HW 74151

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Series A.

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
FOR

JUNE, 1962

HW--74151

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By Authority of CG PR-2

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HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON

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CHEMICAL PROCESSING DEPARTMENT
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JUNE, 1962

I. SUMMARY

Production through June, as compared with the May 9, 1962 HAPO Production Forecast (HW-73531), is summarized below:

	<u>Percent of Forecast Achieved</u>	
	<u>June</u>	<u>Fiscal Year To Date</u>
Separated plutonium nitrate	163.3	100.3
Separated uranium nitrate	157.9	100.7
Uranium oxide	121.9	96.1
Plutonium metal buttons	108.9	100.2
Fabricated parts	18.9	94.2

June production exceeded forecast quantities for all products except fabricated parts. The output of fabricated parts fell below forecast because Model 81 production, forecasted through June, was cancelled at the end of May. The production of Model 1251, however, exceeded the quantity forecasted for June.

The Purex plant operated at an average rate of 23.2 tons per day, except for two shutdown periods which totaled five days. A four-day shutdown was required to flush MnO_2 from the No. 1 Organic Recovery System so that normal flow could be restored; a second shutdown of one day duration was taken on June 30 to replace the first cycle feed rotameter jumper.

Improved performance was evident in the Purex final uranium extraction column (2D) after modifications to the No. 2 Solvent Treatment System resulted in better quality solvent. These changes included (1) the addition of potassium permanganate to the solvent washing operation and (2) provision for internal recycle of solvent within the No. 2 Solvent Treatment System. Subsequent operation of the 2D scrub section was not only more stable, permitting 40 percent higher pulse frequencies, but neptunium concentration in the uranium product was reduced by a factor of four.

Operation of the new continuous neptunium recovery equipment and the Higgins anion exchange contactor, which were installed in the Redox plant during April and May, has been very satisfactory. Although reduced Zr-Nb decontamination efficiency resulted when sodium bismuthate addition was discontinued as an oxidant in the plutonium ozonator, this was offset by the performance of the anion exchange.

In an attempt to improve reactivity of the UO_3 product for the customer, calciner testing was started during June. Test quantities of UO_3 powder, which were produced at temperatures of 270 and 230 degrees centigrade, using ammonia and sulfur additives, were shipped to the customer for evaluation. Further tests are planned.

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Bid package information for the cesium load-out facility at 241-C Building, Project CAC-950, was submitted to the AEC.

A project proposal revision was submitted to the AEC on June 25 requesting funds for: (1) a Redox railroad tunnel air lock and cask car decontamination facility, and (2) a self-propelled car mover.

Scope drawings were completed for a 234-5 Building ion exchange facility for processing Button Line aqueous wastes. The proposed installation would be operated remotely and fully instrumented.

The contractor for Phase I of Project CAC-880, "Plutonium Reclamation Facility - Z Plant", began work about mid-June.

Detail design of the aluminum honeycomb containers for HAPO-I and II casks was completed and the drawings are being circulated for approval. These units were designed to provide all-weather protection for the casks by eliminating the cold weather stiffening which occurs with the present rubber buffers.

P. H. Linker

General Manager
Chemical Processing Department

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (continued)

A. PRODUCTION OPERATION

<u>1. Production Statistics</u>	<u>June</u>	<u>Fiscal Year to Date</u>
<u>a. Percent of Forecast(1) Achieved</u>		
Separated plutonium nitrate	163.3	100.3
Separated uranium nitrate	157.9	100.7
Uranium oxide	121.9	96.1
Plutonium metal buttons	108.9	100.2
Fabricated parts	18.9	94.2
<u>b. Purex</u>		
	<u>June</u>	<u>May</u>
Uranium nitrate produced (tons)	555.25	620.56
Average production rate during operation (T/D)	22.0	20.2
Total waste loss (%)		
Plutonium	0.34	0.37
Uranium	0.31	0.38
On-line efficiency (%)	84.4	99.4
<u>c. Redox</u>		
Uranium nitrate produced (tons)	114.44	20.70
Average production rate during operation (T/D)	4.4	5.3
Total waste loss (%)		
Plutonium	0.44	0.26
Uranium	0.25	0.31
On-line efficiency (%)	72.0	17.8
<u>d. Uranium Reduction (tons)</u>		
Normal UO ₃ loaded	449.82	538.79
Enriched UO ₃ loaded	101.11	19.22
Normal UO ₃ approved for shipment	445.56	499.43
Enriched UO ₃ approved for shipment	98.07	0
Normal UO ₃ shipped	449.72	499.24
Enriched UO ₃ shipped	49.03	94.07
Normal UNH backlog	499	315
Enriched UNH backlog	71	31

(1) HW-73531, HAPO PRODUCTION FORECAST, dated 5/9/62

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e. Plutonium Metal Processing

	<u>June</u>	<u>May</u>
Input to Task I (batches)	312	95
Reduction yield (%)	95.2	96.8
Product recovery output (Kgs)	0	4.32
Product recovery backlog (Kgs)	1079.9	964.18
Waste disposal (grams)	131	124

f. Power

	<u>200-East</u>	<u>200-West</u>
Raw water pumped (gpm)	8,367	4,523
Filtered water pumped (gpm)	1,109	912
Maximum steam generated (lbs./hr.)	260,000	124,000
Average steam generated (lbs./hr.)	213,000	72,600
Total steam generated (M lbs.)	153,420	52,277
Coal consumed (tons)	8,065	2,778

June production exceeded forecasted quantities for all products except fabricated parts. The output of fabricated parts fell below forecast because Model 81 production, forecasted through June, was cancelled at the end of May. The production of Model 1251, however, exceeded the quantity forecasted for June.

J. H. Warren
Manager - Production

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II. ACHIEVEMENTS (Continued)

B. PUREX OPERATION

1. Operating Continuity

The plant operated at an average of 23.2 tons/day rate except for two shutdown periods totaling five days during the last week of the month. The shutdowns were required to chemically flush the No. 1 Organic Recovery System to remove a restriction and to replace the First Cycle Feed (HAF) rotameter jumper. The plant was operating at month's end.

The uranium product met specification. The plutonium product met specification until the first shutdown on June 22. A large "gamma burst" was experienced following the chemical flushes. Product waste losses were normal.

2. Processing Operation

The wash solution in the No. 2 Organic Recovery System was changed to carbonate-permanganate from carbonate only. Process performance of the Second Uranium Cycle was improved by this change and neptunium retention in the uranium product was reduced.

The first strontium purification run at the Hot Semiworks, which had begun on May 27, 1962, was completed on June 1, 1962. The second purification run was conducted between June 9, 1962 and June 16, 1962. This second run utilized constant additions of hydrogen peroxide to "kill" the citrates more quickly. The two runs produced a total of 1,455,000 curies of purified strontium-90. All material was well within product specifications.

Subsequent to the second purification run the organic material used in the two purification runs was stripped and the stripping solution was batch contacted to recover entrained strontium. Approximately 115,000 curies of strontium-90 were recovered.

Three strontium recovery runs were completed during the month. The first two runs recovered a total of 428,000 curies of strontium-90, which was transferred to the 003 CR vault. Analyses to determine the amount recovered in the third run are not complete.

Two hundred gallons of high level waste material (LWW) were loaded in a "bowling ball" cask and transferred to HLO.

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3. Mechanical Experience

The 3WB (Waste Backcycle) pump was replaced when it failed to provide normal flow. The No. 2 agitator on the 2AF(Plutonium Second Cycle Feed Tank) failed because of a loose impeller.

4. Radiation Experience

The total radio-iodine 131 emission for the month was 1.26 curies. The maximum seven-day emission was 0.35 curies.

5. Analytical Experience

A flame spectrophotometer was installed and calibrated for calcium, barium, and sodium. Procedures for the separation of these elements from the high strontium levels present in the purified strontium-90 product are being evaluated.

Manager-Purex

PR McMurray:JMB:gt

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II. ACHIEVEMENTS (Continued)

C. REDOX OPERATION

1. Operating Continuity

Operation of the new continuous neptunium recovery equipment and the Higgins anion exchange contactor, which were installed in the Redox Plant during April and May, has been very satisfactory. However, because of the loss of several critical pump-agitators and the necessity for reworking a large volume of high plutonium waste encountered during the first week of the month, the production achieved was only 85 percent of that scheduled.

2. Processing Operations

On 5-28-62 a breakthrough of plutonium through the third uranium cycle occurred (3D column) and five batches of uranium were subsequently out-of-specifications in plutonium. The high plutonium was apparently caused by insufficient iron in the 3DS stream to reduce all of the plutonium that was being fed to the 3D column. The out-of-specification uranium was reworked this month to meet shipping specifications.

The extraction columns were shutdown for eighteen hours on 6-5-62 to rework a large volume of high plutonium waste. The high waste losses apparently originated from pressurization of the E-2 ozonator during operation, which resulted in plutonium being passed through the vent system to the waste tanks. This condition has apparently been corrected by reducing the operating temperature and water additions to the E-2 ozonator and by reducing the tower vent jet pressure.

On 6-6-62 it was discovered that the bismuth, added as a catalyst for ruthenium ozonation in the E-2 ozonator, was carrying through the new ion exchange contactor into the final plutonium product in the L-16 tank. The bismuth addition to E-2 was immediately discontinued. However, approximately 21 units of plutonium were contaminated with bismuth before the condition was detected. This material is currently being held in storage for reprocessing via the second plutonium extraction cycle.

When the bismuth addition to the E-2 ozonator was discontinued, as noted above, a ten-fold increase in the gamma activity of the feed solution to the 233-S Plutonium Concentration Building resulted. However, the L-6 plutonium product gamma activity has not increased and no ill effects from the elimination of

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bismuth in the E-2 ozonator have been noted to date.

On June 23 and 24 a process test was conducted to determine the feasibility of processing recycle solutions through the new anion exchange contactor via the E-3 plutonium valence adjustment tank and the L-12 plutonium product concentrator. No difficulty was experienced with the test and it appears that this procedure will adequately decontaminate the material to meet customer specifications.

Approximately 148 tons of UNH, with high gamma ratios, were received from the Purex Plant and reprocessed through the silica gel system to reduce the gamma content to within shipping specifications.

On June 29 processing activities were discontinued and at month-end preparations were being made for a three week shutdown in July to permit all personnel, except those necessary for standby and essential supporting activities, to take their vacations.

3. Mechanical Experience

Considerable difficulty was encountered this month with the pumping system from the E-3 plutonium valence adjustment tank in the 202-S Building to the L-12 product concentrator in the 233-S Building. The E-3 pump-agitator has failed and been replaced three times (5-31, 6-14 and 6-17-62) since operations were resumed on 5-23-62. A combination of difficulties has caused failure of the system for one reason or another. Because a thrust bearing weakness in the pump-agitator has been the most frequent cause of failure, it is planned to construct a slower speed pump with a hollow shaft motor. This will eliminate the need for a coupling and an extra thrust bearing because the pump shaft can be supported by the motor bearings. The reduction in pump speed from 3600 to 1750 RPM will diminish problems which undoubtedly have been created by high speed and excessive vibration. To increase the pump head capacity, two of the four ports for agitation in the presently installed pump have been plugged. To correct another problem in the system, the restrictive spline type control valve in the 233-S Building has been replaced with a valve having a three-sixteenth inch equal percentage trim, which should diminish the tendency for plugging.

The pump-agitator in the F-7 metal solution feed tank was replaced on 6-2-62 and again on 6-7-62. Both of the pumps which failed were of the new pump-agitator design (recirculating feature). It has been theorized that the new type pump-agitator has been picking up solids from the tank bottom which caused plugging and an abrasive action, resulting in the pump failure. The pump installed on 6-7-62 was a conventional Johnson closed throat pump minus the agitator feature. Operation to date has been satisfactory, but a significant leak at the vapor throttle bushing on top of the tank was beginning to develop at month end. Plans have been made to install a

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modified pump-agitator with glass bearings prior to the July production run.

On 6-8-62, the pump in the metal solution feed preparation tank (H-1) failed when the shaft became disconnected from the motor. The failed pump had approximately 55 batch hours of operating time since it was originally installed on 12-2-61.

4. Waste Handling and Decontamination

Equipment valued at \$62,450 was received from the processing plants for decontamination, repair or inspection during the month. Equipment valued at approximately \$42,000 was returned to CPD customers, representing a savings of approximately \$28,800 over the cost of new replacement equipment.

A total of 264 manhours was charged to the decontamination and/or repair of railroad, automotive and heavy equipment. The following is a breakdown of the major items decontaminated:

<u>Item</u>	<u>Operation Charged</u>
Well Cars No. 38, 39	CPD
Flatcar No. 3610	Purex
Flatcar No. 3626	Redox
Motor Crane No. 17T-19950	P&GM
Truck Tractor	P&GM
Air Compressors No. 13-16262 & 13-16285	P&GM
Motor Stators (2)	IPD
Stack Fan Blades	Purex
Metabolism Cage	HLO
Scaffolding (200 pieces)	P&GM

5. Radiation Experience

Nine skin contamination cases (maximum 10,000 d/m) and one radiation occurrence were recorded during the month. All skin contamination was readily reduced to non-detectable. The one radiation occurrence was caused by the rupture of a discharge pressure gauge on top of the 152 UNH storage tank during pumping operations. UNH solution was sprayed over the tank, miscellaneous piping, and general ground area. The average radiation reading in the area was 10,000 d/m. By month end decontamination had been completed and the area restored to its original status.

On 6-12-62 the filters were replaced in the off-gas stack from the 233-S Plutonium Concentration Building. This precautionary action was taken because of the more frequent positive results obtained from the exhaust stream air samplers, which indicated a filter rupture.

6. Analytical Experience

The 202-S Analytical Laboratory alerted Redox Technology personnel to an unusual and off-standard condition existing in the Redox

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plutonium product was exhibited by very high "F" factors, indicating the presence of a high density material other than plutonium. Positive identification of bismuth in large enough quantities to account for this phenomenon resulted in discontinuing the use of sodium bismuthate as an oxidant in the process.

A series of uranium oxide and nitrate solution samples from the UO_3 Plant was analyzed for sulfur. This work was requested by the Finished Products Operation in support of their program to more accurately control sulfuric acid flow to the process. A second test program, involving the addition of ammonia to the process, is now underway. This work is being done in an effort to significantly increase the reactivity properties of the product and is requiring extensive ammonia analyses on uranium oxide powder and uranium nitrate solutions.

An evaluation of the current status of the two multichannel analyzers used in the 222-S Analytical Laboratory was completed. The evaluation, which was conducted in conjunction with the Redox Maintenance Operation and the Process Chemistry Operation, involved maintenance costs, continued downtime, and the inability of the equipment to meet operational requirements. Based on this evaluation one of the instruments was sent to the HLO Instrument Shop for a complete overhaul and rebuilding job. If this approach proves satisfactory, the second instrument will be overhauled; however, should this approach fail, early replacement of both instruments will be essential.

The New Production Reactor Operation was provided with technical assistance in outlining the instrumentation and equipment which will be required to provide the facility with quality control water analyses. Judging from some of the rigid detection limits set for some of the impurities, more precise and costly instrumentation will be necessary than previously estimated.

Continued analytical assistance was provided to the Coolant Systems Development Operation in their efforts to trace the source of activation products detected in the reactor coolant systems. Present work involves a series of samples for gamma identification and phosphorus 32 analyses.

Manager - Redox

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

D. FINISHED PRODUCTS OPERATION

1. Operating Continuity

In the fabrication facilities, Model 1251 assemblies were produced on a limited basis. Feed shortages limited the preparation of machining stock for aging in preparation for larger scale production of Model 1251 next month. The production of unfabricated plutonium was improved in June, but mechanical and/or processing difficulties in Task III (Reduction) limited net production. Recovery operations remained shut down except for the burning and dissolution of skulls. The incinerator was out of service essentially all month because of the spread of contamination resulting from the failure of a line from the scrubber. Uranium reduction activities were satisfactory with some slight interruptions caused by the shortage of acceptable feed for the depleted stream.

2. Processing Operations

a. Plutonium Fabrication

Information on plutonium fabrication is presented in Document HW-74233 entitled "Chemical Processing Department, Finished Products Operation, Z Plant Monthly Report, June, 1962" which is classified "Secret, Atomic Weapon Data, Production Rate and Stockpile Quantity Information."

b. Plutonium Processing

Operation of the plutonium preparation facilities was considerably improved this month and output approached normal. Considerable difficulty was experienced with the Task III (Reduction) furnaces. Half of them were out of service during the last three weeks of the month, and about 20 per cent of the product was below standard. The exact cause of the trouble has not been determined. Some relief from the situation has been achieved by reducing the size of the charges to the furnaces.

In recovery, the Recuplex area continued to be involved with deactivation and with special tasks requested by the Investigating Committee. The laboratory (glass) dissolvers continued to process oxide from burned skulls and resulting solution was blended with Purex material to provide plutonium feed to the button line. Gross contamination of the scrubber cell caused the incinerator to remain out of service during the greater

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b. Plutonium Processing (Continued)

part of June. The contamination resulted from the failure of a pressure gauge line on the scrubber recirculation system. Plutonium-bearing caustic solution was sprayed around the scrubber cell, and the resulting contamination proved to be extremely difficult to remove from this small and crowded area.

c. Uranium Reduction

Uranium reduction operations were normal this month until the plant was shut down on June 25 for the annual three-week vacation outage.

At the request of the customer, Carbide Nuclear Co., attempts are being made to improve the reactivity of the uranium oxide powder. Tests in progress during June involved the ammonium ion, sulphate, and calciner bed temperatures.

On June 15, the X-2 feed tank buckled slightly when cold water was added to the hot contents of the tank. No significant damage resulted, and no loss of product was sustained. Procedures for cleaning, inspecting, repairing, and reinforcing are being prepared at month end. Additional venting will be provided.

3. Mechanical Performance

Fabrication equipment operated satisfactorily during the month. Hood HC-43 was converted for the machining of Model 1251 and is now in plutonium service. Hood HC-41 is being similarly converted and is 85 per cent complete at month end. Each hood contains two Gorton lathes. In the Task IV casting facilities, copper lines and tank have been substituted for the black iron equipment in the cooling system for the induction coils of the Stokes furnaces.

Plutonium processing equipment performed satisfactorily except the Task III reduction furnaces and Task III high frequency generator. On an average, approximately half of the furnaces were out of service due to burned lids and plugged furnace valves during the last three weeks of the month. The exact reason for the difficulty has not been determined, but some improvement has been achieved by reducing the size of the furnace charges. The steel cooling jacket of the Tocco high-frequency generating unit failed due to corrosion and was replaced with one fabricated from stainless steel.

Uranium reduction equipment performance was normal except for the partial collapse of the X-2 feed tank. The damage to the tank is slight and procedures for repair and reinforcement are being prepared at month end.

4. Radiation Experience

Radiation and contamination control statistics reveal control normal and satisfactory with a slight upward trend in the number of positive nasal smears.

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4. Radiation Experience (Continued)

One significant case of potential plutonium deposition occurred during the month. A pipefitter punctured a finger with the sharp end of a wire contaminated with plutonium nitrate. Because of the depth of the wound and the relatively large amount of soluble plutonium involved, the wound was excised. Following this, two injections of DTPA (Diethylene-triamine penta-acetic acid) were administered to increase the elimination rate. The amount of deposition has not yet been determined, and bio-assay samples will continue until a determination can be made. The incident was formally investigated as Radiation Occurrence CPD #62-3.

5. Analytical Experience

	<u>May</u>	<u>June</u>
Number of Samples Received	1,568	1,688
Number of Determinations	10,317	16,486
Total Metallic Impurities, Buttons	1,433 ppm	1,325 ppm
Total Carbon Content	370 ppm	480 ppm
Buttons Rejected	7.0%	15.0%
Pu 240 - NRF Buttons (by Mass Spec.)	7.67%	7.74%
Pu 240 - Normal Buttons	-----	6.21%

L. J. Bricker
for
Manager
Finished Products

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

June 1962

II. ACHIEVEMENTS (Continued)

E. POWER AND GENERAL MAINTENANCE OPERATION

1. Operating Continuity

There were no interruptions of steam, water or electrical services that affected continuity of operations of the production facilities; however, a severe windstorm on June 25 caused a breaker in the 252-W Substation to open, resulting in an electrical outage of the "T" Area. The breaker tripped at 5:51 p.m. and was closed at 6:42 p.m. This type outage does not cause the emergency generator in the Power House to come on the line.

2. Inspection, Maintenance and Repair

Repair and alteration work on the spare Purex concentrator was an estimated 70% complete at month's end. The repair work necessary on this vessel was far greater than originally anticipated. X-ray photos continued to disclose additional welding flaws which required corrective action. Installation of the tantalum demister pad is complete, and other alteration work is showing steady progress.

The J-Cell Package for the continuous recovery of Palm at Purex is essentially completed. As-built dimensions have been taken, and calibration by processing personnel is underway. One of the removable tanks in the Package was found to be out-of-tolerance by $1\frac{1}{2}$ " due to a design discrepancy. The trunnions on the tank still remain to be altered to correct this situation. During the month, the column pulsers were received from the vendor and were made ready for installation.

A plastic cartridge for the second-cycle organic cleanup column (R-2) was assembled and made ready for installation during the next scheduled shutdown of the Purex Facility. The cartridge was longer than any heretofore fabricated in the Shops, which necessitated lengthening the shipping cradle before assembly could be completed.

The filter for the revised HAPO-I strontium cask has been received from the vendor to whom it was sent for installation of the screen. Machining of the outer shell was in progress and nearing completion at month's end. Indications are that final assembly of the cask can be completed in July. A one-half-scale model of the strontium shipping filter was fabricated from carbon steel for destructive testing by an off-site laboratory to determine structural impact strength.

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The main portion of the urgent Machine Shop work, required for the model change-over at the Finished Products Operation's Fabrication Facility, was completed during the month. There still remains some spare gauges and fixtures to be made; however, this work is of a routine nature.

Work on the field-installation portion of the Purex Palm Project is rapidly growing to a close. Almost all of the project-procured material is on hand, and most of the remaining work is of a shut-down nature. Completion of the work will be keyed to the August shutdown. Work progress at month's end was as illustrated below:

P&O gallery piping	97%
Aqueous makeup alterations	98
Sampler installations	95
Electrical work	95
Instrument work	90

A total of 33 pipe jumpers was fabricated during the month to meet requirements indicated below.

NPR Fuel Processing Project (CGC 929)	11 jumpers
Purex Reliability Project (CGC 895)	1
Purex replacement (one on emergency)	8
Redox replacement	5
Redox - Spare Parts	3
Redox - R&E	<u>5</u>
Total	33 jumpers

A 40' conveyor was installed in the 200-West Area Laundry Facility for use in the automated monitoring of coveralls.

Installation of a 50,000-pound hydraulic pump in room 7-A of the 231-Z Building was completed during the month. Included in the work was the installation of a control panel and necessary instrumentation to measure pressure and temperature. The equipment was required in connection with isostatic pressing in the Hanford Laboratories Operation's Plutonium Carbide Scinterring Operation.

Other work performed in support of Hanford Laboratories Operation included installation of an annealing hood and equipment in Cell 4, 231-Z Building. This work consisted of installing a hood, ventilation exhaust system, electrical power supply, six small furnaces, complete intermediate vacuum system, hood services, and required instrumentation to measure and record vacuum and measure, record and control the temperature of the six furnaces. This equipment will be used for research-and-development work in the field of vacuum heat treating and quenching of plutonium and plutonium alloys.

A two-inch layer of concrete was poured over the existing floor of the 221-B pipe gallery to cover contamination. The room had been used by the Finished Products Operation for storage of plutonium waste, and is being made ready for use in connection with the Fission Product Concentrate Storage Project.

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Special emphasis was placed on construction of five display cabinets required for the Hanford Visitors' Center, located in the Community House in Richland. The work was done on a crash basis to meet previously established dates for the grand opening.

No. 5 boiler, 200-East Power House, experienced failure of the front water-wall connecting tubes. Corrective measures were taken, and the unit has been returned to service.

A new air compressor, complete with receiver tank and the necessary switch gear, was installed in the 209-E Critical Mass Laboratory.

T. S. LaFayette

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

Essential Waste Routing System

The scope for Project CAC-970 - Purex Essential Waste Routings - is being revised to include a new line from 241-AX-151 diverter station to the 003 tank in the 244-CR Vault. This line will be used for transferring crude strontium from 202-A to 244-CR, bypassing the 241-A-151 and 152 diversion boxes. The present line through the diversion boxes will be a spare for strontium transfer as well as being available for other transfers.

Process Concentrators

Detail design of the J-8 bubble cap tower for the sectionalized concentrator was completed and the drawings were issued for comment. All sectionalized concentrator equipment components involved in the various acid and uranium services are now detailed. Steam condensate control valves now in service on the Purex concentrator tube bundles have an anticipated service life of one to two years. A request has been made to the Hammer-Dahl Company for design of a valve having a service life of five years. The potential vendor is expected to submit a proposal in the near future for evaluation.

HAP Gamma Monitor

Pre-installation tests have been completed on the scintillation detector. Tests are in progress on the ion chamber.

b. Project Engineering

CAC-928 - Leak Detection - 241-A and 241-SX

The contractor's superintendent is on site arranging for materials and labor in preparation for activity starting on the first caisson.

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CAC-950 - Cesium Loadout Facility - 241-C

Bid package information for the loadout facility was issued to the Commission this month. The fixed-price work includes everything except installation of the pump and cooler and associated piping in the pump pit.

CGC-964 - Equipment Disposal - Purex

A survey of the tunnel area has been made and detail design by Bovay Engineers has been started.

c. Manufacturing Engineering

Purex Concentrator Replacements

The "A" Concentrator Unit now on-site is being fitted and insulated for use in the canyon.

The "B" Concentrator Unit at the vendor's plant in Newark, New Jersey, is being X-rayed and repaired in the same portions which were found inadequate in the "A" Unit. Shipment is scheduled for July 27, 1962.

Methods Study Film Program

Three Purex films have been completed, processed, and assembled. These are "Personal Monitoring and Step-off Procedure", "Process Sampling", and "Waste Packaging and Disposal". The next step, consisting of review and analysis for improvements, is being initiated.

2. Special Separations Processing

a. Process Design Engineering

PRTR Shipping Cask

A review was made of the PRTR shipping cask and railroad car design from the standpoint of operational safety while enroute between 300 Area and 200-West Area and while being handled in the Redox Plant. It was recommended that the cask be continually vented during transport to Redox, the cask and primary coolant having adequate heat content for periods well beyond the normal transport time. It was also recommended that the physical stability of the cask and railroad car system be investigated.

Pump Agitators

A new procurement drawing for pump agitators was issued for comment. Also, a new drawing is being prepared for the E-3 Unit to convert to a hollow shaft motor drive. Preliminary drawings have been issued to the shops to make a new E-3 unit from items in spare parts.

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b. Project Engineering

CGC-941-Rev. 1 - Railroad Tunnel Airlock and Decontamination Facility - Redox

A project proposal revision requesting funds for (1) a Redox railroad tunnel airlock and cask car decontamination facility and (2) a self-propelled car mover was transmitted to the Commission on June 25, 1962.

3. Finished Products

a. Process Design Engineering

Ion Exchange

Scope drawings, consisting of an engineering flow diagram and an arrangement drawing, were prepared for a remotely-operated, fully-instrumented ion exchange facility for handling RMC Button Line aqueous wastes. Also, scope drawings were prepared for a glove box facility which will handle RMC Task I filtrate only.

Degreasing and Briquetting Glove Box - RMA Line

Detail design of equipment necessary for re-installation of Hood DB-22 in the RMA fabrication line has been initiated. Purchase requisitions have been issued for a hydraulic unit for the briquetting press and for a closed-inert gas ventilation system.

Fabrication Line Area Modifications

A preliminary engineering study was completed during the month for removing a portion of "C" wall, relocating the maintenance and crucible shops, and revising the ventilation in this area to allow additional space for fabrication equipment.

Isostatic Press

Two preliminary engineering drawings for the installation of the isostatic press in the RMC Fabrication Line have been completed. Also, a purchase specification for a 100,000 psi isostatic press was approved. Purchasing action has been started.

Floturn

The Floturn machine and glove box was relocated to the 234-5 Building during the month and additional aluminum shapes have been made. Although future cold testing will be done, the latest blank design is generally considered to be satisfactory.

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b. Project Engineering

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

The Phase I contractor, the Nor-pac Corporation, Spokane, Washington, came on the site June 13, and has begun work on footings for the process cell wall. Bids for the five-ton crane were opened on June 27. The apparent low bidder was Union Machine Works of Seattle, at \$30,670. A three-ton unit was considered at a price differential of approximately \$2,400; however, the larger unit was selected for greater capability and flexibility.

CGC-968 - Additional Pu Storage Facilities - Z-Plant

A project proposal for requesting additional storage facilities in "Z" Plant for castings and finished components was transmitted to the Commission on May 4, 1962. This proposal was returned unapproved on May 25.

4. General

a. Process Design Engineering

Fission Product Recovery and Transport

Detail design of the aluminum honeycomb containers for HAPO-I and HAPO-II casks has been completed and the drawings are being circulated for approval. These units were designed to provide all-weather protection for the HAPO-I and II casks by eliminating the cold weather stiffening which occurs with the present rubber.

The model filter and two model cask containers (rubber) have been shipped from the vendor's shop to the University of Texas for design verification testing, and two or three more cask containers are expected to be shipped by the end of the month. The personnel at the University of Texas are making preparation for testing to start the week of July 9.

b. Project Engineering

Project Cost Information as of 6-24-62:

Total Authorized Funds - 15 active projects	\$ 11,053,000
Total Cost-to-date	7,572,000
Commitments and Open Work Releases	934,000
Unencumbered Balance	2,547,000
Costs Charged to Above Projects	
5-20-62 to 6-24-62	280,000

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Projects dropped from active status:

<u>Project No.</u>	<u>Funds Authorized</u>	<u>Total Costs</u>
CGC-830	\$572,000	\$ 556,956
CAC-925	10,000	7,983

Manager - Facilities Engineering

HP Shaw:WWC:alr

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JUNE, 1962

II. ACHIEVEMENTS (Continued)

G. RESEARCH AND ENGINEERING OPERATION

1. Purex Process Technology

a. Head-End

A new policy which requires sampling of all waste streams leaving the Purex Plant forced a flowsheet change in the handling of the coating removal waste solutions. Instead of transferring the waste and rinse water to underground storage separately, the two are combined, made 1 M in NaOH, and sampled prior to transfer. Despite the extra caustic addition, a layer of solids has built up in the collection tank, and difficulties have been encountered with plugging in the transfer line.

b. Solvent Extraction

Overall decontamination performance of the solvent extraction equipment changed only slightly during the month. Although the gamma activity of the feed to the Final Uranium Cycle decreased somewhat (about forty per cent), the activity of the feed to the Final Plutonium Cycle increased two-fold. Concurrently, the decontamination performance of the 2A Column decreased 50 per cent to an average DF of about 1000 for the month. Even so, the plutonium product generally analyzed $< 2 \times 10^{-11}$ ZrNb/AT while the uranium product ranged from two to four in gamma ratio.

The hypothesis that the poor decontamination performance of the 2D Column resulted from "do-bads" in solvent was verified late in the month. While the plant was temporarily shut down, changes were made to permit the use of potassium permanganate and internal solvent recycle in the No. 2 Solvent Treatment System. Operation of the 2D Column subsequent to solvent treatment with permanganate showed a marked improvement in column performance as a result of increased stability and the capability of operating at a forty per cent higher pulse frequency.

c. Neptunium Recovery

Neptunium accumulation in the Backcycle Waste System continued to be below normal during the month because of a reported 25 - 30 per cent loss via the HA Column effluent and a 30 - 40 per cent carryover to the final uranium product. Efforts to control neptunium losses included increasing the solvent flow (HAO) to the scrub section of the HA Column and adjusting

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nitric acid concentration in the column by means of the Backcycle Waste and HS Column Recycle nitric acid streams. Operation of the 2D Column at higher pulse frequencies reduced the neptunium carry-over to less than 10 per cent.

d. Solvent Treatment

After hot water flushing of the Batch Wash Tank (TK-G1) in the No. 1 Solvent System failed to remove a restriction from the IO Column feed pump, the system was chemically flushed during a temporary plant shutdown. Five per cent oxalic acid - ten per cent nitric acid flushes unplugged the pump and removed more than 500 gallons of solids which had been retained in the Raschig ring packing of the tank.

During the shutdown, the No. 2 Solvent System equipment was flushed and equipment changes made to prepare for sodium carbonate-potassium permanganate washing of the solvent.

e. Fission Product Recovery

Batch size for strontium recovery from high activity waste (IWW) has been increased to 75 kilocuries of Sr-90 per sulfate precipitation. This amount appears to be near the maximum heat load that can be tolerated in the centrifuge and still not experience difficult cake removal.

Two strontium purification runs were completed in the Strontium Semi-works during the month. Performance of the solvent extraction system is shown below:

<u>Stream</u>	<u>Waste Losses - Per Cent</u>	
	<u>Run #1</u>	<u>Run #2</u>
HA Column Effluent	2.0	2.0
HC Column Organic Effluent	9.0	7.5
Organic Rework Recovery	7.0	6.0
Net HC Organic Losses	2.0	1.5

<u>Impurity</u>	<u>Decontamination Factors</u>	
	<u>Run #1</u>	<u>Run #2</u>
Zr/Nb	>100,000	>8,000
Ru	>4,500	>750
Ce	20,000	1,650
Ba	330	20
Ca	25	20
Fe	>1,000	>1,000

The citrate in the concentrated strontium product from Run #1 was destroyed by adjusting the solution to 3 M HNO_3 and adding H_2O_2 in the ratio of 7.5 mols per mol of citrate. During the second run the H_2O_2 was added continuously to the product concentrator at a mol ratio of 5:1 in order to accomplish the same effect.

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2. Redox Process Technology

a. Mercury-Catalyzed Dissolution

Laboratory work on development of a flowsheet for PRTR fuel element dissolution indicates that irradiated Pu-Al alloys will not activate in solutions stronger than 1 molar nitric acid regardless of the mercury concentration. However, once activation is achieved, dissolution will continue at higher acid concentrations. Since the rate of hydrogen evolution increases as the acidity is lowered, it is desirable to carry out dissolution of the alloy at the maximum practical acid concentration.

A third test of mercury-catalyzed aluminum dissolution was completed during the latter part of June employing 1 M HNO_3 to achieve activation followed by the addition of concentrated nitric acid to increase the concentration to 4 M. The aluminum dissolution proceeded smoothly and rapidly and was 80 percent complete in 45 minutes. The maximum concentration of hydrogen in the off-gas, as measured by the continuous combustible gas analyzer system, was 0.64 percent. Since the surface area of the test charge was approximately half that of the projected PRTR charge, it appears that a two-step dissolution of the PRTR fuel, using mercury catalyzed nitric acid, is practical.

b. I-131 Control

The installation of a 4-inch-deep bed of activated charcoal in the exit line of the 293-S acid absorber to prevent accidental release of radioactive iodine is being considered. One point of concern is whether catalytic oxidation of nitric oxide would cause an excessive temperature rise in the charcoal. During February a test was made using a 4-inch-deep by 2-inch-diameter bed of 6 to 8 mesh activated charcoal in contact with a sample stream from the absorber off-gas. A maximum of 25 C temperature differential was recorded. During June a similar series of tests was made using a sample stream from ahead of the absorber. The test unit, which was packed with 10 to 14 mesh activated charcoal, showed no temperature increase. There appears to be no hazard from nitric oxide oxidation in a 4-inch-deep charcoal bed in the acid absorber exit line even if the acid absorber were not functioning properly.

c. Solvent Extraction

During the report period, process leaks and equipment failures have been responsible for numerous start-ups and shutdowns. Pressurization of the E-2 plutonium ozonator caused plutonium contamination of sizable quantities of waste which required reworking through the HS Column. As a result, there has not been enough operation of the solvent extraction system at steady state to permit an accurate evaluation of the neptunium recovery efficiency of the present flowsheet. The limited number of stream samples taken while the process was leveled out, indicate that the neptunium recovery with the modified neptunium flowsheet will be at least as good as the previous flowsheet which permitted 90 percent neptunium recovery. However, the recovery figure since startup in May has averaged only 73 percent.

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A control system to partially automate operation of the 1B, 2A, and 2B Columns was installed in June and is functioning satisfactorily. With the present system, the rate is manually set at the two primary controllers, one for the 1B Column and one for the 2A and 2B Columns, which in turn control all the streams to these columns at the nominal flowsheet rate. Plutonium refluxing in the 1B Column, which causes abnormal variations in the 1BP plutonium concentration, must be eliminated before the system can be placed on fully automatic control. Then, signals from the 1BP plutonium monitor and the 2AF tank weight factor to the primary controller will permit operation at the upper plutonium concentration limits with all streams controlled at the appropriate flow rate. Operation based on the optimum plutonium concentration, rather than the nominal production rate, will save about \$15 per ton of production in chemicals and waste storage cost.

One deep-well turbine pump and two deep-well turbine pump-agitators have failed in the F-7 position since the Redox startup in May. The failures have been due to loss of capacity after operating 106, 67, and 78 hours, respectively. The deep-well turbine pump now in the F-7 position has been operating 264 hours; however, it is leaking at the throttle bushing and at the labyrinth seal. Since this problem developed after the April flush, the failures are tentatively attributed to abrasive solids remaining in the F-7 tank after the two 3 percent HF - 20 percent HNO₃ flushes made to remove an extensive accumulation of solids. Additional hydrofluoric and nitric acid flushes are scheduled for the July shutdown. It is planned to equip the next pump-agitator with glass bearings, instead of the pile graphite ones presently in use, to obtain improved resistance to abrasion.

d. Plutonium Anion Exchange

Except for poor removal of bismuth, the over-all performance of the L-18 Anion Exchange Unit has been satisfactory. Typical data on decontamination across the anion exchange unit are tabulated below:

<u>Impurity</u>	<u>Decontamination Factor</u> (Arithmetic)	<u>Impurities in</u> <u>Final Product</u>
Fission Products	100	2.5 uc fission product per gram Pu
Iron	5,000	500 parts Fe per million parts Pu
Bismuth	2	200,000 parts Bi per million parts Pu (first four batches)

Waste losses from the anion exchange unit are normally between 0.1 and 0.5 percent. Failure to reduce all of the plutonium to the four valence has been responsible for an occasional higher waste loss.

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The problem of bismuth contamination has been eliminated by operating the E-2 plutonium ozonator without the addition of the sodium bismuthate oxidant. This has resulted in a five-fold increase in fission products in the plutonium feed solution entering the 233-S facility but no perceptible increase in fission products in the final product solution. There has also been a corresponding three-fold increase in radiation fields in the viewing room in the vicinity of the L-12 XAF Concentrator and L-18 Contactor; however, this does not present a significant exposure problem since the maximum exposure encountered is about 20 mr/hr. Elimination of the sodium bismuthate oxidant has resulted in process savings of \$1.60 per ton of production.

Spectrographic analyses of the final plutonium product solution revealed the presence of lead contamination which reached a peak of 10,000 parts lead per million parts plutonium after which it declined to a level of 1000 ppm Pu at month end. Laboratory simulation of the anion exchange process indicated that the DF attainable for lead should exceed 200. Analyses of the anion exchange feed and product streams showed lead concentrations of 200 to 500 ppm Pu with little or no decontamination being achieved. Mechanical introduction of the lead is suspected since analyses of the influent chemical streams have not revealed the source of the lead. Blending of product solution having an indicated lead concentration of 4000 ppm Pu with Purex material has resulted in buttons of normal density. Limited spectrographic analyses indicate the lead concentration in these buttons to be less than 1 ppm Pu.

The anion exchange unit was operated on a test basis using 234-5 Task I supernatant solution as feed for one week-end. No apparent difficulties were encountered, and chemical and spectrographic analyses of the final product batch from this run were within specifications.

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3. Finished Products Chemical Technology

a. Metal Finishing Operation

1. Button Line

Approximately 17 percent of the buttons produced during the month did not meet purity and density specifications. Of these, 43 percent were attributable to "burned" pressure vessel lids. The high incidence of "burned" lids and other evidence of excessively high temperatures, in spite of no change in the heat input to the pressure vessel prior to ignition of the charge, led to the conclusion that the characteristics of the plutonium tetrafluoride powder resulted in high reaction rates with subsequent higher than normal maximum internal temperatures. Lowering the charge size by 15 percent appears to have reduced the heat evolution sufficiently to result in more reasonable maximum temperatures, and, at month end, it is indicated that the wide fluctuations in purity and density have been stabilized at normally expected values.

Testing of the second model of a scrubber for the calciner off-gas was terminated when plugging of both the inlet and overflow lines continued to be a problem. The scrubber tested was designed to improve the ease of cleaning out the inlet line; however, the frequency of pluggage was prohibitively high.

2. Recuplex

Efforts continue to be directed toward deactivation of the Recuplex facility. Currently, methods for recovering, or storing, plutonium contained in the material on the floor of the reception and blending (R & B) hood floor are being devised and investigated.

b. Uranium Reduction Operation

Process testing, to improve the reaction rate of UO_3 in subsequent processing steps at the customer site, has been resumed. Quantities of UO_3 sufficient for testing in the Oak Ridge Gaseous Diffusion Plant pilot plant were produced with two percent ammonia and 4000 ppm sulfur at calciner bed temperatures of 270° and 230° C. Calciner operation was unaffected at 270° C; however, at the lower calcination temperature, bulk density decreased and the appearance of the powder produced indicated that sustained operation would likely lead to calcination difficulties. Further testing will be done at intermediate and higher temperatures. The UO_3 has not yet been evaluated.

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4. Process Chemistry

a. Purex Process Assistance

The improvement in 2D column performance following the initiation of permanganate washing of the organic on June 23rd is encouraging. This need for additional washing, however, indicates the presence of a problem in this area to a greater degree than previously experienced. Work in the laboratory has centered around the inspection and testing of the water and to date this looks like the most likely source.

All water in the plant displays the presence of organic material with surfactant properties, which produce interfacial cruds, and which promote emulsion formation. Concentrates of this organic material demonstrate a retarding effect on uranium extraction. The filters downstream of the ion exchange units tend to remove this material. Solids removed from the filters and tested in the lab have a drastic effect on uranium extraction. Further work is underway before a firm recommendation can be made.

b. Redox Process Assistance

Bismuth in Redox Plutonium Product

Bismuth, in quantities greater than 100,000 parts per million parts plutonium in Redox plutonium product, was found to be due to the partial retention of bismuth on the anion exchange resin during the plutonium loading and scrubbing cycles. The retained bismuth is then eluted along with the plutonium. Sodium bismuthate has been used in conjunction with ozone for the oxidation and volatilization of ruthenium from the plutonium stream. Prior to the installation of the anion exchange unit a solvent extraction cycle eliminated bismuth from the plutonium stream. Ion exchange supplanted this last solvent extraction cycle as far as fission product decontamination was concerned.

In summary, sodium bismuthate is no longer compatible with the Redox plutonium process, unless followed by a solvent extraction cycle. Currently, the decontamination of fission products by the anion exchange unit is such that the use of sodium bismuthate is not required.

c. Hot Semiworks Process Assistance

Two successful strontium purification runs were made in the Hot Semiworks using hydrogen peroxide to oxidize the citric acid in the strontium product. Samples of the strontium product from Tank 6 indicated that greater than 99 per cent of the strontium would precipitate as an easily filterable carbonate. The strontium carbonate thus formed was white rather than the brown color observed when the citric acid was destroyed by radiolysis alone.

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The effect of increasing the temperature of the HC column from 25 to 60 C was studied in the laboratory. It was found that the stripping of strontium was improved by a factor of 2; however, the amount of cerium stripped was also increased by a factor of 2 and the amount of calcium stripped was increased by a factor of 4.

d. Analytical Assistance

1. X-ray Fluorescence

The X-ray fluorescence spectrometer was calibrated for bismuth to provide analytical support to studies being made to determine the course of bismuth in the Redox ion exchange system. Analyses made on all portions of the ion exchange system gave very good material balance.

The X-ray spectrometer has been calibrated for chloride. This analysis will be used to provide conversion efficiency data for the 234-5 PuCl₃ program. The X-ray spectrometer was used to provide information on the behavior of lead on an ion exchange column in support of the study to determine where the lead in the Redox L-6 came from. The instrument was used to determine the path of lead in the ion exchange system. Good material balance was obtained.

2. Water studies

The study of demineralized water quality was continued. Using a boildown to prepare impurity concentrates, the physical characteristics (foaming, color, and odor) of water from several different locations were compared. In the order of descending quality:

100 KE Demineralized Water > Purex Sanitary Water >

Purex Demineralized Water > Purex Cation Exchanger

Effluent Water

Foaming properties of the concentrates could be removed by filtration through a glass frit while both foam and color could be removed with charcoal. Chemical separation of the organics (exclusive of odor) was accomplished by a charcoal-chloroform extraction. Identification of specific organics has not yet been made.

3. U/Pu Ratio - Purex

Glass was found to have an adsorptive property for plutonium not shown by plastic. As a result, dissolver solution composites are now being stored in plastic bottles. Also, to prevent lead sloughing into the sample, the lead biological shield will be covered with plastic.

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4. Chemical Assay

Sixteen analyses of ceric sulfate were made against arsenious oxide and compared against analyses made using Pu metal. The results are being statistically analyzed to determine the feasibility of using arsenious oxide as the primary standard.

5. Check-out Procedure

A check-out and calibration procedure has been provided for the gamma energy analyzers located at 222-S Building. It supplies a routine method for the determination of detector resolution, energy to channel ratio, and efficiency. Efficiency of the gamma detector is checked both as a function of reproducibility of the area of gamma photopeaks and as a function of the shape of the low energy response. The purpose of this document is to provide a performance testing procedure by means of which laboratory and maintenance personnel may check the analyzing system for compliance to the conditions upon which the calibrations are based. The procedure has application to both RCL-256 and RIDL-400 channel analyzers.

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5. 234-5 Development

a. Continuous Electrowinning Plutonium From PuCl_3

Improved temperature control resulted in the highest efficiency of the recent series.

Five runs have been performed in a series planned to test ceramic corrosion. Inadequate temperature control and distribution led to mechanical failures and prevented comparisons of the corrosion rates of beryllia, zirconia, alumina, and magnesia-titania. Changes are now planned to insure a high temperature at the point where the feed salt falls into the flux.

One significant finding is that use of zirconia results in a high melting point, metallic, plutonium-zirconium compound. Use of zirconia will be avoided in near-future runs.

Another result is that the use of constant temperature in one run (control point at outside wall, center of cell) resulted in 47 percent efficiency. This is one of the highest yet observed and is in the range useful for eventual plant application.

b. Electrorefining Of Plutonium Metal

Several conclusions were drawn which should be applicable to the electro-winning study.

Eight tests striving for improved cathode efficiency showed that the higher the plutonium concentration, the greater the black solids formation. Eight percent plutonium by weight is the optimum concentration for a workable system; resulting in small, but tolerable, solids formation.

The plutonium chloride is largely reduced to the metallic state at some distance from the cathode. Alkali metal formed in the primary electrode reaction at the cathode is the reductant. This conclusion is supported by observations that (1) the more free area around the cathode, the better cathode and anode efficiency; (2) when the cathode is below the anode, both efficiencies are higher; and (3) more concentrated melts give lower cathode efficiencies.

c. Incinerator Support

Laboratory studies showed casein glue a good coagulant for scrubber solution.

A number of reagents: ferrous sulfate, aluminum sulfate, gelatin, casein glue, and hide glue were tested as coagulants for particles in the incinerator scrubber solution. Addition of 1.2 - 2.5 grams of casein glue per liter of acidified scrubber solution gave rapid coagulation of fly ash into large particles. Particle settling was complete within approximately two minutes. Decantation or filtration of this solution is

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straightforward.

The other reagents failed to give significant improvements in coagulating and settling of particles. The casein glue was not effective when used with basic scrubber solution.

d. Plutonium Recovery From Fabrication Oil

Acidity and contact time have been better defined.

A series of daily samples has been taken and contacted with the three acid solutions described last month. Solids in the oil have prevented good material balances and obscured the results of short contact times.

Thirty minutes contact with 10 M HNO_3 resulted in complete and reproducible stripping.

Examination of the solids in a Coulter counter shows a size range of 2 - 15 microns. These solids have less than one percent plutonium, but contain appreciable Al, Ca, Fe, Mg, and Si.

Manager
Research and Engineering

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JUNE, 1962

II. ACHIEVEMENTS (Continued)

H. FINANCIAL OPERATION

1. Production Cost

A \$400,000 additional reserve for Special Process Spares was established in June to provide amounts for excessing obsolete and unneeded spares included in current inventories. At month end, approximately \$200,000 of spares had been listed for excessing.

Procedures were established in June for providing Contract and Accounting Operation - Cost Operation with O3 Program cost and budget data in the new report format required by AEC. FY 1962 data was recast into the new format.

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

	<u>Balance</u> <u>5-31-62</u>	<u>Control</u> <u>Allocation</u>	<u>Surplus</u> <u>(Deficit)</u>
<u>Inventories</u>			
Essential Materials	\$ 774	\$ 880	\$ 106
Spare Parts & Standby	1 965	1 778	(187)
Special Materials	120	268	148
Gross Inventories	<u>2 859</u>	<u>2 926</u>	<u>67</u>
<u>Reserves</u>			
Essential Materials	56	58	(2)
Spare Parts & Standby	506	440	66
Special Materials	-0-	153	(153)
Total Reserves	<u>562</u>	<u>651</u>	<u>(89)</u>
<u>Net Investment</u>	<u>\$2 297</u>	<u>\$2 275</u>	<u>\$ (22)</u>

2. General Accounting*

As of May 31, 1962 seventeen active projects had incurred costs of \$7,915,418 against authorized funds of \$11,667,200. Outstanding commitments totaled \$784,780.

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Project CAC-925, "Purex 216-A-2 Crib Replacement" was transferred to the AEC. Total General Electric cost was \$7,983.

Four (4) appropriation requests were approved in June with a total authorization of \$60,894, as follows:

<u>AR No.</u>	<u>Operation</u>	<u>Description</u>	<u>Amount</u>
26058	Finished Prod.	Shipping Equipment for 1251 Models	\$28 500
26063	Purex	Air Compressor - Hot Semi-works	18 900
26061	Finished Prod.	Carbon Analysis Apparatus	9 864
26062	Purex	Metal Cutting Saw	3 630
Total Authorization			<u>\$60 894</u>

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

3. Personnel Accounting

An employee who had previously been discharged and reinstated as the result of an arbitration award, was discharged again in June for falsifying reason for absence from work.

Manager - Finance

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CHEMICAL PROCESSING DEPARTMENT
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JUNE, 1962

III. PERSONNEL ACTIVITIES

A. FORCE SUMMARY

<u>Operation</u>	<u>Monthly Salaried</u>		<u>Weekly Salaried</u>		<u>Total</u>	
	<u>5-31-62</u>	<u>6-29-62</u>	<u>5-31-62</u>	<u>6-29-62</u>	<u>5-31-62</u>	<u>6-29-62</u>
General Manager's Group	11	11	1	1	12	12
Financial	14	14	15	15	29	29
Research & Engineering	65	62	26	28	91	90
Facilities Engineering	62	61	20	23	82	84
Power & General Maintenance	39	39	243	246	282	285
Production	5	5	4	4	9	9
Redox	47	51	203	201	250	252
Purex	64	64	247	247	311	311
Finished Products	<u>53</u>	<u>53</u>	<u>259</u>	<u>261</u>	<u>312</u>	<u>314</u>
Total	<u>360</u>	<u>360</u>	<u>1 018</u>	<u>1 026</u>	<u>1 378</u>	<u>1 386</u>

B. PERSONNEL CHANGES

R. G. Barnes - Senior Engineer, Research & Engineering promoted to:
Manager-Redox Technology, Research & Engineering

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C. TRIPS

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To Other G.E. Components</u>		
W. T. McKeown	New York, N.Y.	Accounting Practices.(6/18/62)
	Schenectady, N.Y.	" " (6/19-20/62)
	Chicago, Ill.	" " (6/21-22/62)
C. W. Smith	Waterford, N.Y.	Elastomers in cork containers. (6/7/62)
<u>To AEC and Other AEC Contractors</u>		
W. S. Frank	Dow Chemical Co.	Consultation on plutonium
A. E. Smith	Rocky Flats Plant	fabrication. (6/4-5/62)
R. E. Smith	Denver, Colorado	
	Los Alamos Scientific Lab., Los Alamos, New Mexico	Discussions on specification trends and future requirements. (6/6/62)
	Sandia Corporation Albuquerque, N.Mex.	IMOG legality discussions and ALO standards discussions. (6/7/62)
	Albuquerque Operations Office, AEC Albuquerque, N.Mex.	IMOG legality discussions. (6/7/62)
	Sandia Corporation Livermore, Calif.	Tour of mock-up shop. (6/8/62)
	University of California, LRL, Livermore, Calif.	Discussions on specification trends and future requirements. (6/8-9/62)
J. B. Fecht	Dow Chemical Co.	Fabrication processes and
E. O. Swain	Rocky Flats Plant Denver, Colorado	process equipment. (6/4-5/62)
W. J. Gartin	Sandia Corporation Livermore, Calif.	Tour of mock-up shop. (6/8/62)
	University of California, LRL, Livermore, Calif.	Specifications and requirements. (6/8/62)
	Albuquerque Operations Office, AEC Albuquerque, N.Mex.	Production scheduling. (6/11-12/62)

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<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To General Industry</u>		
W. H. Koontz	Various vendors and fabricators, Newark, N.J. and St. Louis, Mo.	Inspect process equipment. (5/30-6/3/62)
J. F. Kane	Vendors' representatives, Spokane, Washington	To inspect closed circuit television. (6/11/62)
R. H. Silletto	Northwest Copper Co., Portland, Oregon	Consultation on fabrication. (6/14-15/62)
D. E. Braden	N.American Aviation, Los Angeles, Calif. and Ethyl Corporation, San Francisco, Calif.	To inspect nitrogen generation. 6/25-26/62)
<u>To Conventions and General Meetings</u>		
B. F. Campbell	1962 Nuclear Congress, New York, N.Y.	Presented paper on "Management of High-Level Wastes-Current Practice" (6/4-6/62)
R. E. Tomlinson	American Standards Assn., meeting of Committee N5.2, New York, N.Y.	Radioactive waste disposal. (6/4-6/62)
C. W. Smith	1962 Nuclear Congress, New York, N.Y.	To present technical paper at 1962 Nuclear Congress and to attend meeting of ASA Subcommittee N5.5. (6/4-6/62)
M. K. Harmon	1962 Nuclear Congress, New York, N.Y.	To present paper before the 7th Nuclear Congress. (6/2-7/62)
N. S. Wing	New Orleans, La.	Mass Spectrometer Conference ASTM Committee E-14. (6/1-8/62)
W. C. Johnson	Pullman, Wash.	Presented paper at Northwest Regional Meeting, A.C.S. (6/19/62)
W. G. Browne	Kiwanis Clubs of College Place and Walla Walla, at College Place, Wash.	Spoke on "The Fabulous Three-Way Split," as member of Speakers Bureau. (6/25/62)

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D. VISITORS

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From Other G.E. Components</u>		
Earl Faragher Richard Bennett John Schuster	GE-New York, N.Y. GE-Seattle, Wash. GE-Los Angeles, Calif.	Equipment Inspection. (6/18/62)
Dr. L. R. Fink	Palo Alto, Calif.	General plant tour. (6/27/62)
L. Foley J. E. Larsen	Manufacturing Services Schenectady, New York	Numerical input system discussion. (6/29/62)
<u>From AEC and Other AEC Contractors</u>		
F. J. Quinn B. D. Troyer R. A. Vandergrift	Dow Chemical Co. Rocky Flats Plant Denver, Colorado	Consultation on plutonium chemistry and fabrication, aqueous recovery, Pu solid. electrodeposition. (6/4-7/62)
G. F. Quinn	US-AEC Washington, D.C.	Weapons fabrication. (6/4/62)
C. Powell S. H. Smiley J. H. Fashley	Union Carbide Nuclear Company Paducah, Kentucky and Oak Ridge, Tenn.	Discuss UO ₃ specifications and shipments. (6/11-12/62)
T. R. Workinger B. Schwartz	US-AEC Washington, D. C.	Waste management program, fission product recovery and measurements. (6/11/62)
F. P. Baranowski	US-AEC Washington, D. C.	Waste management program. (6/13/62)
J. A. Porter	duPont Company Aiken, S. Carolina	Pu deposition from molten salts. (6/14-15/62)
Frank Browder	Union Carbide Nuclear Co. Oak Ridge, Tenn.	Design of concentrator and waste disposal equipment. (6/20/62)
P. T. Hibdon G. W. Repp E. A. Stisser	Lawrence Radiation Lab. Livermore, Calif.	MC-1251 shipping test. (6/20/62)

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<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
A. J. Schwertfeger	duPont Company Aiken, S. Carolina	Process Equipment rehabilitation. (6/22/62)
R. E. Blanco	Oak Ridge National	Waste calcination.
J. O. Blomeke	Laboratory	(6/26-28/62)
J. M. Holmes	Oak Ridge, Tenn.	
M. E. Whatley		

From General Industry

W. P. Keith	W. P. Keith Co. Santa Fe Springs, Calif.	Resistance furnace specifica- tions. (6/7/62)
M. H. Fairchild	Pennsalt Chemical Company Los Angeles, Calif.	Decontamination chemicals. (6/19/62)
J. L. Mayer	Pennsalt Chemical Company Seattle, Wash.	Decontamination chemicals. (6/19/62)
Dr. K. Newman	Turco Products Co. California	Decontamination chemicals. (6/26/62)
F. Morris	Turco Products Co. Spokane, Wash.	Decontamination chemicals. (6/26/62)

From Colleges and Universities

J. P. Callanan	AEC Health Physics	Crane demonstration with L. R.
J. B. Dietzman	Fellowship Program	Wallis. (6/26/62)
W. T. Miller	U of W-Seattle, Wn.	
J. W. Spoonemore	AEC Health Physics	Crane demonstration with L. R.
T. A. Steele	Fellowship Program	Wallis. (6/27/62)
	U of W-Seattle, Wn.	

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JUNE - 1962

IV. SAFETY AND SECURITY

<u>Operation</u>	<u>FEO</u>	<u>Fin.</u>	<u>FPO</u>	<u>P&GM</u>	<u>Purex</u>	<u>Redox</u>	<u>Prod.</u>	<u>Rel. Prac.</u>	<u>R&E</u>	<u>Total CPD</u>	<u>YTD</u>
Dis. Injuries						1*				1	3
Ser. Accidents											1
Med. Treat.											
Injuries	2		11	21	12	2			2	50	217
Rad. Occur.			5		6	1				12	104
Contam. Wd.			1**							1	2
Pu Dep.			2			1				3***	6
Fires									1	3***	10
Sec. Viol.			1		2					1	6

* Retroactive from 1-19-62. Injured stepped down from bottom rung of railroad car to the ground. His foot landed on a 3" steam hose causing a twisting of his ankle resulting in the fracture. Injury did not respond to treatment and continued investigation revealed a chip fracture. Surgical repair was done on 6-19-62.

** Contaminated wound occurred when employee (FPO-Maintenance) was feeling around in hood for wrench, something punctured left index finger through gloves. Laceration of left index finger - incision, tissue excised to remove Pu.

*** Three deposition cases were confirmed. These all occurred within the last couple of months. No mpbb has been determined as yet.

**** Purex-Processing - Probable cause - live smoking material thrown into load lugger. Damage - \$10.00. (This occurred twice during the month.)

R&E - FP, 234-5 - Reduction furnace in reduction hood in Room 238 overheated and caused supports of furnace to glow red. Damage - \$10.00.

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JUNE, 1962

V. REPORTS

A. PREPARED AND ISSUED

- HW-61312 ADD 1 REV, Unclassified, "Specifications for Critical Mass Control, Redox Plant - E-Metal", dated May 25, 1962, by R. G. Barnes.
- HW-72909, Unclassified, "Process Engineering for a New Compressor Installation at Hot Semiworks", dated June 1, 1962, by H. L. Caudill.
- HW-73191, Official Use Only, "Project Proposal, Railroad Tunnel Air-lock and Decontamination Facility - Redox - Project CGC-941, Revision", dated June 18, 1962, by L. W. Finch.
- HW-73504, Secret, "Analysis of Cesium-137 in Coating Waste to Estimate Losses", dated May 3, 1962, by J. Mishima.
- HW-73579, Secret, "Special Pu Recycle at Purex", dated May 16, 1962, by B. F. Judson and H. C. Rathvon.
- HW-73647, Official Use Only, "Hazards Review Task Force Report", dated May 11, 1962, by G. R. Kiel for the Task Force.
- HW-73765, Confidential, "A Vertical Calciner for Converting Plutonium Nitrate Solution to Plutonium Dioxide Powder", dated June 1, 1962, by G. L. Stiffler and H. H. Hopkins, Jr.
- HW-73780, Secret AWD, "Progress Report, Finished Products Fabrication Technology - May, 1962", dated May 29, 1962, by A. E. Smith.
- HW-73882, Confidential, "Critical Mass Control Specification for Making Neutron Emissivity Checks on Buttons for Assessing Pu-240 Content", dated June 1, 1962, by L. M. Meeker.
- HW-73926 RD, Secret, "Purex Plant Production Schedule - June, 1962", dated June 11, 1962, by D. McDonald.
- HW-73927 RD, Secret, "Redox Plant Production Schedule - June, 1962", dated June 11, 1962, by D. McDonald.
- HW-73928 RD, Secret, "UO₃ Plant Production Schedule - June, 1962", dated June 11, 1962, by D. McDonald.
- HW-73929 RD, Secret, "234-5 Plant Production Schedule - June, 1962", dated June 11, 1962, by D. McDonald.

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- HW-73951, Unclassified, "Emergency Alarm Systems - Revision - CPD", dated June 7, 1962, by J. F. Kane.
- HW-73954, Confidential, "Critical Mass Control Specification - Rooms 138 and 139 - 234-5 Analytical Laboratory", dated June 11, 1962, by L. M. Meeker.
- HW-74030, Confidential, "Scheduled Shutdown - UO₃ and Redox Plants", dated June 15, 1962, by J. H. Warren.
- HW-74031 RD, Secret AWD, "Analysis of Dimensional Differences of Plutonium Metal Parts - Finished Products Operation", dated June 14, 1962, by W. W. McMahon.
- HW-74032, Secret, "Analysis of Three Groups of 3rd LW Blanket - H Material", dated June 18, 1962, by R. P. Ringle and J. C. Steinhauser.
- HW-74033, Secret, "Analysis of Two Groups of Fringe 105-H Material", dated June 18, 1962, by R. P. Ringle and J. C. Steinhauser.
- HW-74034, Secret, "Analysis of Two Groups of Ring 105-H Material", dated June 18, 1962, by R. P. Ringle and J. C. Steinhauser.
- HW-74050, Unclassified, "241-AX Tank Farm Need Date", dated June 19, 1962, by E. Doud.
- HW-74102, Secret AWD, "Capacity Indices Supplement to Chapter 18, Hanford ALO Production System Capacity Study No. 4", dated June 26, by W. J. Gartin.
- HW-74149, Secret, "Process Test 62-4-T", dated June 29, 1962, by W. F. Unicker.
- HWS-8250 (Specification) - for a 100,000 psi Isostatic Pressing System, 234-5 Building - 200-West Area, dated June 15, 1962, by D. D. Wodrich.

B. PREPARED FOR SIGNATURE AND ISSUANCE

- HW-73883, Secret, "Production - May, 1962", dated June 1, 1962, by W. E. Johnson.

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JUNE, 1962

VI. PATENT SUMMARY

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

INVENTOR

TITLE

None

P. H. Reinker

General Manager
Chemical Processing Department

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END

**DATE
FILMED**

4 / 13 / 93