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CHEMICAL PROCESSING DEPARTMENT MONTHLY REPORT

MARCH, 1961

APRIL 21, 1961

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HANFORD ATOMIC PRODUCTS OPERATION

RICHLAND, WASHINGTON

GENERAL ELECTRIC

MASTER

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
FOR

MARCH, 1961

Compiled By
OPERATION MANAGERS

April 21, 1961

HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON

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CHEMICAL PROCESSING DEPARTMENT
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I. SUMMARY

A. RESPONSIBILITY

There were no changes in the responsibilities of the Chemical Processing Department during March.

B. PRODUCTION

Production of plutonium nitrate from the separations plants exceeded that forecasted for March; fiscal year-to-date production is slightly below that forecasted.

A successful neptunium recovery campaign was completed in the Purex plant and yielded 0.7 Kg.

Four shielded transfer tanks were loaded with 120,000 curies of cesium-137, separated from Purex aged waste. The HAPO IA cask was also loaded with 20,000 curies of strontium-90, recovered from Purex waste and purified by Hanford Laboratories Operation. At month-end, the containers were being observed for temperature and pressure buildup prior to shipping off-site.

The production of UO_3 was below that forecasted, both for March and fiscal year-to-date. Shipping commitments were met or exceeded, with two carloads of powder being shipped ahead of schedule because of a threatened work stoppage at Hanford.

Although the production of unfabricated plutonium metal and fabricated weapon components was below that forecasted, for March and fiscal year-to-date, delivery commitments for both products were met.

C. ENGINEERING

Following the scheduled shutdown in late February, the Purex plant resumed operation on March 10. Performance was generally satisfactory although plutonium waste losses were temporarily excessive while defining the optimum operating conditions for the new second cycle plutonium column. Both products, plutonium and uranium, met shipping specifications throughout the month.

The Redox E-metal dissolver continued to perform in a highly satisfactory manner. Changes in procedure have already reduced decladding waste volumes from 230 gallons per ton to 160 gallons per ton of uranium processed. Although no attempt has yet been made to determine capacity rates of the new dissolver, testing is expected to begin next month.

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Ozonation of Redox final uranyl nitrate product has been greatly improved by eliminating reflux to the ozone sparger vessel. Initial gamma ratios of 75 can be brought down to specification (less than 2 gamma ratio) in less than five hours. Auxiliary periodic acid treatment of uranium product has now been reserved for treatment of product gamma ratios exceeding 75 initially.

The engineering study describing the Phase I facility at B-Plant for fission product concentrates storage, together with integrated conceptual engineering work for Phase II and III waste calcination, was completed and published. The two basic alternates for implementation of Phase I are:

1. Reactivation of B-Plant in accordance with either the "Engineering Study" at \$2,300,000 or the "Bob-tailed Scope" at \$1,400,000.
2. Continued operation of Hot Semiworks, with either of the following supplemental facilities: New Product Storage or New IWW Storage.

An aqueous foam was successfully used in its first equipment burial application. Using a light-frame construction burial box to contain the piece of failed equipment, the voids were filled with aqueous foam after positioning the box in the burial trench. In addition to improved contamination confinement, this technique also shows promise of reducing burial costs. Further tests are planned.

Directive No. HW-251, Modification No. 1, dated March 17, 1961, authorized the total Project Birch - Redox, in the amount of \$325,000. The proposed work will provide increased Birch stripping efficiency and greater processing flexibility.

Tooling design was started for future production of the Model 45 weapon components on the 234-5 Building Fabrication Line. It is estimated that thirty to forty drawings will be required.

Operation of the Gorton lathes in the 234-5 Building was not improved by modifications made by Gorton Company engineers. Further study by Gorton engineers is being concentrated on re-design of the control systems, both electrical and hydraulic. Meanwhile, two of the lathes are in production on material which does not require the tracer controls.

D. GENERAL

The Chemical Processing Department became eligible for the HAPD General Manager's Safety Award at midnight March 14, 1961, after accumulating approximately 2,700,000 man-hours since the last disabling injury on January 11, 1960.

P. H. Reinker

General Manager
Chemical Processing Department

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS

A. PRODUCTION OPERATION

March February

1. Production Statistics

a. Purex

Uranium nitrate produced (tons)	564.8	474.9
Average production rate during operation (T/D)	28.5	25.5
Total waste loss (%)		
Plutonium	0.36	0.30
Uranium	0.16	0.09
On-line efficiency (%)	92.5	66.6

b. Redox

Uranium nitrate produced (tons)	111.9	75.0
Average production rate during operation (T/D)	7.5	6.8
Total waste loss (%)		
Plutonium	0.17	0.16
Uranium	0.11	0.01
On-line efficiency (%)	67.0	55.1

c. Uranium Reduction

Normal UO ₃ loaded (tons)	437.2	483.2
Enriched UO ₃ loaded (tons)	115.2	72.1
Normal UO ₃ approved for shipment (tons)	407.0	502.65
Enriched UO ₃ approved for shipment (tons)	96.0	96.33
Normal UO ₃ shipped (tons)	505.17	502.77
Enriched UO ₃ shipped (tons)	96.37	96.79
Normal UNH backlog (tons U)	323	203
Enriched UNH backlog (tons U)	57	63

d. Plutonium Metal Processing

Input to Task I (batches)	215	285
Reduction yield (%)	97.4	97.5
Plutonium metal buttons produced (% of commitment)	85.2	112.2
Plutonium metal buttons shipped (% of commitment)	114.7	99.4
Product Recovery output (% of schedule)	58.0	148.5
Product Recovery backlog (Kg's)	340.3	246.0
Waste disposal (grams)	1 050	498

	<u>March</u>	<u>February</u>
e. <u>Plutonium Metal Fabrication</u>		
Weapons parts produced (% of commitment)	91.1	100
Weapons parts shipped (% of commitment)	75.0	50.0
	<u>200-East</u>	<u>200-West</u>
f. <u>Power</u>		
Raw water pumped (gpm)	9 027	4 140
Filtered water pumped (gpm)	1 079	966
Maximum steam generated (lbs./hr.)	300 000	130 000
Average steam generated (lbs./hr.)	187 101	96 000
Total steam generated (M lbs.)	139 000	71 500
Coal consumed (est. tons)	6 967	3 815

J. N. Warner
 Manager - Production

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II. ACHIEVEMENTS (Continued)

B. PUREX OPERATION

1. Operating Continuity

A neptunium recovery run was started on March 1 and concluded on March 8, 1961. Normal processing was resumed on March 10 at a 3.0 CF rate. Rates were reduced to 2.4 CF on March 13 in anticipation of a strike but were restored to 3.0 CF on the following day. On March 17 rates were raised to 3.6 CF. On March 30 rates were reduced to 3.2 CF to avoid depleting the supply of "aged" metal prior to the next scheduled outage.

All uranium and plutonium met shipping specifications. Waste losses for neptunium, plutonium, and uranium were normal.

2. Processing Operations

The plant performance was satisfactory during the period. The performance of the new 2A (second plutonium cycle extraction) column equipped with stainless steel nozzle plates instead of plastic Raschig rings was satisfactory. Initially high 2AW losses to the backcycle system were experienced until the operating characteristics of the new column were defined.

The replacement IO (#1 solvent wash) column containing stainless steel nozzle plates also gave satisfactory performance. Gamma activity in the #1 solvent system was significantly lower this month compared to recent operating periods. Gamma levels in the process tended to increase with higher rates and fall as the rates dropped.

The supernate from the 103-A waste tank was pumped back to E Cell where it was centrifuged and the cesium 137 product loaded into Decalso beds in four shielded transfer tanks. A total of 120,000 curies of cesium 137 is awaiting shipment at month's end.

HAPO cask 1A containing approximately 20,000 curies of strontium 90 was received from the High Level cells in the 300 Area. Observations of equilibrium conditions of temperature and pressure are presently being made before releasing the cask for shipment.

A 200-gallon cask of strontium waste solution was received from the 300 Area for further clarification. This material was unloaded to E Cell where it is being held.

3. Mechanical Experience

The F11 and F6 (#1 and #2 acid waste) concentrators were flushed with caustic. Failed west tube bundles in these two concentrators were replaced.

The F6 (#2 acid waste) concentrator has developed serious leaks. Little vacuum can be maintained on the concentrator while operating. Heavy vapor leakage escaping from the tower lagging is visible under slight pressurization of the concentrator.

The pipe trench routing from tank F12 (IWW waste receiver) to the IWW ion exchange system is completely plugged. Two of the ion exchange DOV's have also failed.

A rebuilt centrifuge was installed in the E4 position on March 6 for fission product processing.

The F7 (waste concentrator feed) pump failed on March 11 and was replaced without process interruption. The K1 (final uranium cycle feed) pump failed on March 12 and was replaced. Both pumps developed upper seal leaks.

A new pump for the XAF flow to the N Cell ion exchange column was placed in service paralleling the existing pump.

The thermohms on the K4 final uranium concentrator and the C3 dissolver were replaced.

A floor drain was installed in the Hot Shop to minimize contamination spread, slipping hazards, and to improve housekeeping.

Burials of two failed tube bundles and the old 2A column were carried out successfully.

The failed E4 centrifuge was moved to 221-T for decontamination and repair.

The new 2" waste line from the CR vault to the Hot Semi Works and the new waste line from the Hot Semi Works to the 252-C diversion box were accepted from construction.

4. Radiation Experience

The total iodine 131 emission in March was 21 curies. The maximum seven-day emission was nine curies.

There were three Radiation Occurrences and seven skin contamination cases. The unexpected filling of a polyethylene jumper connecting a fission product transfer cask and the Load-In station (213-A) during valving operations resulted in levels of 200 rads/hr. at two feet. There were no personnel exposures above the permissible limits.

Chemical foam was used for the first time to control the spread of plutonium during the burial of the 2A (final plutonium extraction) column. This technique permits the use of a collapsible burial box at a saving of about \$10,000 per burial.

5. Analytical Experience

A 50 ml bulk sample of the 002-CR vault tank was studied in the RAC (Remote Analytical Cave) to determine the amount and composition of the solids content of the sample. The filtrate contained about one-tenth of the zirconium-niobium and one-third of the lead content of the unfiltered material. A portion of the solids resisted all attempts at dissolution.

The analytical method (using the DK-2 Recording Spectrophotometer) for determining iron in the final plutonium product proved to be extremely reliable and accurate. The total metal impurity analysis on the Purex final plutonium product solution was eliminated. The basis for this move was the high purity of the final product, the validity of the iron analysis, and the infrequent small bias corrections due to impurities. The savings in analytical costs are estimated to be about \$1,000 a year.

A calculation matrix for cesium recovery was prepared by putting standards into the memory of the 256-channel analyzer and solving for each isotope. This approach made possible the direct evaluation of the cesium recovery samples by the 256-channel analyzer. The most troublesome analytical problem is the difficulty in securing representative samples from process vessels that are used for both high and low activity solutions.

A method for evaluating the quality of plant solvent by the "permanganate-demand test" was checked and placed in service.

The transistorized RIDL 400-channel analyzer was received. The detector crystals and lead shields have been installed and calibration work started.

E. R. Irish

Acting Manager-Purex

ER Irish:EAF:gt

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

C. SPECIAL SEPARATION PROCESSING AND AUXILIARIES OPERATION

1. Operating Continuity

Processing operations were conducted as scheduled until March 29, at which time the Redox Plant was shutdown for planned equipment changes. E-metal production commitments for the month and for the first quarter of CY 1961 were achieved.

2. Processing Operation.

Except for the normal week-end shutdowns, E-metal processing was continuous through March 29. At this time both the monthly and quarterly production commitments were met and a scheduled shutdown was taken to replace the leaking G-3 organic still pot. Separation of plutonium is expected to be resumed on or before April 10.

The performance of the new Mark V multipurpose dissolver continued to be very satisfactory throughout the month on a five day per week operating schedule. Some minor fluctuations in the temperature and pot vacuum were traced to valving arrangement in the vent system, but this was subsequently corrected.

Product decontamination throughout the month was good and waste losses low, attributable in part to the longer aged uranium metal dissolved and the relatively stable operating periods. All uranium and plutonium production met shipping specifications.

Approximately 104 tons of UNH, with a high gamma ratio, were received from the Purex Plant and reprocessed through the silica gel system to reduce the gamma content to within shipping specifications.

The routine use of periodic acid in the E-13 uranium product ozonator vessel was discontinued this month. Initially, periodic acid was used routinely as a ruthenium oxidizer to give shorter ozonating time cycles in E-13. However, over the past several months the efficiency of ruthenium removal has been increased considerably by the elimination of total reflux to the E-13 sparger vessel. Uranium solution with

initial gamma ratios up to 75 can now be reduced to specification gamma ratios with ozone sparging of less than 5 hours. At current product rates this time cycle is adequate and the routine use of periodic acid has been discontinued.

3. Mechanical Experience

The mechanical efficiency for the month was 100 percent, there being no equipment failures affecting production. There were four cell jumper replacements made, one because of a plugged transfer jet and three due to thermohm or weight factor malfunctioning.

Modifications to the Robbins-Myers auxiliary hoist for the 60-Ton Canyon Crane were completed this month and the unit returned to spare parts for storage. Maintenance applied material costs for the year were thus reduced by approximately \$10,000.

A new power driven rotating 10-ton hook was installed on the 60-Ton Canyon Crane on 3-24-61. The new hook proved to be very effective in preparing for the new G-3 organic still installation at month end. Replacement time may be reduced by 50 percent due to the ability of the crane operator to maneuver components into position by rotating the hook.

A new type Milton-Roy metering pump, to replace the troublesome proportioneer pumps on the AMU level in the Redox Plant, was installed and is now being tested under actual operating conditions. Preliminary results indicate that this pump is a much improved unit which affords better control and eliminates the acid fumes created by packing leaks in the proportioneer pump. The new Milton-Roy pump is a diaphragm type which eliminates the need for packing.

4. Waste Handling and Decontamination

A shipment of one hundred and ninety-five (195) fifty-five gallon drums containing approximately 50 tons of depleted uranium dry waste from the Dow Chemical Company's plant at Rocky Flats, Colorado, was received and buried on 3-29-61.

Equipment valued at \$97,288 was received from the processing plants for decontamination, repair or inspection during the month. Equipment valued at approximately \$13,762 was returned to customers. A savings of approximately \$11,000 over the cost of new replacement equipment was realized through the equipment decontamination program during the month.

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A total of 338 man-hours was charged to the decontamination of railroad, automotive, and heavy equipment. The following is a breakdown of the major items decontaminated:

<u>Item</u>	<u>Operation Charged</u>
Well Car No. 39	CPD
Well Cars. No. 44 & 48	Purex
UO ₃ Flatcar	FPO
Flat Car No. 3611	Redox
Flat Cars No. 3610 & 3622	Purex
Locomotive No. 30	Transportation
Backhoe No. 17-4628	Transportation
Lowboy Trailer No. 64-9315	Transportation
Power Wagon No. 4973	Transportation
UNH Tractor	Purex
Thimble Trailer No. 64-12574	Purex
Pickup Truck No. 1C-202	Purex
Sedan No. 1A-690	Patrol

Significant Miscellaneous Items Decontaminated

<u>Item</u>	<u>Operation Charged</u>
Column Sieve Plates	Purex
18-3 Process Tank (for Project CAF-847)	HLO
Reactor Rear Face Piping & Fittings	IPD
E-4 Centrifuge	Purex

5. Radiation Experience

Five radiation occurrences were experienced during the month. The most significant one resulted from a pressure release through the air lift line of the H-7 metal solution blending tank sampler during a backflushing operation. General contamination to 15 rads/hr at surface was spread in the sample port area. The whole body dose to the chemical operator and radiation monitor involved in the occurrence was less than 100 mrad, while the localized dose to a significant skin area (1 cm²), due to coverall contamination, was 2.2 and 2.3 rads respectively, based on autoradiographs of the coveralls. Piping modifications to the sampler have been initiated to prevent any similar occurrences.

Two contaminated equipment moves to the Redox Equipment Reclamation Facility were made during the month. A Purex Plant head-end centrifuge, contained in a concrete box, was transferred in a radiation field of 5 r/hr as measured 4 feet from the box. The same box was later used to transfer a dissolver silver reactor and several jumpers from the Redox Plant. Less than 5 mr/hr radiation was measured at 53 feet from the box. Both equipment moves were completed without incident.

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Nuclear excursion evacuation tests were conducted for all groups in the Redox Plant exclusion area on March 30 and 31.

6. Analytical Experience

An intensive review of analytical procedures applied to the UO_3 Plant samples and an increased sample analysis load were carried out this month to aid in determining the cause of a consistently negative book physical inventory difference (BPID) across the UO_3 Plant. Two or more independent analytical procedures were applied to duplicate samples taken at an increased frequency to determine the measurement error in both depleted and enriched UNH handling systems. No deficiencies in analytical procedures, which might contribute to BPID losses, have been uncovered to date.

Chas. S. Dieruth

Manager - Special Separation
Processing and Auxiliaries

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II. ACHIEVEMENTS (Continued)

D. FINISHED PRODUCTS OPERATION

1. Operating Continuity

The fabrication of Model 81 met production and delivery schedules for March. Unfabricated plutonium and uranium oxide both met shipping requirements in spite of production being somewhat under schedule. Plutonium recovery also was below schedule for the month.

2. Processing Operation

a. Plutonium Fabrication

All fabrication effort this month was directed toward the production of Model 81. Deliveries proceeded according to established plans. Information from the customer continued to indicate that good quality parts were being shipped.

March production performance was significantly better than that in February; however, additional improvement is needed if plant capacity is to be consistent with production demands for the future.

The primary problem area in Fabrication continues to be the foundry. The Task Force continues to function in this phase of the operation. Under study at this time are the chip stream, critical mass, double melting, continuous melting, and rejects. These five areas hold the best promise of improved performance.

b. Plutonium Processing

Unfabricated plutonium operations were idle for the first two weeks of the month because of feed shortage. Operating efficiency was highly satisfactory during the time the line did operate, but the lack of feed resulted in production being twelve percent under schedule.

Plutonium recovery operations were severely hampered by mechanical difficulties during the month. Production was 42 percent under a schedule which was reduced to compensate for the scheduled replacement of the corrosion failed concentrators J-26-A and J-7. A series of pump and bellows failures, and

the failure of the supernate concentrator, G-60, resulted in considerable lost production. Processing material from Hood floors, which resulted from the above mechanical failures, adversely affected overall processing rates.

c. Uranium Reduction

Uranium reduction operations were affected adversely this month by both mechanical difficulties and by feed shortages. Schedules were met for enriched material but production was 33 percent below schedule for normal material. Principal causes of lost production time were the failure of a second concentrator tube bundle, and failure of a deentrainment separator. These time losses were sufficient to prevent achievement of quota; however, feed shortage would also have resulted in failure to achieve schedule.

3. Mechanical Experience

Plutonium fabrication equipment continues to present numerous minor difficulties. Principal among these are thermocouple and electrical failures in the casting equipment, and compressor and hydraulic pump failures on the machining hoods. The Gorton lathes in Hoods 41-M1 and 41-M2 were adjusted, calibrated, and placed in plutonium production service during the month.

Plutonium recovery equipment experienced numerous major failures during the month. Concentrators J-26-A and J-7 which failed late last month were replaced on a scheduled shutdown early this month. Corrosion failed G-60 concentrator was temporarily repaired pending replacement during a future scheduled shutdown. Replacement of the M-1, metal dissolver and condenser, which also failed due to corrosion, was required. Pulser bellows on the H-2 and H-3 columns failed and were replaced.

Uranium reduction equipment suffered major failures during the month. The tube bundle in the ED-7 concentrator and the bottom portion of the TD-4 deentrainment separator both failed due to corrosion. Also considerable effort was required in unplugging concentrated feed lines.

All the safety relief valve inadequacies noted in the inspection by Facilities Engineering Operation in November, 1960, have been corrected. Facilities Engineering personnel are to review the corrections for conformance to ASME specifications and to Hanford standards.

An inspection of the Z Area high tank by Finished Products Operation, in conjunction with Power and General Maintenance, and Facilities Engineering has revealed considerable oxide deposits

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under the interior wall paint. Moderate pitting is evident. Money will be provided in future budgets to permit cleaning and repainting.

4. Radiation Experience

Radiation and contamination control show general control to be satisfactory this month.

One contaminated injury was experienced during the month. Initial assay indicates that there will be no significant deposition in this case.

5. Analytical and Final Inspection Experience

	<u>February</u>	<u>March</u>
Number of Samples Received	1,701	1,388*
Number of Determinations	21,552	14,071*
Average Impurity, Buttons	1,727 ppm	1,236 ppm
Buttons Rejected	3.8%	10.2%

*The sharp drop in work load represents a return to normal with the elimination of numerous sampling tests.

A comparison of Pu²⁴⁰ content as determined by mass spectrometer with that determined by neutron counter indicates that the neutron counter will be satisfactory for part-by-part acceptance of weapons components.

6. Events Influencing Costs

The work force of the Fabrication Operation was increased by the addition of eight (8) operators.

The Fabrication Operation worked its force overtime on four Saturdays during the month in order to assure meeting the sharply increased schedule.

Arrangements were made to remove the requirement for the wearing of laboratory coats in the 234-5 and 291-2 Buildings for engineering, supervisory, and clerical personnel who normally perform only inspection-type duties. Laundry charges should be reduced by approximately \$5,000 per year.

Acting Manager - Finished Products

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II. ACHIEVEMENTS (continued)

E. POWER AND GENERAL MAINTENANCE OPERATION

1. Operating Continuity

There were no outages of Power services that affected operating continuity of the prime production facilities.

2. Inspection, Maintenance and Repair

Modifications and revisions to a vendor-fabricated Strontium⁹⁰ shipping cask and cask container were completed on a high-priority basis. Work on the cask, which was of the ion-exchange type, included fabrication of a tubing expansion cushion to absorb the growth of Woods Metal when cooled; placement of the molten Woods Metal, which functions as a heat-exchange medium; and assembly of the unit.

Continued progress was made on the Formaldehyde Denitration Prototype for Purex. All four vessels were completed; 29 jumpers of the required 42 have been finished; and 80 per cent of the field work between 211-A and 202-A Buildings has been completed. The major part of the remaining field work is installation of electrical services and controls.

Three large carbon-steel trays, each about 12'x 12' and with bracing and hangers, have been fabricated for storage of cut-up jumper parts in the Purex canyon. In use, these trays will hang in the hot-pipe trench below the cover blocks, and will store parts of faulty cut-up jumpers. At appropriate times, the salvageable parts will be removed for decontamination and repair, and nonreclaimable parts will be placed in boxes and buried.

A vendor-fabricated Prototype Titanium Tube Bundle is being prepared for service in the Purex H-4 Backcycle Concentrator. The tube bundle has satisfactorily passed a leak test made by use of a portable mass spectrometer, using helium as a leak indicator. Lagging, sheathing, and dimensional mock-up have also been completed, and the only remaining work is installation of legs to allow for standing the unit in a vertical position.

Conversion of an obsolete B-T-U-Plant Centrifuge, for use in the E-4 position at Purex, is in progress. The unit, following modifications, will be used in the Fission Products Program.

Fabrication of a Prototype Sludge Sampler for Purex Tank Farm is about 75 per cent completed. The unit is contained within an 8-inch-diameter cylinder 53 feet long, and is designed to hydraulically remove a sample of sludge from the bottom of a tank and move the sample to a capsule mounted on topside. The sample may then be transported to a laboratory for analysis.

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Mock-up, test, and run-in were completed on two process pumps, and these units were placed in stand-by status. One process pump was prepared for service and shipped to Purex Tank Farm.

Thirty-three process jumpers were completed--nineteen for Purex and fourteen for Redox.

Fabrication continued on 75 birdcages, 75 shipping containers, and 300 inserts for shipping containers. At this time, the birdcages and inserts have been completed, and the shipping containers are about 90 per cent complete.

Fabrication of a hood and air lock to enclose a Sheffield Rotary Contour Gauge at 234-5 Building has reached 50 per cent of completion. This will be the second unit of this type to be installed in the final inspection facility.

A new Crucible Break-Out Hood has been fabricated for the RMC Line at 234-5 Building. Installation will be made later, and the hood will be identified as HC-27.

A pair of nesting tantalum crucibles were made for use in development of plutonium foundry techniques. The tantalum was cold-formed through use of special dies and rolls, and welding was done in an argon atmosphere within a purge box. Six tantalum tapered cylinders of simple design were also fabricated for use as molds.

Three obsolete hoods in Room 242, 234-5 Building, were disconnected from services, blanked off for contamination containment, and disposed of at the 200 West Area burial grounds. These hoods were formerly used for coating finished plutonium shapes.

A specially designed box was constructed for the burial of a Purex I-1 Column. Powder generated into foam by a Foman generator was injected into the box to suppress contamination particles. Rigid SWP conditions prevailed throughout the job, which was completed to customer satisfaction and without incident.

Additional burial-box preparation for Purex included: modification of a box of side-burial design for the storage of the I-0 Column, and making ready for assembly a precast concrete box which, when loaded with concentrator tube bundles, will weigh approximately 35 tons at time of burial.

Four 18-ton casks were transported from specially designed railroad cars to Purex loading facilities, and reloaded on cars after being filled with a cesium product.

In accordance with CPD Safety Standards, all chainfalls in Purex were inspected and tested. Where required, repairs were made.

Purex and 241-CR Tank Farm work included removing cover blocks for changing jumpers and gasket inspection on several diversion boxes.

Services rendered Finished Products during the month included: removal and burial of three polishing hoods that were no longer in use; and replacement, on an emergency basis, of a concentrator tube bundle and an X-30 pump.

In the Redox railroad cut, ground contamination made extensive dirt removal necessary. General Maintenance forces suggested excavating slit trenches at the job site for burial of contaminated dirt, instead of hauling to the burial ground and risking spreading contamination along area roads or contamination becoming airborne. This work resulted in a saving of approximately \$6,000 compared to cost of alternate methods.

An electrically driven, rotating, ten-ton hook, with new lines, was installed in the Redox canyon, replacing an assembly which was removed for burial. Although high radiation levels were encountered, the job was completed within authorized maximum personnel exposure limits.

Burial was effected for the Redox Waste Handling and Decontamination Operation of a truck load of drums of contaminated waste from Rocky Flats.

An electrical outage of approximately one-minute duration, affecting the 200 East Power House and Pump House and the Hot Semiworks, occurred on March 21. Repairs were made promptly. Operating continuity in the production facilities was not affected.

Third-party inspection was performed on No. 2 boiler and the hot-water tank in the 200 East Power House, and No. 1 boiler and hot-water tank in the 200 West Power House. Report indicates equipment in good condition.

Feeding of amines into the steam in the 200 East Power House was started on March 14. Feed rate will be 5 ppm for the first month.

Ventilation balance activities included: completion of final air balance on 105-B Reactor Building, except setting turbine fan speeds; balancing air flows and static pressures in the new machining hood 41-M complex at 234-5 Building, and adjusting controls to hold a 4% O₂ atmosphere in the hoods; assisting the Finished Products Operation in removing and replacing, without spread of contamination, the large panels in the fabrication hoods in 234-5 Building which were highly contaminated.

T. S. LaFollette

Manager
Power & General Maintenance

TGL:ap

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

March 1961

II. ACHIEVEMENTS (continued)

F. FACILITIES ENGINEERING OPERATION

1. Purex

a. Process Design and Development Engineering - None

b. Project Engineering

b. CGC-821 Project Palm.- Purex

With the application of additional manpower, design progress was accelerated so that it is now back on schedule. Construction by the CPFF contractor was started March 15, 1961.

CAC-925 - Purex 216-A-2 Crib Replacement

By Directive No. AEC-191, dated March 23, 1961, the project was authorized in the amount of \$43,000. The work authority was received on March 31, authorizing \$8,000 to General Electric Company.

c. Manufacturing Engineering

Purex HA Column Cartridge

Design and drawings were completed for conversion of the Purex HA Column to all stainless steel nozzle plates. The existing scrub section is made of alternate polyethylene and stainless steel sieve plates. The new cartridge will be installed for testing at the next Purex shutdown.

F-6 Demister

Design has been completed and drafting initiated for installation of a Tantalum demister in a Purex concentrator. The unit is to be used for prototype testing in the F-6 concentrator position.

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Aqueous Foam Used for Equipment Burial

An aqueous foam was successfully used in its first equipment burial application. A Purex L-1 Tower was buried using a light-frame construction box and filling the box with foam after it was in place in the trench. Costs for applying the foam amounted to \$800 foam material and \$700 for installation and application labor. The alternate of constructing a non-collapsible box was estimated to cost about \$10,000 more than the light-frame box. Foam material has been purchased for application to three large boxes of contaminated equipment stored above ground in the 200-E side burial trench, which are planned to be buried in early April.

Titanium Re-boiler

The titanium re-boiler was delivered from the Vendor, Griscom-Russell Company, on March 15, 1961. Presently, it is in the 200-West Area Shops where it has undergone testing and mock-up. Visual inspection of the welds revealed surface markings in several locations which were of concern due to past experience with delayed cracking of titanium welds. A dye penetrant check was made which revealed no depth to the marks. Photographs were made and enlargements were sent to the Vendor for possible explanations. Response from Republic Steel Research Metallurgist who was contacted by the Vendor, indicated these markings were merely a surface condition which does not affect the integrity of the weld. This view was also shared by other persons familiar with titanium welding. During mock-up of the re-boiler, two nozzle locations were found to be off beyond allowable tolerances. The Vendor has agreed to assume the cost of fabricating new jumpers for these two nozzles.

2. Special Separations Processing

a. Process Design and Development Engineering

Dissolver Back-up Filtration

The process design report covering the installation of

1-2

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back-up dissolver off-gas filters at Redox was completed. This installation, estimated at \$175,000 to \$200,000, will provide remotely installed filters in J-cell, for each of the three off-gas lines. These filters in J-cell, to be packed with 115K Fiberglas media with densities from 3 to 9 lbs/ft³, will be 6.5 feet in diameter, the size of current dissolver cell units. Sampling and instrumentation provisions will be made to determine the filters' efficiency and pressure drop. The existing off-gas jet and control systems have sufficient range to cover the increased pressure drop, due to the back-up filter unit.

"E" Metal Feed Concentrator

Preliminary process design work was completed to cover the installation of a fourth feed concentrator in the UO₂ Plant. This work, to be included with the NPR supporting project, will involve removal of an obsolete item of process equipment from a 244-U Cell and installation of a repaired U-Cell Concentrator. Inter-ties will be provided in order that the four feed concentrators may be operated in any combination between the normal and enriched feed loops.

3-3 Calciner Split

Preliminary process design work was completed on the feed and off-gassscrubber portions of the 3-3 Calciner split. The enriched feed loop will be extended to "J" Calciner, and a separate enriched scrubber circuit will be provided for G, H, and J Calciners. This scrubber acid will be recycled to extinction into the enriched feed system.

b. Project Engineering

CGC-830 - Rev. #4 - Plant Modifications for Reprocessing Non-Production Reactor Fuels

Directive No. HW-483, Modification No. 3, confirming abandonment was issued on March 23, 1961.

CGC-913 - Project Birch - Redox

Directive No. HW-521, Modification #1, dated March 17, 1961, authorized the total project in the amount of \$325,000. The proposed work will provide increased Birch stripping efficiency and greater processing flexibility for the 1S Column.

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c. Manufacturing Engineering

Tank Coil Design - E-13 Ozonator

Re-design of the coil for the E-13 Ozonator in 221-T Bldg. was completed. The new unit includes two concentric spirals of 2-inch pipe with each loop stabilized at one point, thus allowing free movement without abrasion for each individual coil.

Silo Lights

Revisions have been made to the Redox Silo Light well insert for utilization of commercial components to provide an explosion-proof fixture.

3. Finished Products Operation

a. Process Design and Development Engineering

Neutron Monitors for Pu Reclamation Facility

A method of detector probe installation has been selected for some of the planned eleven units. The probe will be replaceable from outside the process equipment cell. A prototype instrument combining all the electronic circuitry for a monitor on one chassis has been purchased from Bendix Corporation. Operation of the prototype over a three-week period has been good with the exception of some problem with noise transients and a lesser problem with the value of the high voltage operating point.

Neutron Monitors for Pu Recovery Facility

It has been determined recently that neutron monitors should be used at three locations on the process equipment for use in obtaining estimates of Pu quantities. At one of these locations in particular, only limited effectiveness can be obtained, due to limitation of modifying existing equipment designs. Recommendations are being prepared for instrument components and equipment arrangement.

Fabrication Line Tooling

Tooling design for the 45 model has been started. It is estimated that this will require 30-40 drawings. Design improvements were developed for some of the 81 model tooling such as the vacuum face plate and the plug topping fixture.

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Recuplex Improvements

Detail design drawings, initiated during March, are about 75 percent complete for installation of the prototypical air pulser on the Recuplex H1 Column. Detail design drawings are essentially complete for installation of the prototypical continuous slag and crucible dissclover to replace the recently-failed Recuplex D-2 batch dissclover. A prototypical HF organic wash column, HF make-up tank, and accessory equipment have been ordered for installation in the existing Recuplex facility.

Gorton Lathes

Control system modifications by the vendor, did not result in any improvement of the lathe operation. Further tests have confirmed that extensive modifications and re-design of the control systems, both electrical and hydraulic, are required. The study is continuing. Meanwhile, two of the lathes are in production in a mode of operation that does not require the tracer controls.

b. Project Engineering

CGC-912 - Waste Treatment Facility - 234-5 Building

The bid package for the Phase I contract was transmitted to the AEC on March 20, 1961. Also, the Commission was informed that construction funds were not yet available for obtaining a contractor. The HOO-AEC was supplied supplemental back-up for the estimated engineering costs. It is understood that the revised project proposal was transmitted to the AEC, Washington, on March 8.

c. Manufacturing Engineering

Plutonium Scrap Recovery

Unit costs were estimated for FY-1962 Pu scrap recovery. These costs, in conjunction with previous FY-1964 recovery estimates, were assembled into a standard costs catalog document for AEC-wide reference.

Methods Analysis

Radiographs, serial numbering, and can-out operations were

filmed, and preliminary review completed, in Final Inspection. These films are being used to develop mr control limits and improvements in methods and contingent exposure, time, process control, training, and cost control.

CGC-897 - Fission Product Storage - "B" Plant

The engineering study describing the \$2,300,000 Phase I facility at "B" Plant, for fission product concentrates storage together with integrated conceptual engineering work for Phase II and III and waste calcination was completed and published.

The two basic alternates for implementation of the Phase I portion of the Fission Product Program are as follows:

- (1) Reactivation of "B" Plant in accordance with either the "Engineering Study" at \$2,300,000 or at a reduced scope for \$1,400,000.
- (2) Continued operation of Hot Semiworks with either of the following supplemental facilities:
 - (a) New Product Storage
 - (b) New LWV Storage

In a meeting with the Commission, on March 15, 1961, the basic alternate courses were discussed and evaluated. It was concluded that the most reasonable course of action would be to activate the "B" Plant, and a project proposal should be prepared. It has been estimated that the Phase I work could be completed 14 months after authorization.

TV Remote Packaging

Design was completed on the packaging assembly, which includes the housing, optical scanner, and mechanical components for the closed circuit television camera to be used in the canyon. Drawings are currently being made.

4. General

a. Process Design and Development Engineering

NPR Fuel Processing - Redox

The final process design report covering the changes at Redox, needed for NPR fuel process, was completed and published. The IPD requisitions for NPR fuel canisters were reviewed with Department representatives and approved by the responsible operation manager.

b. Project Engineering

Project Cost Information as of 3/19/61:

Total Auth. Funds - 11 active projects	\$ 7,323,000
Total cost-to-date	5,193,000
Commitments and Open Work Releases	197,000
Costs charged to above projects (2/19/61 to 3/19/61)	155,091

Projects dropped from active status during this period:

<u>Project No.</u>	<u>Authorized Funds</u>	<u>Total Cost</u>
CAC-891	\$ 65,500	\$ 41,897
CGC-909	\$ 90,000	\$ 86,265

 Manager - Facilities Engineering

HP Shaw:WWC:alr

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

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II. ACHIEVEMENTS (Continued)

G. RESEARCH AND ENGINEERING OPERATION

1. Purex Process Technology

a. Fission Product Recovery

Supernate from underground storage Tank 241-A-103, which contains three-cycle Purex process wastes aged three years ten months since the last addition to the tank, was returned to the Purex Plant and centrifuged prior to being processed for cesium recovery. Decalso (an inorganic ion exchange medium) in each of four Shielded Transfer Tanks was "loaded" with 30,000 curies for a total shipment of 120,000 curies of Cs 137. Test measurements on a sealed tank indicated a pressure buildup of only one pound per square inch per day while the temperature remained essentially ambient over a twelve day period.

The HAPO IA Cask was loaded with 20,000 curies of purified Sr 90 by Hanford Laboratories Operation personnel. A test is now in progress to establish the rate of pressure and temperature rise on the sealed IA Cask.

b. Solvent Extraction

Although the over-all decontamination performance was excellent following the resumption of normal operation at CF = 3.0, an increase to CF = 3.6 processing rate produced a 1.5 fold increase in the gamma activity of the intercycle streams. This resulted in a two fold increase in the final uranium product gamma ratio (7.0 to 8.0) but only a small increase in the final plutonium product Zr-Nb/AT ratio. Solvent extraction uranium product batches with gamma ratios of ≥ 7.0 were reduced to the specification of ≤ 2.0 by silica gel treatment; however some batches with gamma ratios of ≥ 7.0 were reduced only to about 2.5. These latter batches were still acceptable for UO₃ processing because 75 per cent of the gamma activity was ruthenium. After a processing rate reduction to CF = 3.0 near the end of the month, the uranium product gamma ratios started to decline and reached equilibrium in the 4.0 - 5.0 range.

The plutonium ion exchange product Zr-Nb/AT also rose during the period of higher processing rates from 1.0×10^{-11} to 2.0×10^{-11} . The increase was partially caused by the increased

gamma activity levels of the 2AF, but more significantly affected by a 1.5 reduction in the plutonium concentration of the 2AF. This latter effect occurred after a plutonium recycle from the ion exchange unit back to solvent extraction was discovered and stopped. As in the case of the uranium product, the plutonium product responded to the reduction in processing rates and at month end started to decline toward 1×10^{-11} Zr-Nb/AT.

Plutonium waste losses via the HA Column effluent (HAW) were normally considerably below 0.1 per cent. After the 2A Column was changed during the last shutdown, recycled plutonium losses via the 2A Column effluent (2AW) were temporarily excessive because the optimum plant operating conditions for the new stainless steel nozzle plate cartridge were not defined. Normal 2AW plutonium recycle losses (1.0 - 2.0 per cent) were obtained by reducing the 2AS two fold and increasing the pulse frequency to 80 cycles per minute; 23 cycles per minute was normal for the fluorothene Raschig ring packed column.

Other items of interest to solvent extraction were as follows:

- (1) The processing capacity of the IC and 2E Columns was restored to normal by replacing the resin in the No. 2 anion unit of the water demineralizer.
- (2) A slight decrease in decontamination performance was noted in the final plutonium cycle after the fluorothene Raschig ring packed 2A Column was replaced with one containing stainless steel nozzle plate scrub and extraction section cartridges. However, because no previous plant experience is available to establish operating conditions, some flow sheet changes may still be required to achieve optimum decontamination performance.
- (3) On March 15 the addition of five parts per million Permacol to the process steam supply was commenced. Laboratory tests indicate that this filming amine which is designed to inhibit scaling and corrosion of steam lines has no significant effect on the process.

c. Neptunium Recovery

A recovery run at the first of the month isolated and decontaminated 0.74 kg. of neptunium from the Backcycle Waste System. Operation during the run was normal except for erratic performance of the 2B Column which reduced the normal processing rate by about forty per cent. Although laboratory data indicated that high neptunium recycle to the Backcycle Waste System (two to four fold above normal) resulted from poor organic quality, over-all recovery during the run was 89 per cent. Changes in the organic treatment equipment

while the run was in progress permitted only a single carbonate wash of the organic rather than the regular alkaline-permanganate, dilute nitric acid and sodium carbonate wash series.

Neptunium waste losses as analyzed in the HA Column effluent (HAW) were excellent (about ten per cent) during the March uranium processing period, but the loss to the final uranium product was consistently two to three fold above the normal one per cent loss. As yet, this loss has not responded to normal flow sheet changes in the 2D Column operation.

d. Solvent Treatment

Readings from the Beckman radiation monitor located near the No. 1 System solvent centrifuge indicate the gamma activity removed by centrifugation is negligible since installation of a IO Column containing a stainless steel nozzle plate cartridge plus the use of a once-through pass, rather than recycle, of the 0.14 M nitric acid scrub. Similar continued operation could signify the desirability of by-passing the organic centrifuges in the future.

Recycle of the solvent through the No. 1 solvent system at the conclusion of the neptunium recovery run reduced the gamma activity from 10,000 to 3,000 microcuries per gallon. However, after the start of irradiated uranium processing, the gamma activity of the solvent returned to 10,000 microcuries per gallon. A subsequent decrease to 6,000 microcuries per gallon correlated with a three-fold increase in the potassium permanganate addition rate to the Batch Wash Tank (TK-G1). A still further reduction to 4,000 microcuries per gallon resulted from reducing the processing rate from CF = 3.6 to CF = 3.0.

e. Waste Treatment

Waste volumes sent to the underground storage tanks averaged 49, 694 and 58 gallons per ton of uranium for neutralized high-level waste (IWW), solvent washes and cell drainage, respectively. Equipment flushes from the solvent treatment cell are included in the solvent wash volume shown above.

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2. Redox Process Technology -

a. Dissolution

The performance of the Mark V multipurpose dissolver continues to be highly satisfactory. A revised decladding procedure, which adds 500 gallons of sodium nitrate solution to the dissolver before fuel charging and then sufficient water to cover the charge (determined visually by the crane operator) has reduced the decladding waste volume from 230 gallons per ton to 160 gallons per ton of uranium processed. No attempt has been made to increase the minimum heel size or to change capacity by changing cut size. However a steam flow recorder was installed, a persistent vacuum fluctuation problem was solved and arrangements were made for the more uniform delivery of fuels from the reactors to the dissolver. Consequently total production capacity can now be increased by operating on a seven-day-week basis. A program of tests aimed at increased instantaneous capacity is also being formulated and it is hoped will be implemented in the coming month.

b. Solvent Extraction

The neutron detection prototype instrument, installed in the 1B (U-Pu partition) Column plutonium product stream, continued to detect and signal instances of incipient plutonium reflux in the partition column. Since the reflux of plutonium appeared to be associated with insufficient reducing strength in the partition column, several flowsheet changes were made during the month, on a test basis, to eliminate oxidizing agents or to increase the reducing potential in the column:

1. The addition of 0.05 M sulfamic acid to the 1AA (first cycle decontamination scrub) stream, to destroy nitrite ion which might be present in the 1AP (first cycle product) stream which is fed directly to the 1B Column, had no effect.
2. Increasing the 1BX (U-Pu partition column extractant) flow by as much as 30 percent had no effect.
3. Increasing the ferrous iron concentration of the 1BX stream from 0.055 M to 0.072 M late in the month gave three days of operation during which no reflux was detected. Further testing is in progress.

Since the addition of sulfamic acid to the 1A Column scrub (1AA) had no effect on the plutonium reflux in the 1B Column, the sulfamic acid concentration of the 1BX stream was returned to the standard flowsheet concentration of 0.05 M.

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The use of ferrous sulfamate to replace the mixture of ferrous ammonium sulfate and sulfamic acid currently used in the make-up of LBX appears attractive for the following reasons:

1. The total solids content of the Redox salt waste will be decreased by reducing the amount of sulfate ion.
2. The evolution of ammonia during waste neutralization will be virtually eliminated.
3. Aqueous make-up procedures will be simplified.
4. The over-all recovery of neptunium will be improved.

Currently, neptunium reaching the LB Column is subject to being complexed by the sulfate present in the column and being stripped into the LBP stream with the plutonium. This neptunium is then lost from the process since it will accompany the plutonium through the rest of the product route. The elimination of this sulfate from the LB Column will greatly decrease this undesirable complexing and allow the neptunium to be extracted with the uranium in the LBU stream; from this it will be separated in the subsequent acid-deficient extraction cycle and returned for internal recycle and recovery. Preliminary tests of LBX made using ferrous sulfamate showed no adverse effects on column operation.

c. Tail-End Treatment

Previous monthly reports (December 1960, January 1961) indicated that the efficiency of ruthenium removal from uranium product solution by ozone sparging was improved with the elimination of total reflux to the E-13 sparger vessel. Although this improvement has not been fully evaluated, currently, final uranyl nitrate product with initial gamma ratios up to 75 can be reduced to the specification of less than two gamma ratio with ozone sparging alone in less than five hours. The liquid phase oxidant, periodic acid, previously used routinely, is now specified for use only when the initial gamma ratio is greater than 75. This gamma ratio has not been exceeded since the beginning of the test, and at production rates forecast for the balance of calendar 1961, the time cycle may be such that periodic acid can be dispensed with entirely, despite gamma ratios greater than the control point value.

d. Waste Storage

Samples of the supernatant solution were obtained from the 101, 107, 108, and 114-SX high level waste storage tanks during the month. Upon cooling to room temperature, each sample crystallized to become approximately 50 volume percent settled solids.

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Preliminary analyses indicate that less than five percent of the neptunium present in the wastes sent to these tanks is in the supernatant solution.

e. Essential Materials

On March 15, a meeting was held on the subject of HAPO aluminum nitrate requirements. Present at the meeting were representatives from: a) the Ortho Division of California Spray Chemical Company from both Kennewick, Washington and Richmond, California; b) the Hanford Operations Office of the AEC; c) the General Electric Company, Chemical Processing Department and Construction Engineering and Utilities Operation. The primary purpose of the meeting was the discussion of technical information needed by California Chemical Company in its chemical research and engineering development work in preparation for acceptance of an invitation to bid on supplying HAPO's needed aluminum nitrate. The consensus of the California Chemical personnel (the chief research chemist, chief analyst, and chief engineer from Richmond, California and the Kennewick plant manager and plant engineer) appeared optimistic despite the extremely tight schedule which they were advised would be required.

3. Finished Products Chemical Technology -

a. Uranium Reduction Operation

1. Concentration and Calcination

The tube bundle of a second 60 percent to 100 percent UNH concentrator (ED-7) failed by corrosion of the tube-to-tube sheet welds after approximately five years of service. The material of construction was 304-L stainless steel. A historical summary of these concentrations is presented in the table following:

<u>Concen- trator</u>	<u>Instal- lation</u>	<u>Service</u>	<u>Tube Material</u>	<u>Remarks</u>
1	ED-2	1951 to 1957	309 SCB	Gasket leak. No metallurgical failure.
2	ED-6	1953 to 1961	309 SCB	Tube-to-tube sheet weld failure.
3	ED-7	1956 to 1961	304-L	Tube-to-tube sheet weld failure.
4	ED-2	1957 to --	304-L	In service
1	ED-6	1961	309 SCB	Original ED-2 reinstalled. In service.
5	ED-7	1961	304-L	In service.

b. Metal Finishing Operation

1. Recuplex

A prototype single tube falling-film type concentrator-stripper was installed in the product handling system. The unit is constructed with a four-inch ID tube packed with 1" x 1" polytrifluorochloro-ethylene Raschig rings, for distributing the feed to the steam-heated walls. Deentrainment is accomplished in a one-foot high section packed with one-half inch Beryl saddles. Initial performance data, compared to that of the old concentrator,

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indicates a possible two-fold increase in evaporation rate, with less entrainment, and a four-fold decrease in corrosion product contamination.

2. Tasks I, II, and III

Calcium fluoride-coated metal reduction pressure vessel lids were used in 43 charges to determine the efficacy of this measure in reducing the iron content of the plutonium regulus. Statistical analysis of the spectroscopic data failed to show any detectable effect of the lid coating on the number of burned lids or the amount of iron in the button.

4. Process Chemistry

a. Purex Process Assistance

(1). First Extraction Column Organic Crud

The source of the black particles contained in recent samples of HAP (organic phase product from the first Purex extraction column) was identified as a molybdenum sulfide lubricating compound. Several such compounds are currently used at Purex. These include "Molly Kote," a graphite type compound of MoS_2 and "Molub" a MoS_2 grease. Wet chemical analysis of the black particles resulting from the reaction of "Molly Kote" with 3 M HNO_3 showed 64% Mo while the black particles found in HAP showed 47.5% Mo.

Laboratory tests showed that the presence of such compounds can adversely affect solvent extraction. Batch contacts using laboratory solvent versus 3 M HNO_3 with 0.01% by weight "Molub" produced black particles at the interface and stable aqueous emulsions. "Molub" at 0.1% by weight raised the plutonium retention number of the test solvent by a factor of about 80, but did not appreciably alter the zirconium-niobium distribution coefficient.

(2). Aqueous Dissolved Organic Materials

There is considerable interest in the extent of dissolved organics in the various aqueous streams which are fed back into the Purex process and the effects of any such materials on solvent extraction. Recently, two streams of interest, the 3WB (backcycle waste) and 2WW (bottoms from the second high level acid concentrator) were sampled and tested for dissolved organics. The 3WB showed little or no dissolved organics, whereas the 2WW showed significant amounts. Zirconium-niobium distribution coefficients were measured on the original solutions and again after dissolved organics had been removed by a carbon tetrachloride extraction. On the 3WB little or no difference was noted between the original solution and after treatment to remove dissolved organics. However, on the 2WW, the zirconium-niobium extraction coefficient was significantly lower after dissolved organic materials had been removed with carbon tetrachloride.

b. Neptunium Purification

During the month, 708 grams of neptunium was received into the experimental purification facility from the Purex Plant. Impurities associated with the neptunium-237 amounted to 127 grams of plutonium, 1060 grams of uranium, 3.22 curies of Zr,Nb-95, and 0.35 curies of Th-234 (UX_1). This neptunium was combined with 60 grams of recycle neptunium and processed through the anion exchange system. To

simulate future plant operations, the anion exchange system was operated "blind"; i.e., no effluent samples were taken during the run to determine the progress of purification. All of the effluent was accumulated in one tank and analyzed after the run was complete. Final effluent results show that the "blind" operation was quite successful.

The material (~ 762 grams Np) was loaded on about 30 liters (wet settled resin) of Dow 21K at an average rate of 6.58 mg/min/cm^2 . The co-absorbed plutonium was washed from the resin with 18 column volumes of reducing wash, passed through at an average of 3.97 ml/min/cm^2 . Thorium-234 and remaining co-absorbed fission products were washed from the resin bed with 18 column volumes of HF wash at an average flow of 4.76 ml/min/cm^2 . This flow was 119% of flowsheet. Waste losses were 0.90%. The purified neptunium nitrate was placed in two shipping casks for shipment to Savannah River. Measurement values for the material shipped were as follows:

Wt. of solution	22.589 kg
Sp.Gr.	1.144
HNO ₃	2.88 M
Fe	0.025 g/l
Np-237	39.79 g/l
Pu	0.015% (Np basis)
TMI	0.1% (Np basis)
Zr, Nb-95	0.25 $\mu\text{c/gm}$ Np
Ru-103, 106	Not detected
Np(V)	78.6%
Np(VI)	21.4%

c. Analytical Assistance

(1) X-ray Fluorescence Spectrometer

A uranium calibration curve has been prepared for the X-ray fluorescence spectrometer and synthetic standards are being run to determine the precision of the method at the various uranium concentrations. The applicable range of the method is from 50 ppm to 100% uranium.

(2) Uranium-237 Growth in Purified Plutonium

As part of a long-term program to measure the beta-gamma contribution from purified plutonium (purified from extraneous beta-gamma emitters), the growth of uranium-237 in freshly purified plant plutonium was studied. Uranium-237 grows into freshly separated plutonium (at a rate equivalent to 50% of equilibrium in 6.7 days) from the alpha decay of plutonium-241. Previously, it was believed that this effect was small for Hanford production material. However, recent data obtained on current final product plutonium shows that the uranium-237 contribution is significant

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and must be taken into account in establishing the beta-gamma contribution of plant plutonium.

(3). Analysis of Special Two-Ton Test Batches

Analytical work on the twelve test batches selected for measuring plutonium content as a function of exposure was completed. The results are reported in HW-68438, "Analysis of the Twelve Two-Ton Test Batches for the Review of Plutonium Formation Rates as a Function of MWD," by W. H. Zimmer.

d. Thermobalance Studies of Plutonium Oxide Chlorination

Further thermobalance studies of the reaction of plutonium dioxide with phosgene were carried out. Four samples of plutonium oxide, which had been prepared by direct calcination of the nitrate and left in the calciner (after completion of the nitrate to oxides of nitrogen reaction) for 0.1, 2, 6, and 20 hours, were tested. The measured half-times of these samples for chlorination with phosgene at 500C were 9.5, 31.8, 103.5, and >103.5 minutes, respectively.

5. 234-5 Development

a. Electrolytic Reduction Of Plutonium Trichloride

Gradual improvement of the hardware has reduced mechanical failures and improved process control. Better cell testing should result in a lower incidence of early cell failure.

A run of five hours and twenty minutes produced 262 grams of metal. The run was terminated prior to failure of the equipment; post-run inspection disclosed the run probably could have continued several more hours before vent tube corrosion would have caused a shutdown. Most of the run was at the usual power of 30 amps (50 grams per hour), but a short period of operation at 50 amps indicated the cell might be capable of greater capacity with this good feed. Most significant features of the run were (1) the lack of unusual incidents, and (2) the consistent response of the system to feed additions or voltage adjustment.

A series of thermal shock tests of nickel-coated cells disclosed several inherent weaknesses of this type of cell. Past failures are now better understood, and improved specifications will be used in obtaining new cells.

b. Continuous Dissolution Of Slag And Crucible

Improved performance was demonstrated in an extended run. The dissolved plutonium was shown to be extractable.

A 32-hour continuous dissolver run was completed. The slag and crucible feed rate was 195 g/hour (total of 6200 g solids charged). Plutonium recovery was quantitative. Iodine concentration in the dissolver overflow solution as iodate was 0.5 g/l, but no plutonium iodate precipitates were observed. The overflow solution was free of gelatinous material. This was effected by reducing the dissolver acid concentration to 7.5 M HNO₃. A solids heel of 500 grams remained at the end of the run. Dissolution of the heel is in progress.

Foaming continues to be a problem immediately after each solids addition. A simple solution to the problem in the plant may be to cut the size of solids charge in half and increase the charging frequency.

The dissolver overflow solution was adjusted to extraction column feed specifications (CAF) and contacted with 20% TBP - 80% CCl₄. No difficulties were experienced in extracting the plutonium. Four stages of extraction reduced the plutonium concentration in the aqueous from 2 g/l to 0.003 g/l in one CAF sample, and from 0.2 g/l to 0.0005 g/l in the second sample.

c. Studies On The Reduction Of Recuplex Waste Loss

Stripping studies show an unexpected failure of dilute acid to strip plutonium from dibutyl butyl phosphonate solvent.

The proposed solvent, 25 percent DBBP - 75 percent CCl_4 , was contacted successively with equal volumes of Recuplex waste, CAW, which was 1.68 M HNO_3 . The equilibrium acid concentration in the organic was 0.6 M HNO_3 , and plutonium 108 mg/l. Stripping tests with 0.1, 0.01, and 0.001 M HNO_3 failed to remove an appreciable amount of plutonium, although the acid was readily stripped. These results may indicate a different mechanism of retention in the organic phase than is found with TBP. Five percent carbonate solutions readily strip the plutonium.

d. Ceramic Development

Special crucibles for melting plutonium were tested and showed that the development objectives were largely achieved. A paper was prepared summarizing the development of dense electrolytic cells by slip casting.

Pouring crucibles were developed over the past six months using three percent fluffy calcium fluoride, nine percent fluffy titania, and 35 percent coarse mix magnesia. Objective of the work was to develop a hard, dense, non-spalling surface which would be less reactive toward plutonium than previous crucibles. These qualities were demonstrated in a series of drastic tests of briquet melting at temperatures over 1000 C. Reaction with the crucible was an order of magnitude less than usual. Since the crucibles broke upon cooling, they are still good for only one trip.

Main application will be for specialty melting applications requiring a ceramic. In view of the success of tantalum for repetitive melting, it is not felt worthwhile to develop these ceramic crucibles further. Heat shock resistance would need to be greatly improved to permit reuse.

The Abstract of "Slip Casting Of Magnesia Titania Bodies" follows.

"Titania is known to increase the rate of diffusion and sintering in pressed magnesia-titania bodies. To meet a need for dense ceramic containers which would hold a molten chloride eutectic, methods were developed for slip casting and sintering fused magnesia containing 1% weight percent titania. The procedures are based on the Loebman method of slip casting fused and milled magnesia using water as the vehicle.

"The principal variables studied were pretreatment of the titania

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(calcined or non-calcined); nature of the deflocculant; percentage of coarse magnesia added to the milled magnesia-titania slurry; sintering temperature.

"Magnesia-titania cells and auxiliary pieces were produced which retained the molten chloride at 800° C for several hours. Several of the formulations resulted in a glazed body."

Manager
Research and Engineering

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II. ACHIEVEMENTS (continued)

H. FINANCIAL OPERATION

1. Production Cost

Department budget data for fiscal years 1962 and 1963 was submitted to Contract Accounting Operation in March for consolidation with the HAPO budget. Data included summaries of both Production and Research & Development budgeted costs and funds required for inventories and equipment.

March operating cost reports reflect the release of \$225,000 in O3 Production funds made available at AEC request.

In a joint effort with the Industrial Engineering Operation a standard price catalogue was prepared and issued documenting plutonium scrap recovery pricing.

Special Requests and Backcharges were relatively heavy during the month and included:

- a. Burial of 195 drums of contaminated material from Dow Chemical Co., Denver, Colorado.
- b. Shipment of spare parts to duPont Co., Savannah River.
- c. Rework of valve diaphragms for charge-back to Tower Equipment Co.
- d. Shipment of 1WW wastes to Oak Ridge.
- e. Shipment of Pu-239 to Oak Ridge.

CPD's investment in inventories at February 28, 1961 compared with budgeted control balances at June 30, 1961 are shown below:

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(amounts in thousands)	Balance 2-28-61	Financial Plan 6-30-61	Surplus (Deficit)
<u>Inventories</u>			
Essential Materials	\$ 837	\$ 777	\$ (60)
Special Materials	64	83	19
Spare Parts & Standby	<u>1 647</u>	<u>1 846</u>	<u>199</u>
Gross Inventories	<u>2 548</u>	<u>2 706</u>	<u>158</u>
<u>Reserves</u>			
Essential Materials	52	56	(4)
Spare Parts & Standby	<u>409</u>	<u>461</u>	<u>(52)</u>
Total Reserves	<u>461</u>	<u>517</u>	<u>(56)</u>
Net Investment	<u>\$2 087</u>	<u>\$2 189</u>	<u>\$ 102</u>

At this date funds appear to be adequate with a surplus of approximately 5% at February 28, 1961. The essential material inventory is scheduled to decrease over the remaining months of the fiscal year and should not exceed financial plan at fiscal year end.

Essential material balance at the end of February was \$46,000 in excess of January, due to precautionary (strike) ordering and low chemical consumption attending the small production month. The spare parts inventory was reduced by \$47,000 due largely to removal of stock from spares for fabrication of a tube bundle.

2. Singular Cost Studies

A financial review of an IPD document draft prepared for a combined operations study involving use of CPD operating cost data was performed during the month. Comments were furnished the Manager-Production, CPD.

3. General Accounting

As of February 28, 1961, thirteen active projects had incurred costs of \$5,191,527 against authorized funds of \$7,198,400. Outstanding commitments totaled \$174,299.

Three directives were received during the month. These were:

CGC-913 - Project Birch - Redox. Total authorization \$325,000

CAC-925 - Purex 216-A-Z Crib Replacement. Total authorization \$43,000

CGC-830 - Plant Modifications for Reprocessing Non-Production Reactor Fuels. Authorized abandonment and reduced the authorized funds to \$572,000.

Approval to place the metal preparation portion of the 234-5 RMA line in accounting category Held for Future Use, startup in 30 days, has been received from AEC. First cost of this equipment was \$1,163,000.

Permission has been obtained from AEC to use seven ammunition supply igloos previously occupied by the U. S. Army. These igloos, located west of the 200 areas, will be used to store contaminated materials. AEC will transfer these facilities to CPD at a later date.

4. Personnel Accounting

A payroll register combining monthly paid and weekly paid employees was issued for the first time as of week ending March 12, 1961.

In several instances, the Internal Revenue Service requested detailed explanation of calculation of excludable wages from employees in regards to their 1960 tax return. The standard form provided by Internal Revenue Service for furnishing of this information was completed by us for those employees requesting it.

5. Auditing

Arrangements were made with the Manager, Patrol Operation to more rigidly enforce property control procedures in the 200 areas in order to disclose and minimize unauthorized removal of government property. Special attention will be given by Patrol to material in private vehicles brought into the areas. Routine searches of personnel leaving the areas will be increased on all shifts and a minimum of one lunch box inspection per week will be made on all shifts.

A review was made of CPD Motor Pool Operation. The activities audited were satisfactory with the exception of the use of government vehicles for transportation from work areas to area badge houses during periods when bus service is available.

6. Procedures

A data processing tabulation was recently developed by Industrial Engineering and CPD Finance, which will provide management control over work orders not feasible with former reporting. A second de-bug listing was received late in March which largely accomplishes objectives originally set in the development of the tabulation. This data processing listing provides management with work order cost to date for each work order and highlights such things as overruns, the fact that an order is completed, and other important control data.

A study of office routines and paper flow regarding the accumulation and recording of data for Purex's preventive maintenance program

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is currently under way. The initial phases of this study are for the purpose of reviewing present manually performed functions, revising existing routines applying the latest work simplification methods, and to determine feasibility of establishing a completely automated system.

Manager - Finance

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (continued)

I. RELATIONS PRACTICES OPERATION

1. Salary Administration

An upward shift of 2% in the Exempt Salary Structure was communicated to management together with additional information relative to comparison of trends in exempt and nonexempt structure changes and Cost of Living trends.

Reconciliation of a subsection engineering manager position was completed and the currently assigned position level confirmed.

Consultation was provided in connection with the reorganization of a subsection in the Research & Engineering Section. Two new positions were evaluated and established.

2. Personnel Placement

An offer was extended to an August, 1961, graduate of Electrical Engineering and Industrial Engineering at the University of Washington and an acceptance received. Acceptance of an offer by a Technical Graduate on the IIAPO program was also received this month with the reporting date set for May 1.

Referrals were received for the six MTP trainees proposed to come to CPD for either their first assignment or for their second year on the Program. Confirmations on all assignments were sent out prior to the end of the month.

A meeting was held with R. R. Herrick, Manager-Technical Education, Western Region, during the month concerning IIAPO's participation in the Advanced Engineering Program to begin in September, 1961. Several interested section and subsection managers from the Department were in attendance.

A revised forecast of exempt personnel requirements for the balance of this calendar year and for calendar year 1962 was submitted to the Hanford Laboratories Operation. This forecast also included predictions of training assignments for Technical Graduates in the Chemical Processing Department.

3. Wage and Benefits

A Millwright, a Process Operator, and a Plumber Steamfitter retired this month.

As a result of added emphasis on completion of suggestions which have been open more than 30 days, the average age for open suggestions has now been reduced to 2.8 months. The average age at the beginning of the year was 4.7 months.

The highest suggestion award in the history of the Chemical Processing Department was presented this month to a Chemical Technologist in the Redox Analytical Control Laboratory. Ernest Schnaible received \$2500 for suggesting a program to permit use of the 7090 data processing machine to calculate results obtained from the 256 Channel Analyzer. This award ranks as the third highest award ever paid at Hanford.

Two new non-unit jobs were reviewed, evaluated and officially established. One a semi-technical job in Control Operation and the other a clerical job in Fabrication Operation of Finished Products Section.

	1960 <u>Average</u>	<u>February</u>	<u>March</u>
Received	38	40	41
Adopted	14	22	20
Awards	\$ 298	\$ 640	\$ 2,985
Savings	\$ 1866	\$ 4387	\$ 14,627

4. Health, Safety, and Radiation

At midnight on March 14, 1961, the Chemical Processing Department qualified for the HIAPO General Manager's Safety Award. Individual photographs were used for personnel to make their selections, but no preselection lists were circulated. The new arrangement will shorten final delivery by an estimated two weeks.

Chemical Processing Department emergency procedures were reviewed, revised, and submitted to Security where HIAPO plans for emergency are currently under audit.

The bus schedule for interarea shuttles has been revised effective April 3. The new schedule will make it more convenient for people to schedule morning medical examinations and return to the area.

5. Communication

Arrangements were made for the Manager, Relations Operation to hold three meetings with groups of management people on March 22, 23, and 24, in the 2713-WB Hutment in 200 West Area. The meetings concerned the settlement of negotiations.

Both PBM-I classes were completed, diplomas finished, and a Graduation Dinner held at the Desert Inn on March 22. Forms have been sent out asking for comments and suggestions on the PBM-I Course.

Other training activities included arrangements for two CPD men to participate in the RO-C&AO's spring BOCE class. Arrangements were also made for two CPD men to participate in RO-C&AO's spring PBM-I class. At the request of Relations Operation, a first quarter Training Statistics Report was prepared and submitted.

During March, 17 OPG's were prepared, approved, and distributed in CPD, a CPD and HAPO OPG Index prepared and distributed, and one other OPG sent out for approval.

RB Britton
Manager, Relations Practices

RB Britton:pf

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CHEMICAL PROCESSING DEPARTMENT
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III. PERSONNEL ACTIVITIES

A. FORCE SUMMARY

<u>Operation</u>	<u>Monthly Salaried</u>		<u>Weekly Salaried</u>		<u>Total</u>	
	<u>2-28-61</u>	<u>3-31-61</u>	<u>2-28-61</u>	<u>3-31-61</u>	<u>2-28-61</u>	<u>3-31-61</u>
General Manager's Group	10	11	1	1	11	12
Financial	13	13	13	13	26	26
Relations Practices	5	5	6	6	11	11
Research & Engineering	63	63	27	27	90	90
Facilities Engineering	65	65	22	22	87	87
Power & General Maintenance	41	39	241	237	282	276
Production	5	5	3	3	8	8
Special Separation Processing and Auxiliaries	50	49	215	216	265	265
Purex	54	54	215	210	269	264
Finished Products	<u>53</u>	<u>53</u>	<u>230</u>	<u>235</u>	<u>283</u>	<u>288</u>
Total	<u>359</u>	<u>357</u>	<u>973</u>	<u>970</u>	<u>1 332</u>	<u>1 327</u>

B. PERSONNEL CHANGES

On March 1, 1961 Mr. W. N. Mobley, Manager Finished Products Operation, Chemical Processing Department, transferred to the Fuels Preparation Department as Manager of Manufacturing Operation.

Effective March 13, 1961, Mr. Robert E. Smith, Manager Finished Products Technology, Research & Engineering Operation was transferred to the position, Specialist, Finished Products & Customer Liaison, Production; and Mr. L. M. Meeker, Specialist, Finished Products & Customer Liaison, Production was transferred to the position, Manager, Finished Products Chemical Technology, Research & Engineering Operation.

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C. TRIPS

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To Other G.E. Components</u>		
C. B. Foster	Manufacturing Services Schenectady, N.Y.	Engineering services (3/30/61)
C. B. Foster	Silicone Products Waterford, N.Y.	Plant layout, procedures and practices (3/31/61)
<u>To AEC and Other AEC Contractors</u>		
B. F. Campbell	Phillips Petroleum Co. Idaho Falls, Idaho	Research Program Consultations (3/2/61)
L. I. Brecke V. R. Cooper P. H. Reinker A. E. Smith	Lawrence Radiation Lab. Livermore, Calif.	Weapon design trends (3/16-17/61)
B. M. Dobbs	AEC-ALOO Albuquerque, N.M.	Weapons fabrication cost account- ing (3/19/61)
A. E. Smith	Lawrence Radiation Lab. Livermore, Calif.	Super-Accuracy Steering Committee (3/22-23/61)
P. H. Reinker J. H. Warren	UCNC-ORNL Oak Ridge, Tenn.	Fission product scheduling (3/27/61)
P. H. Reinker J. H. Warren	AEC-DOP Washington, D.C.	Fission product scheduling (3/28/61)
<u>To General Industry</u>		
L. J. Battey	Nooter Corporation, St. Louis, Missouri	Fabrication of vessels (3/1/61)
L. J. Battey	Graver Tank Co. Salt Lake City, Utah	Fabrication and design (3/2-3/61)
R. A. Kennedy	Pacific Steel Products Seattle, Wn.	Test of fission product cask (3/1-2/61)
P. S. Kingsley	General Inspection Co. Bell, Calif.	Ultrasonic inspection testing (3/6/61)
P. S. Kingsley	Trent Tube Co. Fullerton, Calif.	Ultrasonic inspection testing (3/7/61)
P. S. Kingsley	Southwest Engineering Los Angeles, Calif.	Ultrasonic inspection testing (3/8/61)

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
G. P. Kesel	Airmatic Systems Corp. Saddlebrook, N.J.	Air tube conveyors (3/10-17/61)
G. P. Kesel	Lampson Corp. Syracuse, N.Y.	" " "
G. P. Kesel	Grover Co. Detroit, Mich.	" " "
G. P. Kesel	Standard Conveyor Co. St. Paul, Minn.	" " "
G. P. Kesel	Manning, Maxwell & Moore Co., Muskegon, Mich.	" " "
G. P. Kesel	Allstate Engineering Co. Milwaukee, Wisc.	" " "
G. P. Kesel	Harnischfeger Corp. Milwaukee, Wisc.	" " "
C. A. Lyneis L. L. Zahn	Knapp-Mills Co. Wilmington, Del.	Fission product casks (3/13-15/61)
R. A. Kennedy	Knapp-Mills Co. Wilmington, Del.	Shipping cask design (3/30,31/61)

To Conventions and General Meetings

W. G. Browne	Kennewick presbyterian Church, Discussion Group Kennewick, Wn.	"The Importance of Atomic Energy" (3/5/61)
W. G. Browne	Carmichael Jr. High School Richland, Wn.	"The Importance of Atomic Energy" (3/17 and 3/20/61)
B. F. Campbell C. B. Foster	St. Louis, Mo.	ACS National Meeting (3/22-29/61)
V. R. Cooper H. P. Shaw	APED, Palo Alto, Calif.	Meeting of Managers-Laboratories and Managers Engineering (3/27-28/61)

D. VISITORS

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From Other G.E. Components</u>		
R. R. Herrick	Engineering Education Ser- vice, San Jose, Calif.	Advanced engineering training programs (3/22/61)

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<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
D. W. Leiby J. Colston	GEL Schenectady, N.Y.	Equipment discussions (3/13-27/61)
<u>From AEC and AEC Operational Contractors</u>		
Dr. Allen Langley Dr. J. Turner	Division of Biology & Medicine, Washington, D.C.	Purex plant tour (3/2/61)
W. C. Cunningham B. C. Cline J. R. Jakes	duPont (SRP) Aiken, S. C.	Purex plant tour (3/8/61)
C. W. Christenson	IASL Los Alamos, N.M.	Waste disposal (3/8/61)
G. D. Kelly	Coors Co., Golden, Colo.	Waste disposal (3/8/61)
A. Perge	U.S.A.E.C. Division of Production Washington, D. C.	O2 Development and Production Program (3/22/61)
J. H. Yaeger S. H. Aronsen	Mallinckrodt Chem. Wks. St. Louis, Mo.	Discussions on continuous calcination of uranium and tour of plant (3/23/61)
J. B. Tinker	E. I. duPont Wilmington, Del.	Construction and operation of Waste Storage Tanks (3/28/61)
K. W. Haff C. L. Ottinger	Union Carbide Nuclear Co. Oak Ridge National Lab. Oak Ridge, Tenn.	Purex discussion and plant tour (3/28/61)
<u>From General Industry</u>		
J. S. Heaverlo	Pacific Chemical Co. Seattle, Wn.	Discuss decontamination chemicals (3/1/61)
W. J. Meid L. Mortenson	Chicago, Illinois Seattle, Wash. Engineered Ceramics	Ceramic fabrication (3/20/61)
Andrew Tapsack	Gray Company Seattle, Wn.	Discuss high pressure liquid pump (3/23/61)
Paul Berner	Star Machinery Co. Seattle, Wn.	Discuss high pressure liquid pump (3/23/61)
H. Hayduk D. McMacken	Shell Oil Co. San Francisco, Calif.	Diluents (3/29/61)

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From Foreign Government and Agencies</u>		
Dr. E. W. Fuller	United Kingdom Atomic Energy Authority	Discuss trends in weapons fabrication requirements. (3/20/61)

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IV. SAFETY AND SECURITY

Operation	Facil. Eng.	Finan.	Fin. Prod.	P&GM	Purex	SSP&AO	Prod.	Rel. Prac.	Res. & Eng.	Total CPD	Yr.to Date
Disabling Injuries					1					0	0
Serious Accidents										1	2
Medical Treatment											
Injuries											
Radiation Occur.			12	25	9		7			53	126
Contam. Wounds			6		3		5			14	62
Pu Depositions			1*							1	8
Fires										0	1
Security Violations										0	1
									2	0	4

* A process operator was lifting an ingot from the balance in a hood when he punctured his hood and surgical gloves and left index finger on a sharp edge. Plutonium deposition of 2.3×10^{-4} μ c was found in the wound. It was decided not to excise any skin or flesh to remove this small quantity from the finger. Bioassay samples were taken and the results are pending.

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V. REPORTS

A. PREPARED AND ISSUED

- HW-67203, Official Use Only, Project Proposal, CGC-895, Rev. #1, "Reliability Improvements-Purex" by D. W. McKee, dated March 8, 1961.
- HW-67666, Secret, "Engineering Study - Strontium-90 and Rare Earth Processing in "B" Plant" - by H. L. Caudill, et al., dated January 17, 1961.
- HW-67728, Secret, "B-Plant Fission Product Flowsheets - Part I" - by S. J. Beard and B. F. Judson, dated January 12, 1961.
- HW-67757, Unclassified, "Process Specifications for Chemical Hazard Control - Purex Plant" - by R. G. Geier, dated March 6, 1961.
- HW-68099, Secret, "CPD Waste Management, Plant Improvement Program" - by B. F. Campbell, dated March 1, 1961.
- HW-68146, Official Use Only, Project Proposal, CAC-925, "Purex 216-A-2 Crib Replacement" - by L. W. Finch, dated March 6, 1961.
- HW-68205, Secret, Project Proposal CGC-811, Rev. #4, "Additional Plutonium Fabrication Facilities - 234-5 Building" by D. W. McKee, dated March 15, 1961.
- HW-68340, Confidential, "Studies on the Reduction of Recurplex Waste Losses" by R. S. Kingsley, H. W. Crocker, H. H. Hopkins, Jr., dated January 31, 1961.
- HW-68438, Secret, "Analysis of the Twelve Two-Ton Test Batches for the Review of Pu Formation Rates as a Function of MWD" - by W. H. Zimmer, dated February 9, 1961.
- HW-68640, Secret, "Budget for FY 1963 and Revised Budget for FY 1962 - Proposal for Research and Development - Separations Development (02-53-04)" - by V. R. Cooper, dated March 1, 1961.
- HW-68641, Secret, "Budget for FY 1963 and Revised Budget for 1962, Proposal for Research and Development - Chemical Processing and Reduction Development - Plutonium (CPD)(02-53-05)" by V. R. Cooper dated March 1, 1961.
- HW-68655, Confidential, "Ammonium Bifluoride Fusion of Ignited Plutonium Dioxide" - by H. W. Crocker, dated February 24, 1961.

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- HW-68659, Secret-Atomic Weapon Data, "Budget for FY 1963 and Revised Budget for FY 1962, Proposal for Research and Development - Chemical Processes and Reduction Development - Special Plutonium Chemistry (02-53-05-04)" - by V. R. Cooper, Dated March 1, 1961.
- HW-68660, Unclassified, "Terminal Budget Report - Research and Development - Nonproduction Reactor Fuels - Budget Activity 02-62-00" by V. R. Cooper, dated March 1, 1961.
- HW-68665, Unclassified, "Terminal Report - Technology of Non-Production Reactor Fuels Reprocessing - Budget Activity 2790" - by V. R. Cooper, dated March 1, 1961.
- HW-68729, Secret, "Contour and Wall Thickness Gage Prototype" - by P. H. Reinker, dated March 3, 1961.
- HW-68730, Unclassified, "Redox Plutonium Ozonator Information Manual" - by O. D. Erlandson, dated March 1, 1961.
- HW-68731, Secret, "Purex Plant Production Schedule, March 1961" - by D. McDonald, dated March 6, 1961.
- HW-68732, Secret, "Redox Plant Production Schedule, March 1961" - by D. McDonald, dated March 6, 1961.
- HW-68733, Secret, "UO₃ Plant Production Schedule, March 1961" - by D. McDonald, dated March 6, 1961.
- HW-68734, Secret, "234-5 Plant Production Schedule, March 1961" - by D. McDonald, dated March 6, 1961.
- HW-68736, Secret, "Budget for FY 1963 and Revision of Budget for FY 1962 - Plant Acquisition and Construction" by D. R. Gustavson, dated March 15, 1961.
- HW-68758, Secret, "Essential Materials Consumption - Purex, CPD, February 1961" by J. E. Lentz, dated March 8, 1961.
- HW-68799, Unclassified, "Budget for FY 1963 and Revised Budget for FY 1962 - Proposal for Research and Development - Strontium Separations Development (04-10 XX - 01)" - by V. R. Cooper, dated March 1, 1961.
- HW-68825, Secret, "Budget for FY 1963 and Revision of Budget for FY 1962 - Proposal for R&D General Weapons Development" - by V. R. Cooper and A. E. Smith, dated March 10, 1961.
- HW-68856, Unclassified, "Secondary Containment of Dissolver Off-Gases, Design Criteria for Redox Facilities" - by S. R. Bierman, dated March 15, 1961.
- HW-68949, Confidential, "Scheduled Shutdown - Redox Plant" by J. H. Warren, dated March 22, 1961.

B. PREPARED FOR SIGNATURE AND ISSUANCE

IIW-68699, Secret, "Production, February 1961" dated March 1, 1961, W. E. Johnson.

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V. PATENT SUMMARY

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

<u>INVENTOR</u>	<u>TITLE</u>
R. A. Schneider, Research & Engineering	The Use of Oxalate Ion To Increase The Separation of Hexavalent Actinide Elements from Tetravalent Actinide Elements In A Tertiary Amine Solvent Extraction System.

P. H. Reinken

General Manager
Chemical Processing Department

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3 / 29 / 93