AEC Finance and Production Divisions as follows.

- a) Itemization of depreciation for proposed Pu Reclamation Facility as discussed in a July 17 Germantown meeting.
- b) Maintenance history of the Recuplex Operation from FY 1958 through present date and estimated maintenance costs from the present date through FY 1964 on the basis: (1) a 12 to 18 month delay of a new HAPO Reclamation Facility and (2) that there will be no delay.
- c) Facilities and packaging required for offsite shipment of scrap assuming that a Pu Reclamation Facility will be constructed.
- d) Total costs which would be incurred if construction of a new Pu Reclamation Facility were to be delayed 12 to 18 months.
- e) Unit and total prices for Fission Products to be shipped to Oak Ridge during the remainder of FY 1962.
- f) Fission Products cost data for FY 1961 and 1962 was furnished Research & Engineering Operation for use in a Washington meeting.
- g) Revised and issued document number HW-70589, "Estimated Pu Scrap Recovery Costs," relating to Pu recovery resulting from operation of a new Recuplex Facility to be completed in FY 1964.

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Approval was received from the AEC to start plant maintenance work budgeted for FY 1962 on Silo Light Modifications - Redox (\$75,000) and Trap Pit Modifications - Purex (\$150,000).

A contingency maintenance request was submitted for improvement of the Redox Crane Maintenance Platform (\$22,000).

An approval letter was prepared and forwarded for the signatures of CPD and HAPO General Managers in regard to the "Submerged Combustion Prototype (\$200,000). At the request of Mr. W. E. Johnson this prototype is currently undergoing a "hazards review."

CPD's investment in inventories at July 31, 1961, compared with budgeted balances at that date, are shown below:

(amounts in thousands)	<u>Balance 7-31-61</u>	<u>Control Allocation</u>	<u>Surplus (Deficit)</u>
<u>Inventories</u>			
Essential Materials	\$ 799	\$ 760	\$(39)
Spare Parts & Standby	1 732	1 738	6
Special Materials	104	65	(39)
Gross Inventories	<u>2 635</u>	<u>2 563</u>	<u>(72)</u>
<u>Reserves</u>			
Essential Materials	56	60	(4)
Spare Parts & Standby	<u>452</u>	<u>435</u>	<u>17</u>
Total Reserves	<u>508</u>	<u>495</u>	<u>13</u>
<u>Net Investment</u>	<u>\$2 127</u>	<u>\$2 068</u>	<u>\$(59)</u>

Note - Control allocation represents FY 1962 Revised Budget as the Commission has not yet established an inventory Financial Plan.

2. General Accounting

As of July 31, 1961, twelve active projects had incurred costs of \$5,581,424 against authorized funds of \$11,158,000. Outstanding commitments totalled \$712,911.

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There were no projects closed nor new projects authorized in August.

Six Appropriation Requests, totaling \$64,420, were approved in August. These were

26003	Grinding Equipment	Fin.Prod.	\$35,000
26008	Solution Storage Hood	R&EO	14,000
61-CPD-46			
Supp.#1	H-5 Off Gas Filter	Redox	5,000
26005	Controlled Potential Coulometer	Purex	4,900
26010	S/S Glove Box Sample Preparation	R&EO	3,100
26009	Hewlett Packard Printer	Purex	2,420

Physical inventory of "B" plant installed equipment was started August 25, 1961. This represents the first of CPD standby facilities to be inventoried under the current program to inventory all HAPD installed property. The inventory of CPD installed property, except standby facilities, was completed earlier this year.

Manager - Finance

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

AUGUST--1961

II. ACHIEVEMENTS (continued)

I. RELATIONS PRACTICES OPERATION

1. Salary Administration

The Relations Section of the Chemical Processing Department is being dissolved, effective September 1, 1961. Functions previously performed by this Section on a centralized basis for the Department are being reassigned to operating components.

Two new exempt positions were established in the monitoring function of the Special Separations Processing and Auxiliaries Operation.

Revaluation studies of three positions were completed. The current level was substantiated for one position and further revision of the position guides for the remaining two positions was recommended.

A review of the salaries of those Tech Grad personnel that have been added to the CPD roll since the last general salary review was completed and recommendations made to the appropriate managers. Appropriate salary adjustment plans were made.

Approximately forty-five revised position guides were reviewed and evaluated in connection with the program to review and up-date the department's exempt position guides. Except for those positions that are in process of revision by association with organization restructuring, the program was essentially completed.

2. Personnel Placement

An offer was extended to a chemist for an assignment in the Finished Products Operation Control Laboratory. Acceptances were received from the two offers made last month--one to a chemist for Redox, the other to an engineer for the Purex Section.

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The first of the Craft trainees assigned to the Craft type personnel Training Program were assigned to the Chemical Processing Department [REDACTED] that all 10 assignments in the Chemical Processing Department will be filled by the middle of September. These trainees will be assigned, for cost purposes, to the individual sections and will count in each section's manpower ceiling.

Two qualified Instrument Technicians who are on layoff status from the Flight Propulsion Division in Cincinnati have indicated an interest in employment at HAPCO. Special approval from the AEC has been requested for the payment of moving expenses for these two people, and offers to them were extended during the month.

A forecast of Technical Graduate Requirements for the Chemical Processing Department for fiscal year 1963-1964 was submitted to the Hanford Laboratories Operation. The forecast included total requirements for both rotational assignments and expected permanent placements.

3. Wage and Benefits

An Instrument Technician from Special Separations Processing and Auxiliaries, retired during the month.

Retirement papers were completed for one Chemical Analyst who retires next month and preliminary preparations made for one Chief Power Operator who has elected to take optional retirement next month.

Arrangements were made for the distribution of fifteen-year service pins for 403 CPD Employees who complete 15 years of GE service on September 1, 1961. Also, one employee, a Sheetmetal Journeyman in Shops Operation will receive a Quarter-century pin for completion of 25 years GE service on September 29, 1961.

Two job descriptions for new clerical jobs were reviewed and evaluated. One of the new jobs was established by Research and Engineering in the Finished Products Fabrication Technology Operation. The other description, for a job in Financial Production Cost Operation, was sufficiently similar to an existing job that the new description was not required. The additional person was, therefore, assigned the existing job description.

Tuition refunds were processed for twelve employees who completed courses at the University of Washington Center for Graduate Study during the spring quarter.

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Suggestion submissions returned to near-normal due to activity in the Purex Section. Purex more than doubled their normal monthly figure. Activity in other components remained considerably below normal.

4. Health, Safety, and Radiation

A heavy equipment operator was fatally injured on August 14, 1961. As a result of premature removal of the boomer chain from a D-8 caterpillar tractor lashed to the deck of a transport trailer, the tractor rolled backward, crushing the employee under the tractor draw bar as the unit fell to the ground.

While cutting $\frac{1}{2}$ " stainless steel plate on a Do-All saw, an employee sustained a corneal burn to his left eye. A metal chip bounced off the saw table and flew under the face shield (laboratory type) and safety spectacles he was wearing.

An uncontrolled spread of contamination occurred on August 16, 1961, in 234-5 Building during Minor Construction removal of hood 27 from the RMA line.

Two Facilities Engineering personnel received exposures in excess of HAP0 operational controls during final inspection of tie lines to the A-31 waste solvent crib at Purex. The dose rate had changed from known previous conditions because of premature and unauthorized use of the new crib.

5. Communication

The Communication Office provided the movie shooting script and direction for a safety movie which was made during the month. The movie was based on the safety experiences of three CPD employees, which were earlier determined to be the winners of the "It Happened To ME -- It Could Happen To You" safety contest.

Two news releases were prepared for the local and regional press. These included one concerning the fatality and the other concerning the contamination incident in the 234-5 Building.

Work was started during the month on a write-up concerning CPD's Fission Product business. The material will be put into form suitable for distribution to all Department monthly salaried employees.

RB Britton
Manager
Relations Practices

RB Britton

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CHEMICAL PROCESSING DEPARTMENT
Monthly Report

August - 1961

III. PERSONNEL ACTIVITIES

A. FORCE SUMMARY

<u>Operation</u>	<u>Monthly Salaried</u>		<u>Weekly Salaried</u>		<u>Total</u>	
	<u>7-31-61</u>	<u>8-31-61</u>	<u>7-31-61</u>	<u>8-31-61</u>	<u>7-31-61</u>	<u>8-31-61</u>
General Manager's Group	11	10	1	1	12	11
Financial	13	13	13	12	26	25
Relations Practices	5	5	5	6	10	11
Research & Engineering	64	64	27	27	91	91
Facilities Engineering	68	68	23	23	91	91
Power and General Maintenance	38	37	243	242	281	279
Production	5	4	3	3	8	7
Special Separation Processing and Auxiliaries	49	49	213	211	262	260
Purex	56	57	215	219	271	276
Finished Products	<u>54</u>	<u>54</u>	<u>245</u>	<u>249</u>	<u>299</u>	<u>303</u>
Total	<u>363</u>	<u>361</u>	<u>988</u>	<u>993</u>	<u>1 351</u>	<u>1 354</u>

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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>		
I. N. Taylor A. E. Smith W. J. Gartin	Lawrence Radiation Lab. Livermore, Calif.	Plutonium Metallurgy Conference. (8/22-24/61)
D. R. Gustavson B. F. Judson	U.S. AEC Germantown, Md.	Fission Product Program. (8/28-30/61)
<u>To Conventions & General Meetings</u>		
M. K. Harmon	APED, Palo Alto, Calif.	Manufacturing Engineering Seminar. (8/1-2/61)

D. VISITORS

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From Other G.E. Components</u>		
H. A. Torchia	Computer Dept. Phoenix, Ariz.	Computer routines. (8/28-9/4/61)
<u>From AEC and Other AEC Contractors</u>		
John R. Horan	AEC, Idaho Falls, Ida.	Purex Plant Tour. (8/11/61)
John Ruch	AEC, ORNL Oak Ridge, Tenn.	Purex Plant Orientation. (8/22/61)
Paul Verdow	U.S. AEC Washington, D.C.	Purex Plant Orientation. (8/22/61)
<u>From General Industry</u>		
F. G. Seeberger G. Salmon	Texas Instrument Co. Houston, Texas	Liquid level control. (8/3/61)
H. Paul Berner	Star Machinery Co.	Assemble & demonstrate proper operation of newly acquired equipment. (8/8/61)
Donald I. Lettermore	Grayco	" " "
T. H. Kelley	Lodge & Shipley Co. Cincinnati, Ohio	Flo-Turn Machine Startup (8/17-24/61)

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Visitor

From

Nature of Discussion

From Colleges & Universities

George Watt

Univ. of Texas
Houston, Texas

Purex Process.
(8/24/61)

From Other Government Agencies

Capt. R. Rentschler

USAF, Washington, D.C.

Purex Plant Tour
(8/17/61)

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IV. SAFETY AND SECURITY

Operation	Facil. Eng.	Finance	Fin. Prod.	P&GM	Purex	SSP&AO	Prod.	Rel. Prac.	Res.& Eng.	Total CPD	Yr.to Date
Disabling Injuries				1*						1	1
Serious Accidents				1**						1	5
Medical Treatment											
Injuries											
Radiation Occur.			11	29	9	17			2	68	364
Contam. Wounds			5		10	3			1	19	150
Pu Depositions			2		1***	1***				2	16
Fires					1					3****	6
Security Violations					1	1				1*****	8
										1	6

* A heavy-equipment operator was fatally injured when a D-8 caterpillar rolled backwards off a truck. In an attempt to set the brakes of the caterpillar, the operator slipped and fell; he was crushed in the chest area by the bar hitch of the machine. Death was instantaneous.

** An employee received a burn over the cornea of an eye when a piece of hot metal bounced from a table (under a face mask and safety glasses) into the eye. The injury was not disabling.

*** An employee received a puncture wound when he dropped a wrench to the floor. In reaching for the wrench, he came in contact with a contaminated object puncturing three pairs of gloves. Maximum contamination of the wound area was 1,000 d/m. The wound was decontaminated to less than 500 d/m.

A woman was cutting plastic from a contaminated poppy probe with a pair of contaminated scissors when she pierced her surgical gloves. There was no detectable contamination in the wound or blood smears.

**** During the month of August, Chemical Processing Department was charged with three plutonium depositions. Maximum permissible body burden was less than one per cent in two of the cases, and in the third--MPB was less than two per cent.

***** Employees were melting paraffin in a dish when it ignited. Damage was \$12.

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V. REPORTS

A. PREPARED AND ISSUED

- HW-69829 9, Secret, "81-C Stability - 7-26-61 to 8-2-61" dated 8-7-61, by A. E. Smith.
- HW-69829 10, Secret, "81-C Stability - 8-3-61 to 8-15-61," dated 8-16-61, by A. E. Smith.
- HW-69829 11, Secret, "81-C Stability - 8-16-61 to 8-22-61," dated 8-23-61, by A. E. Smith.
- HW-70138 Secret, Preliminary Project Proposal - CGC-944- "Metal Control Facility - 234-5 Building" - dated 8-14-61, by D. W. McKee.
- HW-70588 Secret, "Chemical Processing Department Monthly Report- July 1961," dated 8-21-61, by Operations Managers.
- HW-70642 Secret, "Analysis of SRL Purified Neptunium Nitrate Standard," dated 8-3-61, by R. A. Schneider.
- HW-70644 Secret, "Purex Plant Production Schedule - August 1961," dated 8-7-61, by D. McDonald.
- HW-70645 Secret, "Redox Plant Production Schedule - August 1961," dated 8-7-61, by D. McDonald.
- HW-70646 Secret, "UO₃ Plant Production Schedule - August 1961, dated 8-7-61, by D. McDonald.
- HW-70647 Secret, "234-5 Plant Production Schedule - August 1961," dated 8-7-61, by D. McDonald.
- HW-70680 Unclassified, "Performance and Fabrication Criteria of a Titanium Reboiler for F-6 and F-11 Purex Concentrators," dated 8-8-61, by W. H. Koontz and L. L. Zahn.

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- HW-70718 Confidential, "Redox Test Program - July through December, 1961," dated 8-14-61, by M. K. Harmon.
- HW-70724 Secret, "Trip Report - Nuclear Safety Discussions at SRL, ORNL, ORGDP, Y-12, LASL, and RFP," dated 8-14-61, by R. E. Isaacson.
- HW-70726 Unclassified, "Cost Model of Steam Generation in the 200 Areas," dated 8-15-61, by A. C. Morgenthauer.
- HW-70728 Secret, "Measurement Procedures for Purified Birch," dated 8-14-61, by J. S. Buckingham.
- HW-70731 Secret, "Returned Plutonium Buttons," dated 8-15-61, by J. H. Warren.
- HW-70739 Secret, "Neutron Multiplication Measurements in the Hood 20 Casting Furnace," dated August 15, 1961, by R. B. Chitwood, E. D. Clayton, R. E. Isaacson, E. G. Pierick, R. L. Stevenson.
- HW-70750 Secret, "Progress Report - Finished Products Fabrication Technology Operation, July 1961 - August 15, 1961," by Members of the FFFTO, R&E.
- HW-70792 Unclassified, "Plutonium Recovery from Contaminated Materials - Project CGC-813, 232-Z Building, 200-W Area - FINISHED PRODUCTS CHEMICAL TECHNOLOGY - Neutron Monitoring Investigation," dated 8-23-61 by C. G. Wills.
- HW-70813 RD Secret, "Lawrence Radiation Laboratory Capability Part Chronological History," dated 8-22-61, by A. E. Smith.
- HW-70842 Unclassified, "In-Plant Neutron Multiplication Test No. 2," dated 8-24-61, by R. E. Isaacson.
- HW-70847 Unclassified, "Distribution Ratios of Uranyl Nitrate and Nitric Acid in Methyl Isobutyl Ketone - Water ($\text{UO}_2(\text{NO}_3)_2$)- HNO_3 - $\text{Al}(\text{NO}_3)_3$ - NaNO_3 Systems," dated 8-28-61, by C. A. Colvin and R. S. Strong.
- HW-70883 Secret, "Letter to JG Epp, Dow Chemical Co.," dated 8-30-61, by R. A. Schneider.
- HW-70906 Secret, AWD, "Impurities in Model 81-C Components," dated 8-31-61, by L. M. Knights. (Report to Mr. Agnew, LASL.)
- HW-70797, Unclassified, "CP Correction Factor for Energy Sensitivity," dated 8-18-61, by L. M. Knights.

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B. PREPARED FOR SIGNATURE AND ISSUANCE

IIW-70569 Secret, "Plutonium Production for FY 1962 and FY 1963,"
dated 8-4-61, by T. R. Clark

IIW-70587 Secret, "Production - July 1961," dated 8-1-61, 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>
John S. Crowder, Power and General Maintenance	A die for breaking short lips on sheetmetal.
A. W. Hildebrandt, Finished Products	Sheffield gauge, single adjusting clamping chuck.
R. E. Tomlinson, Research and Engineering	Concept of a saltless solvent extraction process.

P. H. Reinher

General Manager
Chemical Processing Department

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END

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5/12/93