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CHEMICAL PROCESSING DEPARTMENT MONTHLY REPORT

NOVEMBER, 1961

DECEMBER 21, 1961

HANFORD ATOMIC PRODUCTS OPERATION

RICHLAND, WASHINGTON

GENERAL ELECTRIC

[redacted]

HW 71895

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
FOR

NOVEMBER, 1961

80579

Compiled By
OPERATION MANAGERS

December 21, 1961

HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON

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

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CHEMICAL PROCESSING DEPARTMENT
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I. SUMMARY

Production through November, as compared with the October 25, 1961 HAPO Production Forecast (HW-71366), is summarized below:

	Percent of Forecast Achieved	
	November	Fiscal Year To-Date
Separated plutonium nitrate	113.2	99.1
Separated uranium nitrate	118.1	101.3
Uranium oxide	99.7	99.9
Plutonium metal buttons	119.3	118.8
Fabricated parts	92.1	99.5

November production was highly satisfactory and forecasted quantities were either achieved or exceeded for all products except fabricated parts. The production of fabricated parts fell slightly below forecast because of difficulties associated with a new model.

A successful neptunium recovery campaign was made in the Purex plant and yielded 1.6 Kgs. of product. Total recovered since January this year from the two separations plants slightly exceeds 10.0 Kgs.

Purex processing continued at a capacity factor of 3.3 until the scheduled shutdown on November 13, 1961 to recover the neptunium inventory. Both products, plutonium and uranium, met specifications.

The HAPO I cask, loaded with non-radioactive cerium as the double salt (Na_2SO_4-$Ce_2(SO_4)_3$) by Hanford Laboratories, was prepared for shipment to ORNL. Similarly, the HAPO II cask, loaded with non-radioactive strontium carbonate by Hanford Laboratories, was prepared for shipment to the Martin Company.

With the processing of current feed (aged 120 days after discharge from the reactors), some difficulty was experienced at the Redox plant in controlling Iodine-131 emission to the atmosphere. During early November, corrective action consisted of adding mercuric nitrate to the dissolver. Next, scrubbing of oxidizer off-gases was initiated. Each step successively improved Iodine-131 control, but not sufficiently. Since tests have shown activated charcoal to be an excellent absorbent for halogen gases, plans have been made to install a bed of activated cocoanut shell charcoal.

The prototype HF Wash Column, for washing Recuplex organic solvent, was operated successfully for 48 hours during November, processing both organic

solvent and "floor collected" Recuplex rework material. Material was processed through the column in about 20 hours, compared with two weeks previously required for blending into Recuplex feed streams.

A Work Authority, dated November 6, 1961, authorized an increase of $81,400 to the General Electric Company for Project CAC-928, "Leak Detection - High-Level Waste Tanks - 241-A and 241-SX." Advance notice has been sent out to prospective bidders, with bid opening expected to be January 4, 1962.

Design work has been initiated on a gamma monitor for use primarily in the fission products' program. It is now planned to install a sample cell with associated equipment in the Purex sample gallery to analyze quantitatively high activity level samples for Ce-144, Zr-Nb, and other isotopes.

A general spread of low-level contamination to the eastern half of the Purex exclusion area occurred on November 30, 1961. Fission products escaped from the trap pit because of failures in a process vessel steam coil and in the trap pit piping. Control and cleanup work was executed promptly.

P. H. Reinker

General Manager
Chemical Processing Department

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II. ACHIEVEMENTS

A. PRODUCTION OPERATION

1. Production Statistics

	November	Fiscal Year to Date
a. Percent of Forecast(1) Achieved		
Separated plutonium nitrate	113.2	99.1
Separated uranium nitrate	118.1	101.3
Uranium oxide	99.7	99.9
Plutonium metal buttons	119.3	118.8
Fabricated parts	92.1	99.5

b. Purex	November	October
Uranium nitrate produced (tons)	282.11	371.42
Average production rate during operation (T/D)	26.8	27.1
Total waste loss (%)		
Plutonium	0.24	0.37
Uranium	0.18	0.18
On-line efficiency (%)	47.4	44.2

c. Redox		
Uranium nitrate produced (tons)	101.82	131.34
Average production rate during operation (T/D)	7	7.8
Total waste loss (%)		
Plutonium	0.18	0.19
Uranium	0.12	0.14
On-line efficiency (%)	71.9	75.0

d. Uranium Reduction (tons)		
Normal UO_3 loaded	416.99	651.90
Enriched UO_3 loaded	147.25	136.22
Normal UO_3 approved for shipment	297.78	546.59
Enriched UO_3 approved for shipment	145.10	97.56
Normal UO_3 shipped	298.13	597.18
Enriched UO_3 shipped	147.21	48.07
Normal UNH backlog	21	149
Enriched UNH backlog	113	156

(1) HW-71366, HAPO PRODUCTION FORECAST, dated 10-25-61

e. Plutonium Metal Processing	November	October
Input to Task I (batches)	216	251
Reduction yield (%)	96.1	97.57
Product recovery output (Kgs)	82.36	198.58
Product recovery backlog (Kgs)	588.5	497.6
Waste disposal (grams)	41	626

f. Power	200-East	200-West
Raw water pumped (gpm)	7 545	4 449
Filtered water pumped (gpm)	863	993
Maximum steam generated (lbs./hr.)	262 000	148 000
Average steam generated (lbs./hr.)	147 500	113 276
Total steam generated (M lbs.)	106 248	81 559
Coal consumed (est. tons)	5 805	4 447

November production was highly satisfactory and forecasted quantities were either achieved or exceeded for all products except fabricated parts. The production of fabricated parts fell slightly below forecast because of difficulties associated with a new model.

A successful neptunium recovery campaign was made in the Purex plant and yielded 1.6 Kgs. of product. Total recovered since January this year from the two separations plants slightly exceeds 10.0 Kgs.

V R Chapman

for Manager - Production

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II. ACHIEVEMENTS (Continued)

B. PUREX OPERATION

1. Operating Continuity

The plant operated at a CF of 3.3 for the first thirteen days of the month except for two shutdown periods of twelve and nine hours. The plant was then shut down for scheduled maintenance work for the remainder of the month.

A successful neptunium recovery run was made during the shutdown period. All plutonium produced met specifications.

Approximately 9,000 gallons of UO_3 recovered nitric acid were lost to the chemical sewer through an open strainer valve. With this exception product waste losses were normal.

2. Processing Operation

Eleven PR cans of high gamma plutonium product and three PR cans of recycled 234-5 plutonium were processed through the ion exchange unit during the shutdown period.

Approximately 240 kilocuries of "rough-cut" strontium 90 crude were recovered and transferred to the 003 CR vault tank.

The HAPO I cask, loaded with non-radioactive cerium as the double salt (Na_2SO_4-$Ce_2(SO_4)_3$) by Hanford Laboratories, was prepared for shipment to ORNL. Similarly, the HAPO II cask, loaded with non-radioactive strontium carbonate by Hanford Laboratories, was prepared for shipment to the Martin Company.

Two 200-gallon casks of oxalate waste were shipped to the 300 Area High Level Cells for research and development studies.

Limestone neutralization of Process Condensate Waste was discontinued on 11-16-61.

3. Mechanical Experience

Temporary shutdown of normal processing occurred during failure of the F-10 backcycle pump jumper (12 hours), and the J-5 second cycle plutonium feed pump (9 hours). The J-5 pump failed as a result of mechanical seizure.

Flanged carbon steel piping assemblies in Trap Pits #2 (F-6 high level waste concentrator condensate line) and #5 (J-8 first cycle uranium concentrator condensate line) were replaced with stainless steel, all-welded piping. The J-8 concentrator condensate discharge was converted from steam trap to in-cell diaphragm-operated valve control.

The E-2 centrifuge that failed on 2-10-61 was removed from E-2 position for future reclamation and replaced with a reconditioned spare unit. The E-4 centrifuge thermohm, E-4 diverter, E-2 power supply, and E-2 diverter jumpers were replaced.

The rotor and fan housing of #3 and 3-A fresh air supply fans were scraped, sandblasted, and painted to remove heavy calcium deposits. This increased the air flow substantially.

Bearings were replaced on 291-C exhaust fan motor at the Hot Semiworks and on #2 canyon exhaust fan motor as a preventive maintenance measure.

The final uranium product transfer pump (K-6) was replaced with a spare when upper seal leakage became excessive.

4. Radiation Experience

The total radio-iodine 131 emission was 5.3 curies for the period. The maximum seven-day emission was 4.4 curies. There were nine Radiation Occurrences and five cases of skin contamination.

A reverse flow in the service piping to the first cycle waste concentrator (F-11) on 11-22-61 caused high dose rates and a localized spread of contamination to the Pipe and Operating Gallery.

A general spread of low-level contamination to the eastern half of the exclusion area occurred on 11-30-61 when the waste rework tank (F-8) coil failed and allowed the emission of fission products through failed piping in the #2 trap pit at the rear of the Purex Building. Contamination control and cleanup was prompt.

Two process steam bundles, which had failed, were transferred to the Equipment Burial Ground without incident on 11-10-61.

P R McMurray
Manager-Purex

PR McMurray:RDP:gt

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II. ACHIEVEMENTS (Continued)

C. SPECIAL SEPARATION PROCESSING AND AUXILIARIES OPERATION

1. Operating Continuity

The Redox Plant resumed E-metal processing on 11-6-61, after a ten day shutdown (October 26 to November 6) to allow feed metal aging time. Except for two short interruptions, one to replace a processing pump and the other to repair a leak in the raw water supply line to the building, processing operations were conducted as scheduled. With the processing of current feed (aged 120 days after discharge from reactors), some difficulty was experienced in controlling I-131 emission to the atmosphere and it was necessary to reactivate the scrubber for the vessel vent system.

2. Processing Operations

During October the accumulated backlog of enriched uranium metal feed was depleted. As a result, E-metal processing for November was delayed until 11-6-61 to allow additional feed metal aging (minimum of 120 days after reactor discharge). Processing for the balance of the month was conducted as scheduled, except for 25 hours of downtime on 11-6 and 11-7-61 to replace the pogo pump in the E-2 plutonium ozonator and repair the spare line motor relay on the 60-ton canyon crane, and a 20 hour shutdown on 11-27-61 to repair a leak in the raw water supply line to the building.

With the start of the current metal feed processing (aged 120 days) on 11-6-61, mercuric nitrate additions to the metal solution were started to help suppress the release of I-131 from the vessel vent system. However, after only a short period this was discontinued, when evidence developed that the mercury might be carrying through the process as a plutonium contaminant. Subsequent exhaustive quantitative analyses revealed that mercury was present only in a very small concentration (less than 100 parts per million parts of plutonium) and would not be hazardous during further plutonium processing. The 13 PR cans of plutonium, which were temporarily held up pending analytical results, have now been released to the Finished Products Operation for final processing.

When mercuric nitrate additions to the metal solution were discontinued, as noted above, the H-5 caustic scrubber was reactivated in an effort to control I-131 emission to the 291-S

stack. This action was taken since special sampling equipment installed on the off-gas streams leading to the stack have indicated the H-4 oxidizer vent system as the major source of iodine emission.

Operation of the G-3 hexone stripper, which was restricting the process rate to approximately 80 percent due to low heat transfer, was restored to full capacity following a 10 percent nitric acid flush of the pot on 11-3-61. The build-up of an organic film is believed to be responsible for the decreasing heat transfer. An attempt will be made to determine the film composition so that its recurrence can be minimized or prevented.

3. Mechanical Experience

The west tube in the D-12 waste concentrator was successfully installed on 11-4-61 after the tube bundle well was given a special sluice flush treatment. A special sluicing jumper, fabricated during the latter part of October, was instrumental in removing a considerable amount of sludge from the bottom of the well. This sludge build-up was apparently the cause of the tube bundle not seating properly during previous installation attempts.

The pogo pump in the E-2 plutonium ozonator tank failed and was replaced with a new unit on 11-7-61. The installation was complicated when the power to the spare line on the 60-ton canyon crane failed and left the pogo jumper suspended on the hook over the cell. It was finally dislodged and dropped into the cell so that the crane could be moved into the barn for repairs. A broken wire to a relay was subsequently found and repaired. The jumper, although slightly bent, was retrieved from the cell, installed, and to date the unit has operated satisfactorily.

The H-5 caustic scrubber recirculation pump was replaced with a new unit on 11-26-61. Operation of the old pump was unreliable, continuing to kick out after varied periods of operation. The replaced pump had 5,365 hours of operating time since it was originally installed on 6-2-58.

The number two air compressor for the 202-S Building failed on 11-21-61 when a key on the oil pump shaft sheared. Repairs were completed and the unit was back in service on 11-22-61. A portable compressor was brought in and used as a spare while repairs were being made.

On 11-25-61, a leak was detected in the eight inch raw water line to the 241-SX tank farm. Excavation on 11-27-61 revealed that the leak was in a valve flange approximately four feet off the twenty inch water line to the Redox Plant. Repairs were made and the system returned to service on 11-28-61. Approximately 20 hours of lost processing time for the Redox

Plant resulted.

A new teflon liner was successfully pulled through an in-concrete steam line (DG-30) from the north pipe gallery to D-cell in the Redox Canyon. The new liner is equipped with a protective nozzle on the cell side, which should overcome a weakness in the original liner installation. At month end a new steam jumper had been installed and actual testing of the liner under operating conditions was started.

4. Waste Handling and Decontamination

Processing equipment valued at $15,213 was decontaminated, repaired and returned to CPD customers this month. A savings of approximately $13,640 over the cost of new replacement equipment was realized. In addition, a savings of approximately $3,000 was realized on equipment for other HAPO operations.

A total of 251 man-hours was charged to the decontamination and repair of railroad, automotive, and heavy equipment. The following is a breakdown of the major items decontaminated:

Item	Operation Charged
Well Cars No. 38 & 44	CPD
Flat Cars No. 3622 & 19061	Redox
Tractor Trailer No. 68E-3633	Purex & P&GM
Flatbed Truck No. 68-907	Purex & P&GM
Motor Crane No. 10797	Purex & P&GM
Motor Crane	P&GM
Water Truck	P&GM
Sedan No. 1A-1016	Patrol
Hanford Jumper Heads (6)	Minor Construction
Hanford Jumper Heads (20)	CPD

5. Radiation Experience

Three radiation occurrences were recorded during the month. Most significant was an occurrence which involved the deposition of 5×10^6 d/m smearable plutonium contamination on the greenhouse viewing room floor in the 233-S Concentration Building. No personnel exposure was involved. It is believed that an imbalance of the 233-S ventilation system occurred during a high wind condition (50 mph) on the 12-8 shift, 11-22-61. The contamination has been fixed and clean-up work to restore the area to normal status is underway.

The total I-131 emission from the 291-S stack during November was 12.75 curies. The average per day was 0.425 curies and the maximum for a 24 hour period was 1.79 curies. During the seven day period 11-17 through 11-23-61, 4.08 curies were emitted from the stack. This higher than normal emission has been attributed to the combined effects of shorted metal feed cooling times, malfunctioning of the H-5 caustic scrubber system, and failure of the H-5 recirculation pump. The pump and associated

jumpers have now been replaced and better performance in this area is expected with subsequent operation.

6. Analytical Experience

In attempting to calibrate the Sharp Low Beta Counter, difficulty was experienced in obtaining an even spread of activity on the steel counting dish. Since the major difficulty appeared to be a pile up of the sample on one side of the dish due to surface tension, efforts were directed toward breaking this by using alcohol on the partially dried sample. This approach appears to be successful and it is expected that calibration of the instrument for Sr^{90} and Y^{90} will be completed during December.

Four foot-operated solenoid valves were installed in the primary sampling cave in room 2B. The new valves will allow the addition of reagents and solutions by remote control, thus reducing radiation exposure and possible spillage, plus providing a better quality analytical result.

Development and application of new cleaning techniques permitted utilization of used lead bricks obtained from the 300 Area burial grounds, for the modification and enlargement of the detector shield for the multi-channel gamma energy analyzer. Surveys, at the required less than 20 c/m level, were accomplished on 65 bricks by means of a scintillation detector connected to the single channel analyzer.

7. Events Influencing Costs

The Redox Plant was shutdown during the Thanksgiving holidays (November 23-24) and only those people necessary to carry out miscellaneous standby assignments were scheduled to work.

Chas. S. Drosuth

Manager - Special Separation
Processing and Auxiliaries

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II. ACHIEVEMENTS (Continued)

D. FINISHED PRODUCTS OPERATION

1. Operating Continuity

Continuity of operation was affected by feed shortages resulting in low output (76% of schedule) of unfabricated plutonium. Plutonium recovery output was 49 percent of schedule attributable to high waste losses and mechanical failures. The continuity of operation in the casting facilities of the Fabrication Operation was affected by the shortage of metal, with 22 percent of the available operating time lost. The uranium reduction operation was normal.

2. Processing Operations

a. Plutonium Fabrication

Information on plutonium fabrication is presented in Document HW-71920 entitled "Chemical Processing Department, Finished Products Operation, Z Plant Monthly Report, November, 1961" which is classified "Secret, Atomic Weapon Data, Production Rate and Stockpile Quantity Information."

b. Plutonium Processing

Feed shortages limited the operation of the plutonium processing facilities. Mechanical difficulties did not adversely affect production, and all materials were processed when available.

The recovery facilities were plagued with equipment failures, process difficulties, and high waste losses resulting in an output of 49 percent of schedule. The process difficulties were not resolved at month end.

The incinerator ventilation systems were tied into the operating systems and balanced in preparation for the initial "hot start-up" runs.

c. Uranium Reduction

Production of depleted uranium oxide was limited by feed shortages; otherwise, plant operation was normal.

3. Mechanical Performance

Plutonium fabrication equipment operated satisfactorily during the month. Minor mechanical problems were solved during the down-time resulting from lack of feed.

Minor mechanical failures interrupted the plutonium processing line but were corrected without affecting the output. Plutonium recovery equipment required excessive maintenance work on leaking valves, pump failures, line leakage, etc.

There were no major equipment failures of uranium reduction equipment during the month.

4. Radiation Experience

In-line multiplication tests demonstrated the fact that casting stacking was critically safe. Stacking within the limits set is resulting in a personnel neutron exposure problem. Tests are being conducted to determine the neutron attenuation rates for borated polyethylene to better define shielding requirements.

Contamination statistics indicate satisfactory control during the month. One case of minor plutonium deposition (trace levels) occurred when an operator sustained a puncture wound.

5. Analytical Experience

	October	November
Number of Samples Received	2,305	1,901
Number of Determinations	15,503	14,654
Total Metallic Impurities, Buttons	846 ppm	623 ppm
Total Carbon Content, Buttons	460 ppm	255 ppm
Buttons Rejected	1.4 %	0

W J Gartin

Manager,
Finished Products

II. ACHIEVEMENTS (continued)

E. POWER AND GENERAL MAINTENANCE OPERATION

1. Operating Continuity

Power services (steam, water and emergency electrical services) were supplied the production facilities, in quantities sufficient to effectively maintain continuity of operation for the entire period covered by this report.

2. Inspection, Maintenance and Repair

Work on the Purex J-Cell package for continuous Palm recovery is temporarily halted due to the failure of the offsite-procured pulse columns to pass inspection. The columns have been returned to the vendor for corrective alterations; however, the overall delay is not anticipated to be longer than five weeks. Erection of the dunnage is complete and awaiting installation of the columns.

Fabrication of a Mark V Dissolver for the Redox facility has shown excellent progress and is an estimated two weeks ahead of schedule at this time.

Considerable modifications and additions to the existing 233-S Building hood were required to accommodate installation of the continuous-Birch-recovery ion-exchange contactor at the Redox facility. Included in the work was the fabrication of sections of the hood addition, removal of lucite panels, and installation of temporary stainless-steel covers. The size and location of the hood dictate that it be installed in small sections and under extremely adverse conditions due to contamination. The work was progressing satisfactorily at month's end.

Special emphasis was placed on the preparation of a spare D-12 waste-concentrator tower for the Redox facility. Failure of the in-service unit necessitated its urgent replacement. Shop work on the spare unit was complete at month's end.

Corrective alterations to a spare precycle decontamination (HA) column for the Purex facility were completed, and the vessel was placed in Spare Parts storage. The vessel's pulse-leg flange was out-of-specification as received from the vendor, necessitating removal and reorientation of the flange and hydrostatic testing of the vessel for leaks.

Other vessel components made ready for future service at the Purex facility included the mockup and installation of a #37 concentrator tube bundle.

Fabrication of an off-gas heater, of the type required in the removal of radioactive iodine at Redox, was complete at month's end. The unit was made ready for service and placed in standby status.

A considerable portion of the output of the Machine Shop and of the Tool and Die Shop was directed toward the support of the fabrication line in Hanford Laboratories Operation's 231-Z facility. Included was the fabrication of gauge assemblies, vacuum chucks and other special tools for the Gorton lathes, and storage pallets and cooling blocks for the assembly lines.

A record was achieved during the month when 38 cell pipe jumpers were fabricated without the use of overtime. Eleven of the jumpers were for the Palm Project at Purex, eight were for the Redox Birch Project, eleven were Purex replacements, and eight were Redox replacements. Three each of the Purex and Redox replacement jumpers were required on an emergency basis.

Installation of a second Sheffield Gauge and accompanying hood for the Finished Products Operation was an estimated 96% complete at month's end. The remaining work consists of panel installation, revisions to the diverter arm, incidental piping and wiring, and leak testing.

The Pipe and Operating Gallery piping phase of the Purex Palm Project is approximately 25 % complete; however, progress has been somewhat retarded by the lack of necessary materials being procured from off-site, and, secondly, by inadequate shutdown time for making process tie-ins. Installation of three new samplers was approximately 70% complete at month's end.

Modifications to the Injection Casting Hood and associated equipment at the Hanford Laboratories Operation's 231-Z facility are in progress. The work is required in order to permit the equipment to be used for research on high-temperature-phase transformation of plutonium. Involved is the installation of electrical heating elements; increasing the vacuum-system range to 25 microns; providing a lifting hoist, instrumentation and required service piping.

Routine inspection of the emergency generators in the East and West Power Houses disclosed the East Area unit to be in excellent condition; however, the West Area turbine shaft was bent approximately 12 mils, and was vibrating slightly. It was immediately replaced. The inspection, by a representative of the Terry Turbine Co., was in accordance with procedures established in 1958 to inspect the emergency generators every three years, under the supervision of a factory representative. The bent shaft, complete with turbine wheel, will be shipped to an off-site repair shop for corrective alterations.

A hydrostatic test of No. 4 Boiler in the 284-E Power House revealed one connector tube and seven waterwall tubes to be leaking at the lower header. The tubes were rerolled with satisfactory results, and the boiler is available for service at this time.

A liquid-level gauge assembly, containing an electronic sensing device, was installed in the 002 tank in the 241-TX Tank Farm. Signal cables connect the sensing device to a field selector unit. Telephone lines connect the field selector to receiving unit, which is similar to a dial telephone, and is located in the engineers' office in the 271-T Building. When dialing the 002 tank, using a predetermined number, the liquid level is indicated at the receiving station. The installation was in support of an engineering development program, sponsored by the Facilities Engineering Operation.

T. S. La Follette

Manager
Power & General Maintenance

TGL:ap

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (continued)

F. FACILITIES ENGINEERING OPERATION

1. Purex

a. Process Design Engineering

Fission Product Gamma Monitor

Design work has been initiated on a gamma monitor for use primarily in the fission product program. It is now planned to install a sample cell with associated equipment in the Purex sample gallery, to quantitatively analyze high activity level samples for Ce^{144}, Zr-Nb, and other isotopes.

This practical application in the high-level radiochemical facility is based on development work by Hanford Laboratory components on shielding collimators and energy analyzers. Detailed design of the sample cell and the collimators has been initiated. The portable 400-channel gamma energy analyzer is to be used for initial tests of the method.

Effluent Sampler - A-30 Crib

Design and drawings were completed for a new type effluent sampler. This sampler takes a uniform sample of the liquid in which it is submerged. The unit consists of a bottle, capillary tubing in the cork and a weight to submerge the bottle. For the A-30 installation, a carrier assembly on guide rods was designed to raise and lower the sample into the crib effluent box.

b. Project Engineering

CGC-821 - Project Palm - Purex

Two pulse columns (plus two spares), fabricated by Allied-Engineering and Production Corp., of Alameda, California, had many welds which lacked full penetration and have been returned to the vendor for repair. These columns are to be installed in the "J" Cell package.

CGC-897 - Rev. #1 - Fission Product Concentration Storage System - 200 East Area

Drilling of the 14-inch ventilation holes was resumed on November 16, after replacement of the drill shaft which had broken while drilling the first hole. Six of the 84 holes required have been completed. Equipment removal from cells was completed except for Cell 9 which will remain in service to jet out waste water. Only Cells 8 and 11 will require extensive decontamination.

2. Special Separations Processing

a. Process Design Engineering

Equipment Burial and Transfer Containers - Design of burial containers for the H4 vessel and H4 tower were completed. Design of an inner and outer burial container for silo jumpers was also completed. The design of a box for tube bundle burial was initiated.

Alpha Energy Analyzer - A solid-state-type of alpha detector and amplifier is being investigated for use in detection of Brandy and plutonium in samples of high gamma and beta activity.

b. Project Engineering

CAC-928 - Leak Detection - High-level Waste Tanks - 241-A and 241-SX

A Work Authority, dated November 6, 1961, authorized General Electric Company an increase of $81,400 for a total of $101,400. Information for a fixed-price contract for drilling of the vertical tests wells was completed this month and the advance notice to prospective bidders has been sent out. Bid opening is expected to be January 4, 1962.

3. Finished Products

a. Process Design Engineering

RMC Fabrication Line - Mold design for the new #3000 shape has been completed and the approved drawing has been issued. A new machine for polishing fabricated parts was designed, fabricated, and installed.

b. Project Engineering

CGC-811 - Additional Pu Fabrication Facilities - 234-5 Building

The HC-42 machining complex was placed in operation on October 30, 1961. Installation of lead shielding on the HC-458 Storage Hood and the HC-40 Degreasing and Briquetting Hood is nearly completed.

4. General

a. Process Design Engineering

Fission Product Shipping - Discussions on a design verification program for HAPO-designed shipping casks were held with representatives of General Engineering Laboratory, Oak Ridge National Laboratory and the University of Texas.

b. Project Engineering

Project Cost Information - as of 11/19/61:

Total Authorized Funds - 11 active projects	$11,049,000
Total Cost-to-Date	5,964,000
Commitments and Open Work Releases	1,223,000
Unencumbered Balance	3,862,000
Costs charged to above projects 10/22 - 11/19/61	277,340

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

A project proposal requesting authorization of funds to provide purified strontium storage facilities at Hot Semiworks and a replacement waste crib was transmitted to the Atomic Energy Commission on November 8, 1961.

Manager - Facilities Engineering

HP Shaw:olc

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

G. RESEARCH AND ENGINEERING OPERATION

1. Purex Process Technology

a. Fission Product Recovery

Strontium recovery operations continued during the month with the completion of ten sulfate runs, five oxalate runs and three concentration runs. Stepwise reduction of the sulfate concentration from 1.0 to 0.75 to 0.50 M in the tank during precipitation was tested. No increase in strontium loss was noted at 0.75 M, and the results at 0.50 M are still being evaluated. Increasing the temperature from 60 to 65° C during centrifugation had no significant effect on strontium recovery.

Special, large volume samples, obtained during strontium runs, showed that seventy per cent of the promethium was lost to the sulfate precipitation waste and the remaining thirty per cent separated from the strontium during the oxalate step. This data explains the poor promethium recovery during the promethium-cerium test runs and supports the feasibility of the peroxyacetate process for producing a rare-earth-free cerium product.

b. Solvent Extraction

Plant operation continued until a scheduled shutdown on November 13. Except for a brief period of recovery following an emergency shutdown, overall solvent extraction performance was good. Solvent extraction uranium product generally ranged between 4.5 and 6.2 in gamma ratio and was reduced to $\leq$2.0 by silica gel treatment. The plutonium ion exchange product was generally acceptable for further processing except during the upset period, when two batches were recycled to solvent extraction for rework.

Two successive brief shutdown periods, at equilibrium conditions, were required on November 7 to replace a failed feed jumper to the Backcycle Waste Concentrator and a failed 2A Column feed pump. Subsequent startups produced a severe burst of gamma activity which originated in the First Decontamination Cycle and extended throughout the plant. Because the bulk of the radioactivity followed

the plutonium and resulted in out-of-specification plutonium product, uranium product was recycled for two shifts to absorb the plutonium rework. Decontamination steadily improved with continued operation throughout the solvent extraction system; however, normal performance was not attained prior to shutdown.

c. Neptunium Recovery

Neptunium accumulation in the Backcycle Waste System (3WB stream) was good during the operating period except for two periods of temporary high losses by the following mechanisms: (1) via the uranium product (2EU stream) following a flood in the 2D Column and (2) via the HAW after startup subsequent to the emergency shutdown. Overall accumulation represented retention of 77 per cent of the neptunium introduced into the HA Column with virgin feed during the run period.

A neptunium isolation and decontamination run was made during the shutdown based on the standard hydrazine ferrous sulfamate flowsheet. Eighty-nine per cent of the accumulated neptunium was recovered to yield an overall recovery efficiency for the run period of about 69 per cent.

d. Plutonium Concentration

Performance of the Plutonium Ion Exchange Unit was excellent with a decontamination factor of about twenty being achieved. After 41 days of operation (60 days in the unit) resin samples revealed an average concentration of 700 uc/gal. Zr-Nb. This compares favorably with the 450 uc/gal. analyzed during the first portion of the run period, and was significantly lower than the 2000 uc/gal. measured just prior to the August shutdown (after ~ 45 days operation). Although the resin appeared to be in good condition with only a normal amount of fines, it was replaced during the shutdown to preclude pushing difficulty during the next run period.

Approximately 20 Kg. of plutonium were reworked through the ion exchange unit during the plant shutdown; however, the decontamination performance experienced was very poor (from DF = -2 to DF = 1.7). Cross-contamination in the subsequent sampler tank and product handling facilities appeared to be the principal reason for the high gamma activity in the rework product.

e. Solvent Treatment

The gamma activity in the Soltrol-170 diluent solvent of the No. 1 System remained in the 3000 - 4000 uc/gal. range throughout the month. Average composition of the solvent gamma activity was 85 - 90 per cent ruthenium and 10 - 15 per cent zirconium-niobium, which reflects a slight increase in the percentage of ruthenium over previous operating periods. Continued plant operation has shown that in plant solvent the Ru/ZrNb activity ratio in the solvent is higher when Soltrol-170 is employed as a diluent than when Shell E-2342 is used.

2. Redox Process Technology

a. Solvent Extraction

Two previous tests have demonstrated that the partition column plutonium product stream (1BP-Pu^{III}) was successfully oxidized in the extraction section of the second plutonium decontamination cycle column (2A) when the scrub stream (2AS) was 0.2 M HNO_3 and 0.3 M $Na_2Cr_2O_7$. However, decontamination was adversely affected with the third plutonium product stream (E-3) gamma increased by a factor of five. A third test completed during the month used a scrub stream containing 0.3 M $Na_2Cr_2O_7$, 0.0 M HNO_3 which also adversely affected decontamination, contrary to expectations. It has been postulated that Cr^{VI} is extracted and reduced to Cr^{III} in the organic phase and follows the aqueous product stream to the plutonium ozonator (E-2) where it destroys the sodium bismuthate and reduces the decontamination normally attained in the ozonator. Subsequent tests will introduce the sodium dichromate lower in the 2A Column (four feet below the feed point). Less Cr^{VI} should be extracted under these conditions and, if the postulation is correct, decontamination will not be adversely affected.

Laboratory studies of the operation of the first cycle decontamination (1A) and partition (1B) columns indicated that the sodium dichromate used as a holding oxidant in the scrub stream (1AA) may be responsible for the intermittent plutonium reflux seen in the 1B Column (reported previously in February and May, 1961). It was found that Cr^{VI} present in the 1AA scrub was extracted into the organic stream together with the uranium and plutonium product. In the partition column the Cr^{VI} oxidized sufficient ferrous iron to prevent complete reduction of the plutonium to the aqueous favoring form (Pu^{III}), thus causing the plutonium to reflux. Sodium dichromate was eliminated from the 1AA scrub stream during the month without apparent effect on the 1A Column operation. Operation of the 1B Column since this process change has been very satisfactory; however, additional operating experience will be required to fully evaluate column performance.

The heat transfer attainable in the organic still pot (G-3) decreased until hexone distillation limited the processing rate during August, 1961. However, after a ten percent nitric acid flush, full capacity was restored. A second ten percent acid flush was necessary during November to restore heat transfer capacity. The build-up of an organic film is believed to be responsible. When another acid flush becomes necessary, an attempt will be made to determine the composition of the organic film so that its recurrence can be minimized or prevented.

b. I-131 Control

During the month of October, 1961, approximately six percent of the I-131 charged to the dissolvers was emitted to the Redox stack. Sampling of the metal solution oxidizer off-gases indicated that the major portion of the I-131 was emitted during oxidation. During the first half of November, metal solution in the dissolvers was butted with mercuric nitrate to a concentration of approximately 5×10^{-4} M to complex I-131 and prevent its emission during subsequent processing. This concentration of mercuric nitrate reduced the I-131 emission to 2.7 percent of that charged to the dissolvers. Mercuric nitrate addition was suspended at mid-month when qualitative analysis of the final plutonium product stream indicated mercury present. Exhaustive quantitative analyses showed that mercury was present in very small concentrations (less than 100 parts per million parts of plutonium), which would not be hazardous during further plutonium processing. When mercuric nitrate addition was suspended, scrubbing of the oxidizer off-gases with 15 percent caustic was initiated. Emission of I-131 was reduced to 1.9 percent of that charged to the dissolvers, an improvement over that attained with 5×10^{-4} M mercuric nitrate.

Off-site tests indicate that activated charcoal is an excellent adsorbent for halogen gases. Since neither the addition of mercuric nitrate nor caustic scrubbing has given adequate I-131 retention, a bed of 6-8 mesh activated cocoanut shell charcoal will be installed in the oxidizer off-gas stream, on a test basis, as soon as possible. Laboratory ignition tests indicate that there is no likelihood of ignition of the charcoal under conditions that could conceivably be encountered in the oxidizer off-gas system.

c. Waste Storage - 114-SX Sludge Dissolution Test

Recirculation of the 114-SX tank contents dissolved an additional three inches of sludge during the month. The sludge depth, as measured by tank soundings, has decreased from the initial 29.5 inches to 12.5 inches. The sludge temperature, which was 275 F initially, has decreased to 195 F at the end of November, 1961. The analytical results on samples taken to date are:

Date Sample Taken	10-18-61	11-2-61	11-27-61
Specific Gravity	1.112	1.226	1.248
pH	12.2	11.7	-
Free Caustic (NaOH)	6.5 g/l	8.6 g/l	-
Nitrate (NO_3^-)	1.64 M	3.47 M	-

Date Sample Taken	10-18-61	11-2-61	11-27-61
Nitrite (NO_2^-)	2.1 g/l	3.2 g/l	-
Chloride (Cl^-)	1.2 g/l	1.0 g/l	-
Sulfate ($SO_4^=$)	0.2 g/l	0.18 g/l	-
Aluminum (Al^{+++})	6.7 g/l	8.9 g/l	-
Chromium (Cr^{+6})	5.5 g/l	6.7 g/l	-
Gross Gamma	3.65×10^5 uc/gal	4.3×10^5 uc/gal	-
Gross Beta	3.7×10^5 uc/gal	4.6×10^5 uc/gal	-
Cesium (Cs^{137})	-	4.7×10^5 uc/gal	-
(Cs^{134})	-	1.4×10^3 uc/gal	-
Strontium (Sr^{90})	-	Not detectable	-
Neptunium (Np^{237})	-	$< 2 \times 10^{-5}$ gms/gal	-
Uranium	3.0×10^{-4} g/l	2.1×10^{-4} g/l	-
Americium-Curium	$< 4 \times 10^5$ $\frac{\text{counts}}{\text{min. X gal.}}$	$< 4 \times 10^5$ $\frac{\text{counts}}{\text{min. X gal.}}$	-

b. Finished Products Chemical Technology -

a. Metal Finishing Operation

1. Tasks I, II, and III

Statistical evaluation of spectroscopic analyses of buttons reduced with and without $AlSiO_3$ covers revealed a probably significant decrease in the frequency of buttons with iron content in excess of 500 ppm. The occasional high iron contamination, without the ceramic covers, is due to sporadic attack of the iron lids of the pressure vessel during the reduction reaction.

2. Recuplex

The increased use of sulfate-bearing materials in the stripping agent and in organic solvent and machining oil washing solutions, and a high incident of solvent extraction waste rework resulted in an increase in the extraction column sulfate concentration to an estimated 0.5 M. The distribution coefficient, E o/a, (at an aqueous concentration of one gram of plutonium per liter) decreased to about 0.1 and resulted in high extraction losses. Acceptable distribution coefficients (and extraction losses) were achieved through the use of a high nitric acid flowsheet.

Increased concentrations of hydroxylamine sulfate in the stripping solution resulted in the deposition of plutonium sulfate crystals on the final concentrator surfaces. Review of the past performance of the concentrator indicates that the deposition may have occurred sporadically. The crystalline material is soluble in boiling dilute nitric acid. Hydroxylamine nitrate is being used currently to avoid future precipitation of sulfate crystals.

The HF wash column was operated successfully for 48 hours with both organic solvent and floor collected materials. Following a process leak, a quantity of floor collected material was processed in twenty hours that normally would have required about two weeks for blending into feed streams. Minor piping changes are planned prior to putting the column into routine operation.

4. Finished Products Fabrication Technology

a. G.E. 312 Computer Test

On November 4, essentially all activity associated with the on-line testing of the G.E. 312 computer system was discontinued. Team members that have not been reassigned to other work are presently evaluating the results of the test and preparing a report for issuance in the near future.

5. Process Chemistry

a. Purex Process Assistance

Process assistance in support of the Purex plant has been concerned with the clarification of Tk-103A supernatant liquid. Cesium^{137} is recovered from the supernatant liquid by adsorption on Decalso resin and clarification is necessary to prevent clogging of the equipment and to decrease the contamination of the product.

The sample was received via the 300 Area hot cell and contained about 0.5 V/O flocculent particulate matter. Clarification of the solution was brought about by settling (settling rate ca. 1"/hr) or by filtering. Single thicknesses of Cambridge SS wire cloth were used as filters. Either 24 x 110 or 16 x 200 mesh cloth removed greater than 98% of the particulate matter. It was assumed that 100% of the ZrNb^{95} in the slurry was associated with the precipitate, and ZrNb^{95} DF's were used to arrive at a figure for precipitate removal. Cerium^{144} also appeared to be held primarily on the precipitate.

All cesium 137 (ca. 10.6 curies/gal) in the sample was in solution or could be removed from the particulate matter by washing with dilute NaOH.

Although analytical results were somewhat erratic for Ru^{106} and Sb^{125}, these elements appear to be in solution and are not removed by filtering.

1. Solvent Studies

In addition to those results reported last period, a combination of the standard carbonate permanganate and $Mg(OH)_2$ was tried. This proved to be only slightly more effective than either procedure alone.

The use of EDTA (ethylene diamine tetra acetic acid), which forms strong aqueous soluble complexes with ZrNb^{95}, was investigated. Preliminary results indicate that 0.05 M EDTA in neutral or slightly acid media (used in place of the acid wash in the 1-D column) could double the ZrNb DF across the G-cell.

Other complexing agents of this type will be investigated also.

The anion resin (Permutit-SK) at Purex was inadvertently subjected to freezing temperatures. Laboratory observation of the frozen beads revealed a high percentage (20%) of fractures. A sample of good quality resin was cooled to 0 degrees C for 45 minutes then allowed to come to room temperature. The resin contained 80% fractures after this treatment. While the resin was cold it was extremely sensitive to shock; slight pressure on a cold resin bead would cause it to shatter.

b. Redox Process Studies

1. Oxidation of Neptunium and Ruthenium by Potassium Persulfate

In order to oxidize neptunium to the hexavalent state in an acid deficient system, an oxidizing agent stronger than dichromate is necessary. Persulfate has been found to be compatible with the process and will oxidize neptunium in such a system. However, under oxidizing conditions (temperature greater than 90 C), persulfate will also oxidize ruthenium to ruthenium tetroxide which is volatile. One must be prepared to handle ruthenium volatilization if persulfate is used as an oxidant.

c. Neptunium Purification

Sixteen hundred grams of virgin neptunium have been received from the Purex plant. Purification of approximately half of this material is 80% complete and will be ready for shipment to Savannah River by December 11, 1961. The remaining material will be purified immediately following the current run.

d. X-ray Spectrometer Work

1. A one month test program has been started to test the X-ray fluorescence spectrometer as a routine analytical tool for analyzing UNH samples from U plant. This data will be used to provide a comparison between the X-ray spectrometer and the X-ray photometer.

2. Several test runs were made using NaCl as a stand-in for $PuCl_3$ to determine the conditions needed to analyze $PuCl_3$ for Cl^- by X-ray fluorescence. It has been determined that an EDT crystal should be used as the dispersing medium and that a gas flow proportional counter, using P-10 gas, should be used as the detector.

3. Fe, Cr, and Ni were spiked into UNH solution at a concentration of ca. 1000 ppm U each. The X-ray spectrometer was used to scan the peaks and each element had a peak large enough to indicate that the elements could be detected at lower limits; perhaps in the 100-200 ppm range. This test is the preliminary to the work of determining metallic impurities in UNH and $Pu(NO_3)_4$ samples by the X-ray spectrometer.

e. Coulter Counter

Calibration of the Coulter Counter has been completed. Two complementary methods of calibration were used, and good agreement between the two methods was obtained.

[redacted]

The writing of a complete instruction booklet for the Coulter Counter is now in progress. This will complement the incomplete instruction booklet that accompanied the instrument at delivery.

f. Laboratory Assistance

1. The silicon diode-alpha detector system for Redox was received and its operating characteristics investigated. Optimum operating conditions and procedures were determined and issued in two memos: Alpha Energy Analysis with a Silicon Diode Detector; and Operation Instructions for the Silicon Diode-Alpha Detector. The detector was released for routine alpha energy analysis.

2. A TMC-400 channel analyzer was obtained from FEO. A series of duplicating tests were run using Redox Detector No. 1 in conjunction with the TMC-400 and the two Redox RCL-256's. The primary objective of the tests was to determine the characteristics of the low energy response of the RCL-256's to facilitate their alteration through the use of a linearizing circuit. The desired information has been obtained.

3. Referee analyses for hydrazine essential material analyses performed at Purex were carried out at Redox. The hydrazine sample was found to comply with the specifications, so the analytical methods were reviewed with Purex personnel. A rough draft of the specification analyses was subsequently sent to the Purex laboratory.

   Following the report of mercury in Redox plutonium product, the analytical method was reviewed. Method modification had already taken place in the SSP & AO laboratory, so the review consisted of inspecting instrument calibration techniques, standard and spike recoveries, and justifying the basis for method revision. Recoveries from blind standards further verified the decision that the modified analysis was adequate.

   A literature survey was made for a method of determining carbon in plutonium trichloride. It was found that antimony powder has been used under similar conditions to selectively absorb chlorine gas. Moreover, only minor modifications would have to be made to incorporate this absorber in the existing equipment for carbon analysis. Antimony powder has been ordered, and a method evaluation will be made upon its receipt.

6. 234-5 Development - H. H. Hopkins, Jr.

a. Direct Calcination Of Plutonium Nitrate

A run in the vertical calciner mockup indicated that the use of sulfuric acid to prepare a feed having a sulfate-to-plutonium ratio of unity leads to a hard, adherent cake rather than a loose powder. For this reason, sulfate at a lower ratio will be added as ammonium sulfate in runs scheduled for the immediate future in the screw calciner.

The requirement of low holdup time and good dust control has led to abandonment of the trough calciner in favor of alternate designs. Preliminary tests have been made in the screw calciner originally built for oxalate calcination.

Results show moderate reactivity. In addition, the (-1.0 mm +0.5 mm) fraction showed about the same reactivity as the (-60 +140 mesh) fraction. Evidently the large particles have considerable porosity.

b. Vibrating Tube Chlorinator

The vibrating tube demonstration chlorinator was operated to fill local and off-site requests for plutonium trichloride.

A new high rate was achieved by use of a slightly-pressurized system. Previously a vacuum of 1 - 10 inches' water was used to prevent even minor phosgene leakage. Pressurization (1 - 10 inches' water) excluded air leakage into the system and therefore excluded the chemical reaction with traces of oxygen.

Peak performance of the chlorinator was 395 grams per hour as plutonium for a 1.5 hour period. The day's run of 4 hours and 35 minutes (excluding 35 minutes down-time) averaged 343 grams per hour. Conversion to $PuCl_3$ was 95 percent complete as indicated by duplicate chloride analyses on four representative samples of the powder. Reported values were 28.4, 29.0, 29.6, and 30.4 percent chloride, whereas the theoretical value is 30.8 percent chloride in $PuCl_3$.

c. Electrolytic Reduction And Refining

A porous ceramic crucible was used as an anode compartment to study the electrode reactions associated with the plutonium electrorefining operation.

Several batch-type electrolytic runs were made during the month to study the anode basket arrangement for electrorefining, and to investigate other electrochemical unknowns. A porous crucible should be essentially transparent to the melt and ion movement, while preventing any solids to move from one electrode region to the other.

The porous crucible worked as far as electrical conductivity and

passage of chloride ion is concerned, but the barrier was opaque to plutonium ion transfer. This was evident because the cathode compartment of the cell soon depleted of its plutonium content. Of the crucibles tested, a pressed zirconia crucible was the best for electrical conductivity and ionic mobility.

The following cell voltages or back emf's were determined during the month.

Pu/depleted melt//Cl_2/C	2.9 - 3.2
Pu/$PuCl_3$ (15% by wt.)//Cl_2/C	2.2 - 2.6
Pu/$PuCl_3$ (15% by wt.)//Cl_2/PuO_2-C	1.2 - 1.6
Pu/$PuCl_3$ (15% by wt.)//Cl_2/Pu	0.6 - 0.8

Interpretation of these measurements follows:

Normal back emf for plutonium electrowinning should be 2.2 - 2.6 volts. A back emf of 1.4 indicates presence of oxide, particularly at the start of a run. A high back emf (around 3) indicates depletion of plutonium from the melt in the area of the cathode. A very low back emf (less than 1), usually accompanied by the lack of bubbling and unusually high amp/volt ratio, indicates plutonium metal in some form in the area of the anode. The last conclusion would help to explain the apparent shorting encountered toward the end of some of the electrowinning runs.

d. Incinerator Support

Samples of incinerator ash containing different mixtures of burned wood, filter media, rubber gloves, and plastic were readily ground in an inexpensive hand-driven mill. The particle size of the materials was reduced to 0.5 mm diameter or less, a satisfactory size for recovery of the ash.

e. Solubilities In Molten Salts

Various salts and salt mixtures utilized in the electrolytic reduction of plutonium are under study.

Solubility of $PuCl_3$ in 60 percent KCl - 40 percent $BaCl_2$ melt was examined. The trichloride went immediately and completely into solution at a temperature of 850 C. Any plutonium dioxide present either with the trichloride or introduced separately was found to be insoluble and settled out of solution, forming a layer on the bottom.

Behavior of the electrolysis melt has been studied. Upon freezing, a melt and trichloride system forms two separate and distinct crystalline phases. The first phase, which forms near the sides of the vessel, is a light blue-green. The second phase, in the interior where cooling takes place more slowly, is much darker in color.

R. E. Tomlinson

Acting Manager

[redacted] Research and Engineering

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (continued)

H. FINANCIAL OPERATION

1. Production Cost

The Midyear Budget Review was completed and submitted on schedule including narrative justifications and supplementary schedules detailing fission products fund requests. Three funding sources are presently used for fission products: (1) Isotope Inventory, (2) 02 Program (B Plant startup), and (3) customer held funds (Ce-144).

We have been advised by the AEC that recuplex services provided other integrated customers, will be charged to "work in process" inventories rather than billed to the customer.

A study was completed, with the assistance of Facilities Engineering and Finished Products operations, regarding allocation of startup period costs between (1) startup on weapons model 1251, (2) production of this model, and (3) production of weapons model 81. Coding producers will be established in December from this study.

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

	Balance 10-31-61	Control Allocation*	Surplus (Deficit)
Inventories			
Essential Materials	$ 799	$ 760	$ (39)
Spare Parts and Standby	1 877	1 738	(139)
Special Materials	273	65	(208)
Gross Inventories	2 949	2 563	(386)
Reserves			
Essential Materials	56	60	(4)
Spare Parts and Standby	452	435	17
Special Materials	153	--	153
Total Reserves	661	495	166
Net Investment	$2 288	$2 068	$(220)

*Control allocation represents FY 1962 Revised Budget as AEC has not yet established a Financial [redacted] entories.

[redacted]

2. General Accounting

As of October 31, 1961 costs of $6,315,208 had been incurred by 12 active projects against authorized funds of $11,538,000. Outstanding commitments totalled $954,048.

During November a Work Authority for $101,400 was received from the AEC on Project CAC-928 - Leak Detection - High Level Waste Tanks 241-A and 241-SX. Project CGC-813 - Plutonium Recovery from Contaminated Materials - was financially closed out for a final cost of $569,660.

Seven Appropriation Requests totaling $89,975 were approved during November as follows:

AR No.	Description	Section	Cost
26019 Supp. #1	Dissolving, Fusion and Burning Hood	R&EO	$45,050
60-CPD-06	Mass Spectrometer	FPO	16,175
26020	Purex Canyon TV	Purex	11,650
26021	Equipment Dismantling Facility	FEO	6,300
26006	Pump and Turbine	P&GM	6,000
26024	Telescoping Scaffold	Redox	4,500
26022*	Radial Drill	Redox	300
			$89,975

*Transfer from another AEC site=freight cost only.

3. Internal Auditing

Investigations were made regarding products purchased by employees under the terms of the Employee Product Purchase Plan during the period July 11 through October 15, 1961. No irregularities were noted.

Observations were made of government vehicles usage for transporting personnel to and from area badge houses at shift changes. Generally this practice was followed by department personnel only when bus service was not readily available.

A member of the local HOO-AEC Audit Branch spent some time in the department during the month in connection with their current audit of budget execution and cost procedures. Their prime interest relates to segregation of cost between process technology and research.

for L. B. Christopher
Manager - Finance

[redacted]

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (continued)

I. EMPLOYEE RELATIONS

1. Personnel Placement

Due to investigations now being conducted and to the possibility of a vacation shutdown for the Redox Plant and other considerations, requisitions for five utility operators previously received were canceled. The above considerations may make it possible to move operators between plants at appropriate times so that additional people would not be required.

Plans are being finalized to begin a third BOCE course in CPD probably starting in January of February 1962. Course materials will be ordered in the very near future.

RB Britton
Manager
Employee Relations

RB Britton

[redacted]

CHEMICAL PROCESSING DEPARTMENT
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III. PERSONNEL ACTIVITIES

A. FORCE SUMMARY

Operation	Monthly Salaried		Weekly Salaried		Total	
	10-31-61	11-30-61	10-31-61	11-30-61	10-31-61	11-30-61
General Manager's Group	10	10	1	1	11	11
Financial	14	14	16	15	30	29
Employee Relations	1	1	0	0	1	1
Research & Engineering	67	67	27	26	94	93
Facilities Engineering	67	64	21	21	88	85
Power & General Maintenance	36	37	247	245	283	282
Production	5	5	4	4	9	9
Special Separation Processing and Auxiliaries	48	48	211	212	259	260
Purex	65	65	240	241	305	306
Finished Products	53	55	250	263	303	318
Total	366	366	1 017	1 028	1 383	1 394

B. PERSONNEL CHANGES

No personnel changes.

C. TRIPS

Visitor	To	Nature of Discussion
To Other G.E. Components		
C. W. Smith	GEL, Schenectady, N.Y.	Fission product cask design verification. (11/6-7/61)
A. E. Smith	Manufacturing Laboratory, Schenectady, N.Y.	Numerical Input System Dev. (11/15/61)
To AEC and Other AEC Contractors		
M. N. Raile	Dow Chemical Co. Denver, Colo.	Inspect shipped product. (11/2-3/61 & 11/16-17/61)
R. E. Van der Cook P. B. Fisk D. D. Wodrich	Dow Chemical Co. Denver, Colo.	Casting equipment, shipping and gaging problems. (11/6 and 11/7/61)
R. E. Van der Cook P. B. Fisk D. D. Wodrich	Los Alamos Scientific Laboratory Los Alamos, New Mexico	Casting equipment, nondestructive testing meeting. (11/8 and 11/9/61)
C. W. Smith	ORNL Oak Ridge, Tenn.	Fission product cask design verification. (11/8/61)
R. C. Hollingshead	Sandia Corp. Albuquerque, N. M. Dow Chemical Co. Denver, Colo.	Fabrication and inspection. (11/14/61) Fabrication and inspection. (11/15-16/61)
L. M. Meeker W. J. Gartin	Dow Chemical Co. Denver, Colo.	Attend meeting on plutonium processing. (11/21/61)
A. E. Barber	Dow Chemical Co. Denver, Colo.	Inspect shipped product. (11/30 and 12/1/61)
To General Industry		
M. E. Yates	Allied Engineering & Production Co., Alameda, Calif.	Repair to palm pulse columns. (11/27-29/61)
To Conventions and General Meetings		
P. H. Reinker	Chicago, Ill.	Atomic Industrial Forum. (11/5/61)
R. E. Olson	Berkley, Calif.	Equipment Management Meeting. (11/15-16/61)

[redacted]

To Conventions and General Meetings (continued)

R. E. Tomlinson P. H. Reinker	University of Calif. Lawrence Radiation Lab. Livermore, Calif.	Attend meeting on 03 R&D programs. (11/28/61)
C. T. Groswith	Toronto, Canada	Attend Manufacturing Management Conference. (11/28-30/61)

To Colleges and Universities

C. W. Smith	Univ. of Texas, Austin, Texas	Fission product cask design verification. (11/9/61)

To Foreign Governments and Agencies

A. E. Smith	United Kingdom Atomic Weapons, Research Dev., AWRE Harwell, England	VISAM-34 meeting. (11/6-11/61) IMOG meeting. (11/13/61)

D. VISITORS

Visitor	From	Nature of Discussion
From Other G. E. Components		
B. E. Woodward L. Holthausen	APED, San Jose, Calif.	Instrumentation available from the Nuclear Electronics Products Section. (11/8/61)
From AEC and Other AEC Contractors		
E. R. Young	Dow Chemical Co. Denver, Colo.	Discussion and interpretation of product specifications. (11/8-9/61)
Maj. J. Delistraty	U.S. AEC, Div. of Military Application Germantown, Maryland	Purex process and plant tour. (11/6/61)
T. Murphy	U.S. AEC, Comptrollers Office Washington, D.C.	Fission product program and tour facilities. (11/14/61)
M. Pobereskin R. Rapp, Jr.	The Martin Company Baltimore, Maryland	Discussion and tour of Hot Semi-works. (11/28/61)
Wayne Fisher Charles Seay	ALOO Albuquerque, N.M.	Assembly study. (11/30/61)

Visitor	From	Nature of Discussion
From General Industry		
Robert Lawford	Sheffield Corp. Dayton, Ohio	Sheffield gage installation. (11/7-16/61)
P. Byrne J. Kaufman	Linke' Division General Precision, Inc. Palo Alto, Calif.	Inspection equipment discussions. (11/8/61)
W. E. King J. V. Ezell	Ingersoll-Rand Corp. Seattle, Wash.	Demonstrate tools. (11/9/61)
Paul Berner	Star Machinery Co. Seattle, Wash.	Demonstrate tools. (11/21/61)
P. H. Wormell	Industrial Consultant Leawood, Kansas	Discussed tracer work and cutting tools. (11/28/61)
From Other Federal and State Agencies		
Representative Melvin Price	Joint Committee on Atomic Energy	Purex tour. (11/10/61)
Kenneth McAlpine		

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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
Serious Accidents					1*					1	7
Medical Treatment Injuries			7	17	3	5			2	39	499
Radiation Occur.			7		9	3			1	20	190
Contam. Wounds			1**							1	17
Pu Depositions			3	1	1					5***	12
Fires											10
Security Violations											9

* A serious accident was sustained by a journeyman pipefitter when he was struck a glancing blow on the head by a part of a 6" air-operated pressure reducing valve installed in a steam line. The valve was being removed for repair and suddenly changed position due to trapped pressure in the line. The injury involved a contusion and laceration of right side of head.

** A utility operator received a puncture wound while working in Hood 27-C Maximum contamination of the wound area was 1,000 d/m.

*** During the month of November, five previously incurred plutonium deposition cases were confirmed. Maximum permissible body burden was less than one percent in all of the cases.

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V. REPORTS

A. PREPARED AND ISSUED

HW-50360 REV 3, Secret, "Process Specifications for Operational Control - Redox Plant", dated October 19, 1961 by R. G. Barnes.

HW-70337 (OUO) - Project Proposals - "216-Z-9 Crib Replacement - 'Z' Plant", dated October 20, 1961, by L. W. Finch.

HW-71089 Unclassified, "Process Engineering for Additional Storage, Load-out, and Waste Facilities Hot Semi-works", dated October 12, 1961, by H. L. Caudill and E. Doud.

HW-71099 Project Proposal - "Strontium Storage and Waste Disposal", dated October 25, 1961, by D. W. McKee.

HW-71305 Secret, "Neptunium -237 Content of E-Metal", dated October 10, 1961, by R. A Schneider.

HW-71321 Secret, "Cesium-137 As An Index of the Nuclear Materials Content of Coating Waste", dated October 11, 1961, by R. A. Schneider.

HW-71333 Unclassified, "Process Engineering - Cesium Load-out Facility at the 241-C Tank Farm", dated October 30, 1961, by L. R. Michels.

HW-71410 Unclassified, "Prototype Facilities for In-Tank Concentration of Radioactive Wastes", dated November 28, 1961, by S. R. Bierman

HW-71432 Unclassified, "Plutonium Isotopic Analysis Comparison Test", dated October 26, 1961, by W. H. Zimmer.

HW-71567 Secret, "Dimensional Stability Alpha Phase Plutonium", dated November 1, 1961, by R. E. Tomlinson.

HW-71568 Secret, "Fabrication of 81 Component", dated November 1, 1961, by P. H. Reinker.

HW-71577 Secret, "CPD Monthly Report - October, 1961", dated November 21, 1961, by Operations Managers.

HW-71578 Secret, "Assembly Facilities", dated November 1, 1961, by E. O. Swain, et al.

HW-71579 Unclassified, "Addendum to In-Plant Multiplication Test No. 2", dated November 1, 1961, by R. E. Isaacson and R. L. Stevenson.

HW-71588 Confidential-Undocumented, "Nuclear Safety Review, Chemical Processing Department, October 1960 Through September 1961", dated November 9, 1961, by R. L. Stevenson.

HW-71594 Secret, "Purex Plant Production Schedule - November 1961", dated November 6, 1961, by D. McDonald.

HW-71595 Secret, "Redox Plant Production Schedule - November 1961", dated November 6, 1961, by D. McDonald.

HW-71596 Secret, "UO3 Plant Production Schedule - November 1961", dated November 6, 1961, by D. McDonald.

HW-71597 Secret, "234-5 Plant Production Schedule - November 1961", dated November 6, 1961, by D. McDonald.

HW-71601 Unclassified, "Group Utilization of Time Surveys, CPD Maintenance Groups", dated November 1, 1961, by A. C. Morgenthaler.

HW-71610 Secret, "CPD Waste Status Summary - January 1, 1961 - June 30, 1961, dated November 6, 1961, by R. E. Roberts.

HW-71618 Confidential, "Scheduled Shutdown - Purex Plant", dated November 7, 1961, by J. H. Warren.

HW-71639 Secret, "Plutonium Monthly Report, October 1961", dated November 9, 1961, by E. F. Kurtz.

HW-71665 Secret, "Dimensional Stability of Alpha Plutonium Components", dated November 10, 1961, by R. E Tomlinson.

HW-71708 Secret, "Progress Report - Finished Products Fabrication Technology Operation - October, 1961", dated November 16, 1961, Compiled by Members of the FPFT Operation.

HW-71720 Unclassified, "Invention Report: A Vertical Calciner for Solutions Which Present A Critical Mass Problem", dated November 17, 1961, by G. L. Stiffler and W. H. Crocker

HW-71769 Secret, "Annual Summary and Program Review, CY-1961, 234-5 Development Operation, dated November 30, 1961, by H. H. Hopkins, Jr.

B. PREPARED FOR SIGNATURE AND ISSUANCE

HW-71576 Secret, "Production - [redacted]1961" dated November 1, 1961, by W. E. Johnson.

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VI. PATENT SUMMARY

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

INVENTOR	TITLE
G. L. Stiffler, Research & Engineering H. W. Crocker " "	A Vertical Calciner For Solutions Which Present A Critical Mass Problem.

P. H. Reinker

General Manager
Chemical Processing Department

[redacted]

END

DATE FILMED

4/20/93