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HW 76054

This document consists of
42 pages. ~~Continued on next page.~~

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
FOR

HW--76054

DE93 007066

DECEMBER, 1962

Compiled By
OPERATION MANAGERS

January 21, 1963

HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON

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

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DECEMBER, 1962

I. SUMMARY

Production through December, as compared with the October 25, 1962 HAPO Production Forecast (HW-75289), is summarized below:

	<u>Percent of Forecast Achieved</u>	
	<u>December</u>	<u>Fiscal Year To Date</u>
Separated plutonium nitrate	91.0	99.2
Separated uranium nitrate	95.7	102.9
Uranium oxide	80.7	91.7
Plutonium metal buttons	129.6	101.5
Fabricated parts	90.3	100.7

With the exception of plutonium metal buttons, the production of other products was below that forecasted for December. Although Purex established a new record high for uranium output, the production of plutonium nitrate, uranium nitrate, and uranium oxide was below that expected because of unscheduled shutdowns in the Redox plant. In comparing actual performance to that which was forecasted for December, it should be noted that large and challenging quantities were forecasted for these three products. For the fiscal year, the production of fabricated parts slightly exceeds the forecast although December output was low.

The Purex plant operated continuously at an average rate of 27.1 tons per day until December 29, when it was shut down because of a lack of sufficiently aged metal feed. Process performance continued to be highly satisfactory although the plutonium product did exceed specifications for one brief period.

Following the operability tests started last month, two neptunium runs, both successful, were made in the new continuous neptunium recovery system at Purex. The facility demonstrated capacity considerably in excess of the design value, good column stability, and the ability to recover from process upsets.

The HAPO-II-2 cask, containing approximately 165,000 curies of purified strontium-90, was released to the AEC on December 31 for shipment.

For the second consecutive month, E-metal processing in the Redox plant was plagued with unscheduled shutdowns. On December 3, a leak developed

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in the trench section of the feed supply line to the precycle extraction column. Approximately sixty-six hours were required for correction. On December 15, plugs developed in the two precycle column systems (1A and 1B). While heating the columns to remove the plugs, radioactive material backed up into the inert gas header. A week was required to decontaminate and replace the affected piping.

Three Zirflex dissolution tests were made at Redox during December to develop data on rates of dissolution and on rates of hydrogen evolution. Two zirconium dissolution tests simulated PRTR fuel dejacketing. The third test simulated the initial phase of PRTR element dissolution, at low acid concentrations. Hydrogen evolution remained well within the operating limit in all cases, and facilities for diluting the off-gas at the dissolver were not used.

The 234-5 Building Ion Exchange Facility (Project CGC-978) handled all filtrates generated by the button line during December plus miscellaneous waste solutions. Plutonium recovery was 99.3 percent on filtrates only, 97.6 percent on total combined feed.

AEC Directive HW-548, dated December 6, 1962, authorized \$350,000 for design of a demonstration fission product packaging system in B-Plant.

All currently authorized work has been completed on Project CGC-929, "NPR Fuels Processing Facilities - 200 West Area." The project will be inactive until further work is authorized.

P. H. Reinker

General Manager
Chemical Processing Department

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS

A. PRODUCTION OPERATION

1. Production Statistics

December

Fiscal Year
to Date

a. Percent of Forecast⁽¹⁾ Achieved

Separated plutonium nitrate	91.0	99.2
Separated uranium nitrate	95.7	102.9
Uranium oxide	80.7	91.7
Plutonium metal buttons	129.6	101.5
Fabricated parts	90.3	100.7

b. Purex

December

November

Uranium nitrate produced (tons)	784.51	695.01
Average production rate during operation (T/D)	27.1	29.8
Total waste loss (%)		
Plutonium	0.45	0.40
Uranium	0.31	0.27
On-line efficiency (%)	93.5	82.3

c. Redox

Uranium nitrate produced (tons)	43.32	61.50
Average production rate during operation (T/D)	7.1	8.0
Total waste loss (%)		
Plutonium	0.42	0.45
Uranium	0.34	0.33
On-line efficiency (%)	34.0	41.0

d. Uranium Reduction (tons)

Normal UO ₃ loaded	631.43	649.00
Enriched UO ₃ loaded	85.10	89.74
Normal UO ₃ approved for shipment	630.89	638.30
Enriched UO ₃ approved for shipment	50.46	50.30
Normal UO ₃ shipped	678.74	491.91
Enriched UO ₃ shipped	50.52	101.00
Normal UNH backlog	818	579
Enriched UNH backlog	8	6

(1) HW-75289, HAP0 Production Forecast, dated 10-25-62

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e. <u>Plutonium Metal Processing</u>	<u>December</u>	<u>November</u>
Input to Task I (batches)	421	399
Reduction yield (%)	98.5	95.2
Product recovery output (Kgs)	173.54	56.12
Product recovery backlog (Kgs)	1380.96	1487.65
Waste disposal (grams)	662	859
 f. <u>Power</u>	 <u>200-East</u>	 <u>200-West</u>
Raw water pumped (gpm)	11,070	4,373
Filtered water pumped (gpm)	1,144	883
Maximum steam generated (lbs./hr)	284,000	175,000
Average steam generated (lbs./hr)	219,800	113,000
Total steam generated (M lbs.)	163,536	83,954
Coal consumed (est. tons)	8,616	4,531

With the exception of plutonium metal buttons, the production of other products was below that forecasted for December. Although Purex established a new record high for uranium output, the production of plutonium nitrate, uranium nitrate, and uranium oxide was below that expected because of unscheduled shutdowns in the Redox plant. In comparing actual performance to that which was forecasted for December, it should be noted that large and challenging quantities were forecasted for these three products. For the fiscal year, the production of fabricated parts slightly exceeds the forecast although December output was low.

J. N. Warren
Manager, Production

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

B. PUREX OPERATION

1. Operating Continuity

Operation at 3.6 CF was sustained until December 29 when scheduled shutdown activities began. A net production record was achieved.

2. Processing Operation

Plutonium product was within specifications except for the product produced during a one-day diversion to the L Cell package. Uranium product met specifications during the major portion of the month; silica gel treatment of the out-of-specification material was successful.

Two neptunium runs were completed in the continuous neptunium recovery system (J Cell package). Neptunium recovered and loaded out totaled 3.4 kilograms.

Satisfactory operation of the prototype formaldehyde denitration unit was demonstrated at approximately flowsheet rates using an anti-foaming agent in the 1WW feed.

The HAPO-I-B Cask was loaded with approximately 470 kilocuries of strontium-90. The HAPO-II-2 Cask containing 165,000 curies of strontium-90 was released for shipment on December 31.

Strontium recovery series #54 was completed and run series #55 started.

A Bowling Ball cask was loaded with 175 gallons of Purex 1WW waste and shipped to 300 Area for studies by HLO.

3. Mechanical Experience

The coating waste line from Purex to 102-C waste tank became plugged on 12-5-62. An alternate route using the strontium line was used until the lines were unplugged on 12-20-62.

Jumper changes in the 105-A pump pit and the 151-C, 152-C and 152-CR Diversion Boxes to facilitate supernate transfers for the cesium-137 recovery program was completed.

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4. Radiation Experience

The total radio-iodine¹³¹ emission for the month was 8.71 curies for a daily average of 0.28 curies.

A concrete box containing six failed pumps was successfully buried.

Manager - Purex Operation

PR McMurray:AJW:mas

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II. ACHIEVEMENTS (Continued)

C. REDOX OPERATION

1. Operating Continuity

E-metal processing in the Redox Plant was plagued with unscheduled shutdowns and only 50 percent of the expected production was achieved. On December 3 a leak developed in the trench section of the feed supply line to the precycle extraction column (1A). Approximately 66 hours of operating time were required to locate the leak and to provide pipe jumpers for rerouting the feed through a spare trench line. Operations were resumed on December 6 and except for the usual week-end shutdowns, were continuous until December 15, when plugs developed in the two precycle column systems (1A and 1S). The columns were heated to remove the plugs; during this operation radioactive material backed up into the inert gas header behind the silo operating panel board and activated the radiation alarm. A week was required to decontaminate and replace the affected piping. Operations were not resumed until December 31.

The Uranium Oxide Plant operated at satisfactory rates throughout the month. Calcination of enriched uranium was curtailed at various times throughout the month due to a lack of feed material from the Redox Plant. Approximately 24 hours of operating time were lost in the depleted uranium calciners due to a shortage of shipping containers. However, the shipping schedule for depleted uranium was met.

2. Processing Operations

a. Redox Processing

A new backcycle line was installed on the L-18 anion exchange contactor in the 233-S Concentration Building, which provides a routing for returning a portion of the spent scrub stream (XASR) from the contactor back to the L-12 plutonium concentrator. This will permit re-using the acid in the scrub stream, thus replacing the fresh nitric acid formerly added to the final solvent extraction plutonium stream before the feed concentration step. It will also reduce the amount of caustic needed for neutralization of acid in the solvent extraction backcycle system.

Piping was installed this month which permits routing the 3E column waste hexone directly to the G-1 Organic Receiver Tank, by-passing the 1-0 Organic Stripping Column and the G-3 Hexone

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Stripper. This flow change is expected to reduce the amount of organic fed to G-3 by approximately 25 percent and result in a corresponding reduction in the hexone loss experienced via this route.

Two zirconium dissolution tests, simulating the de jacketing operation with PRTR fuel elements, were made this month. Both tests were conducted as planned and without incident. In both tests zirconium scrap metal was dissolved in a boiling 4.0 M NH_4F and 0.35 M NH_4NO_3 solution. Hydrogen and ammonia concentrations in the dissolver off-gas were well below the operating limits.

The resin in the L-18 ion exchange contactor in the 233-S Concentration Building was replaced on 12-24-62. No difficulty was encountered in either removing the old resin or adding the new. The old resin had been in use for five months. During this period approximately 316 kilograms of plutonium had been processed through the contactor.

3. Mechanical Experience

Tube bundle gasket leaks developed on the G-3 organic still and the D-12 waste concentrator on 12-3 and 12-30-62, respectively. New gaskets were installed and subsequent operation has been satisfactory.

The pump agitator (E-5) in the 2A column feed tank failed and a new unit was installed. The failed unit had operated 2086 hours since its installation on 4-4-62.

Piping changes were made in the UNH storage handling system this month whereby the UNH in storage can be continuously fed into the third uranium decontamination cycle columns. The new piping provides a routing for reprocessing out-of-specification UNH without interrupting the continuity of virgin feed processing.

4. Waste Handling and Decontamination

Equipment valued at \$56,000 was received from the processing plants for decontamination, repair, inspection or burial during the month. Equipment valued at approximately \$84,000 was returned to customers, representing a savings of approximately \$55,000 over the cost of new equipment.

From AEC contractors in Livermore, California, and Albany, Oregon, 209 drums and boxes of contaminated waste were received and buried without incident on 12-20-62.

5. Radiation Experience

While attempting to remove the plugs which developed in the two pre-cycle column systems (1A and 1S) on December 16, radioactive material

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backed up into the inert gas header behind the Redox silo operating panel board and activated the radiation alarm. Subsequent radiation surveys revealed general radiation readings of 150 mr/hr at the south end of the operating panel board. The contaminated inert gas header was replaced. During this removal operation floor contamination occurred. The area was subsequently decontaminated and returned to normal status. No over-exposure to personnel occurred.

Five radiation occurrences (including the one noted above) and five skin contamination cases were recorded during the month. All skin contamination was readily reduced to non-detectable.

6. Analytical Experience

Continuation of the Atomic Energy Commission study, "Irradiation Damage to Structural Materials Program", has involved a second inter-site isotope and instrument calibration exchange of data to provide information and conditions for optimum and standard methods of multi-channel gamma analysis. As in the first exchange of irradiated wire samples, the Redox Analytical Laboratory will perform the initial analyses and then distribute the materials to the other nine participating laboratories.

Manager - Redox

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II. ACHIEVEMENTS (Continued)

D. WEAPONS MANUFACTURING OPERATION

1. Operating Continuity

There were no significant interruptions to operating activities during the month. All delivery schedules were met.

2. Processing Operations

a. Plutonium Fabrication

Information on plutonium fabrication is presented in Document HW-76166 entitled "Chemical Processing Department, Weapons Manufacturing Operation, Z Plant Monthly Report, December, 1962" which is classified "Secret, Atomic Weapon Data, Production Rate and Stockpile Quantity Information."

b. Plutonium Processing

A high production rate for unfabricated plutonium was achieved during the month, and schedules were exceeded by five per cent.

The new ion exchange equipment continued to perform well. It was possible to process successfully several batches of miscellaneous laboratory wastes in conjunction with the regular supernates from the production line. Compaction of the resin bed is proving to be a problem, with backflushing supplying a partial solution at month end.

Recovery activity contributed significantly to the production effort in December when it was possible to dissolve and reprocess 138 kilograms of plutonium from the skull oxides. A decrease in the total scrap inventory was achieved.

Fifty boxes of miscellaneous scrap were processed through the incinerator during the month.

3. Mechanical Performance

Fabrication equipment performed well during the month. Minor repairs were required on the 19 B-2 furnace, the HC-23 CTR freezer, and the press in Hood HC-40.

The button line equipment performed satisfactorily with minor problems appearing in the fluorinator controls and heating elements, the vacuum drum filter drive, and the calciner off-gas system.

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3. Mechanical Performance (Continued)

The renovation of the Hood 9-A unit (continuous wet chemistry through fluorination equipment) in preparation for the major overhaul of Hood 9-B progressed satisfactorily. Improved piping in the calciner off-gas system and an improved "B" valve are being installed in the 9-A unit.

Operation of the incinerator equipment was satisfactory. The burner belt was shortened and a new loadout head was installed during the month.

The renovation and modification of the hood for the drying of the floor sludge from the Recuplex Reception and Blending Hood was completed.

4. Radiation Experience

Radiation and contamination control statistics revealed an improvement in control over that of the previous several months.

Vault Room No. 106, located in Zone I near the entrance of the building, was outfitted with appropriate pedestals for the storage of the temporary oversupply of canned plutonium buttons.

5. Analytical Experience

	<u>November</u>	<u>December</u>
Number of Samples Received	3,180	3,220
Number of Determinations	16,756	20,416
Total Impurities, Buttons	1,632 ppm*	1,190 ppm
Buttons Rejected	1.4%*	3.8%
Pu 240 - Normal Buttons (by Neut. Count)	6.06%*	6.00%

*Corrected figure.

WJ. Hartman
Manager
Weapons Manufacturing

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II. ACHIEVEMENTS (Continued)

E. POWER AND GENERAL MAINTENANCE OPERATION

1. Operating Continuity

There were no interruptions of steam, water or electrical services that affected continuity of operations of production facilities during the period covered by this report; however, an export raw water outage of five minutes' duration occurred December 27. An electrical distribution switching irregularity in the 100 Areas caused the export system to surge, activating the surge compressors, thus causing the outage.

2. Inspection, Maintenance and Repair

Extensive design modifications to the HAPO 1B-1 cask were completed December 18. The cask was released promptly to Purex for a strontium⁹⁰ shipment.

Fabrication of a four-furnace ingotting hood for the Weapons Manufacturing Operation was completed. The new hood will replace an existing three-furnace hood in the RMC line.

The buffer (shipping container) for the HAPO 1B-2 strontium⁹⁰ cask is being altered to make it suitable for winter usage. The work consists primarily of installing removable sheathed lagging on the buffer and altering the method of securing the buffer to the flatcar. The work was approximately 50% complete at month's end.

A complex activated-charcoal filter is being assembled for the Research and Engineering component at Redox. The filter is to be installed in series with the sand filter for removal of radioactive iodine from the stack off-gases.

A chemical addition system was fabricated and installed in the sample gallery at Purex for servicing the new Q-cell Palm purification facilities.

Two titanium tube bundles for the F-6 waste concentrator, and one for the H-4 recycle concentrator, were as-built, lagged, sheathed and otherwise made ready for installation during the next planned shutdown of the Purex facility.

An obsolete Redox concentrator tower (D-4) was converted to use with the D-14 waste concentrator in that facility. Modification work included removal of the coil, installation of a tantalum demister pad, and adaptation of the pad to the flange of the D-14 vessel.

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Twenty-three pipe jumpers were fabricated to meet requirements as indicated below.

Purex	8
Redox	12
Spare Parts	1
Cesium Loadout	<u>2</u>
Total	23

Renovation of the T-Area steam supply lines by an outside contractor is nearing completion. Portions of the new line are underground, and the remainder is supported by steel poles set in concrete. The work is an estimated 90% complete at this time.

Facilities for thawing coal, when it arrives on the plant site frozen in railroad cars, have been installed at the 200-West Area coal-unloading station.

All electrical and mechanical equipment damaged during the November 26 fire at the East Area coal silo has been repaired and returned to normal service.

T. S. LaFollett

Manager
Power and General Maintenance

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (continued)

F. FACILITIES ENGINEERING OPERATION

1 Purex

a. Process Design Engineering

Waste Diverter

Nineteen (19) demonstration runs, using simulated formaldehyde-treated waste, were made in the mock-up waste diverter during the month. The concentration of the waste was increased periodically to simulate lower volumes of waste per ton of production as follows:

<u>VOLUME % SOLIDS</u>				
<u>Number of Runs</u>	<u>Concen. Gals/Ton</u>	<u>Settling 24 Hours</u>	<u>Settling 7 Days</u>	<u>Equiv. Ton Throughput</u>
1	160	37	--	67
8	100	47	39	594
3	90	51	40	160
2	70	--	46	100
2	60	61	50	120
3	50	62	51	216

The gravity flow line from the diverter to the pumps was easily flushed with water after each run, but the diverter tank and trap were not flushed. Even after standing as long as seven days with 50 gal/ton solution, there was no indication of plugging in the diverter trap. These determinations, including data on spillage at varied concentrations and temperatures, indicate satisfactory operation at the anticipated throughput rates.

Model Tank - 241-AX Waste

A test run, using 100 gal/ton simulated neutralized formaldehyde-treated waste, was made in a scale model of the currently designed 241-AX self-boiling waste tank which was fabricated by Hanford Laboratory Operations. Observations indicated that the current AX design is capable of maintaining the waste solids in suspension. The test program is being continued to determine at what waste concentration

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the AX tanks would cease to function satisfactorily.

Single-cycle Acid Recovery Process

Scope drawings on the improved equipment and routings for single-cycle recovery were completed and approved. The scope report has been completed.

"J" Cell Package

Following hot start-up of the "J" Cell package in November, a successful production run was made with product loaded out, after concentration in the "L" Cell concentrator. All equipment functioned well although the 3B Column appears to be somewhat temperamental with respect to flooding with changes in uranium concentration in the solvent.

b. Project Engineering

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

The fixed-price contractor has completed all of his work except applying Amercoat, installing three doors, miscellaneous clean-up items, and performing acceptance tests. The Jones Company work in the 103 pump pit is complete except for installation of remote equipment.

CGC-981 - Fission Product Packaging Facility - "B" Plant

Atomic Energy Commission Directive HW-548, dated 12/6/62, authorized \$350,000 for performing design for a demonstration fission product packaging system to be provided in "B" Plant.

2. Redox

a. Process Design Engineering

"D" Cell Renovation at D-14 Position

By use of a mercury switching device incorporated with the template, the position and levelness of the foot pads were established. The architect-engineer has completed designs for a method of cell floor repair.

E-13 Radiation Monitor

A jumper is being fabricated for installation of an ionization chamber in the E-13 Ozonator Vessel. This unit will replace an earlier one which has failed after a few weeks of operation.

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Methane Proportional Chamber Amplifier

Fabrication of the packaged unit was completed, and the anticipated operation was obtained on test. The unit was installed in the Redox Laboratory for three months of operation and testing before final evaluation. Accurate testing has been initiated with very good preliminary results.

b. Project Engineering

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

Contract work is completed in both tank farms, except for punch list items which are now being cleared.

CGC-929 - NPR Fuels Processing Facilities - 200-W Area

All currently authorized work on this project has been completed. It will be inactive until further work is authorized.

3. Weapons Manufacturing

a. Process Design Engineering

RMC Button Line

The calciner off-gas "blowback" filter is being prepared for mock-up testing. Approved design drawings were issued for the following items: sump probe, ball valve to replace lower fluorinator "B" valve, Task I filtrate transfer pump-piping modification, HC-9B calciner arrangement, and container for scale-up prototype of re-usable crucible.

RMA Fabrication Line

Tie-in of the CCl₄ line from the chemical make-up room to the Degreasing and Briqueting Glove Box has been completed. Start-up, initiated on December 19, has been satisfactory.

Pu Measurement & Detection by 380 KEV Gamma

The 380 KEV Gamma method of detecting and measuring plutonium has resulted in estimation of plutonium residues within the 26-inch vacuum lines located in the 234-5 Building duct level. Preliminary computations of the observed data indicate a total plutonium residue in excess of 12 kilograms within the duct level vacuum piping. Approximately seven kilograms of this residue are in the newer 4-inch diameter lines and the remaining five are in the original 6-inch diameter lines which have been re-

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moved from active service. The extensive trial observation of this new method, as provided by the vacuum line readings, served to demonstrate the relative effectiveness and efficiency for difficult-to-reach locations as compared with neutron measuring equipment.

b. Project Engineering

CGC-912, Rev. #3 - Waste Treatment Facility - "Z" Plant

A project proposal revision requesting a four-month extension of the project completion date to provide time to determine equipment changes required for improved nuclear safety control, was transmitted to the Commission on 12/14/62. On the same date, Directive HW-522, authorized this request.

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

A new Chempump was installed in Hood H-7A to replace one which had failed because of a loose impeller. This installation completes the project pump work. New rupture discs rated at 25 psig and safety valves set at 22 psig, have been installed to protect the glass columns. The addition of the safety valves should end the rupturing of discs due to over-pressure pulsing. Refinements to the instrumentation are being designed by Construction Engineering and Utilities Operation.

c. Manufacturing Engineering

Production Control Assistance-Fabrication

The new machining data card was installed and is being evaluated for optimum effectiveness. A revision to the form was made which enables operators to identify run numbers easily and more quickly.

4. General

a. Process Design Engineering

Isotope Power Source Facility

Discussions were held with Oak Ridge National Laboratory personnel on processes, equipment, and facilities for preparing packaged shapes of strontium titanate, cesium glass, cerium oxide, and promethium oxide. Design criteria and conceptual design studies have been initiated on a new Hanford facility near "B" Plant to prepare the above shapes on a production basis, using

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feed stocks from the "B" Plant Waste Management facility. Preliminary design and construction schedules have been established in cooperation with HLO.

b. Project Engineering

Project Cost Information as of 12/23/62:

Total Authorized Funds (21 active projects)	\$ 12,270,000
Total Cost-to-date	9,783,000
Commitments and Open Work Releases	692,000
Unencumbered Balance	1,795,000
Costs Charged to Above Projects (11/18/62 to 12/23/62)	207,000

Manager
Facilities Engineering Operation

HP Shaw/alr

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

G. RESEARCH AND ENGINEERING OPERATION

1. Purex Process Engineering

a. Feed Preparation

The combining of coating waste and rinse water which caused plugging in the coating waste line to underground storage during the month has been discontinued and extra caustic is being added so that precipitation of solids can be minimized.

The results of a 10-day test using mercurous instead of mercuric nitrate for suppression of I¹³¹ emission indicate that mercurous nitrate is as good or better than mercuric nitrate.

b. Solvent Extraction

Solvent extraction performance was generally excellent during the month with uninterrupted operation at an average 3.6 CF until the scheduled shutdown on December 30. Approximately 3000 gallons of hydrolized sump and miscellaneous waste material was reworked with no adverse effects on the process.

Performance of the First Cycle was somewhat variable during the month due to acid control difficulties and backcycle waste flow changes associated with operation of the new J-Cell neptunium recovery package. Decontamination in the Second Plutonium Cycle continued to be good. The resin in the Plutonium Ion Exchange Unit required change-out during the month reflecting a trend toward decreased service life.

Performance of the Final Uranium Cycle was very good with respect to neptunium and plutonium decontamination, but below normal with respect to fission product decontamination. The product stream (2UC) averaged only slightly above specifications, however, and final treatment through the silica gel facility reduced the activity to well below shipment limits.

c. Neptunium Recovery

Neptunium accumulation in the plant was above normal, with typical losses via the HAW and 2EU streams of only about ten and four per cent, respectively. Two highly successful recovery and decontamination runs were completed during the month with performance of the new "package" recovery system exceeding expectations. In spite of problems incident to start-up of a new

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facility and upsets caused by process tests, recovery and decontamination performance was excellent. Also, during the second decontamination run, operational stability of the columns was excellent. Capacity considerably in excess of the design value was demonstrated, with maximum stable operating frequencies equal to or greater than levels achieved in the "cold" cartridge development studies. The rate of neptunium accumulation in the system under normal conditions and the ability of the system to recover from upsets and regain temporary "losses" to the Backcycle Waste System was excellent.

d. Waste Treatment

Operation of the prototype formaldehyde denitration unit at essentially flowsheet rates was very smooth while using an antifoam concentration of 35 to 70 ppm in the IWW feed. Gamma activity in the acid recovered by formaldehyde treatment during the month, however, was a factor of 50 - 100 times greater than normal recovered acid with higher activity occurring whenever the antifoam addition was interrupted. The acidity in the formaldehyde treated waste was higher than desired, (~ 3 - 4 M HNO_3 vs. desired 1 M).

A special sampler was installed in TK-105-A to monitor sludge accumulation as the tank is filled with neutralized formaldehyde treated waste. A prototype sluicer was installed in TK-103-A. Tank 105-A was heated by addition of hot supernatants from TK-101-A prior to its use for formaldehyde treated waste storage during the next run period.

e. Fission Products

The fifth cesium recovery campaign was completed during the month. Three casks were loaded with cesium from waste supernatant solution stored in the 105-A Tank, which has been used for all previous campaigns. The fourth cask was loaded from supernatant solution in 101-A Tank, which has not been previously used. The 101-A Tank material was tested prior to using it for increasing the cesium inventory available to the new C-Farm cesium facility. No difference in process behavior or dose rates from the loaded cask were observed with the 101-A solution.

About 65 kilocuries of strontium⁹⁰ which had poor carbonate precipitation characteristics was combined with other rework and recovered by a single batch contact. Over 97 per cent of the strontium was recovered with decontamination factors greater than 50 for Fe, Na, Ce, ZrNb and Ru.

Late in the month, a new HAPO-IB Cask was loaded with 470 kilocuries of strontium⁹⁰. The cask was loaded more easily than the HAPO-II Cask because of the greater filter surface area and reduced cake thickness.

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2. Redox Process Engineering R. E. Harrison**a. Dissolvers****Zirflex Dissolution Tests**

Two zirconium dissolution tests, simulating the dejacketing operation with PRTR fuels, were made during the report period. In the first test, 250 pounds of thick-wall (1/4") of zirconium pipe and scrap pieces were dissolved in a boiling solution with the composition of 4.0 M NH_4F and 0.35 M NH_4NO_3 . In the second test 196 pounds of thin-wall zirconium tubing and 54 pounds of zirconium pipe were dissolved under the same conditions as described above. In both tests the concentrations of hydrogen and ammonia in the dissolver off-gas were well below the explosive limits without using either the gas scrubbing or gas diluting facilities which are available. Data on this test are tabulated below:

MAXIMUM CONCENTRATION IN OFF-GAS

	<u>Ammonia</u> (% by volume)	<u>Hydrogen</u> (% by volume)	<u>Reaction Rate</u>
First test	3.9	0.64	Visual inspection showed complete dissolution in 21 hours.
Second test	6.3	0.16	Visual inspection showed complete dissolution in 16.5 hours.

Mercury Catalysis

A fourth test of mercury catalyzed dissolution of aluminum was completed during the report period. (Refer to the April and June reports for details of the previous tests.) The first two tests were made using a 4.0 M HNO_3 -0.002 M $\text{Hg}(\text{NO}_3)_2$ solution which was effective in dissolving aluminum jackets. Subsequent laboratory development work on a flowsheet for PRTR fuel element dissolution indicated that irradiated plutonium-aluminum alloys would not activate in solutions stronger than 1.0 M HNO_3 regardless of the mercury concentration. However, once activation was achieved, dissolution would continue at higher acid concentrations. The third test, simulating dissolution of a PRTR fuel element, was made using a 1.0 M HNO_3 -0.003 M $\text{Hg}(\text{NO}_3)_2$ solution to start the dissolution; the acid concentration was adjusted to 4.0 M HNO_3 as soon as the reaction was started. The fourth test was made to determine the maximum concentration of hydrogen in the dissolver off-gas with the acid adjustment step delayed for approximately one-half hour, since the rate of hydrogen evolution is greater at low acid concentrations. The maximum hydrogen concentration in the dissolver off-gas was 2.4 percent; facilities for diluting the off-gas at the dissolver tower were not used.

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Heel Rinse Procedures

One coating waste loss test was made during the month which consisted of rinsing the dissolver heel with boiling water prior to charging. Results indicated a reduction in coating waste losses of about 30 to 50 percent. This rinse procedure lengthens the dissolver time cycle by about two hours per charge. However, with the two E-metal dissolvers available, dissolver capacity is no problem, and the boiling rinse procedure will be adopted.

b. Solvent Extraction

During the report period the necessary jumpers were installed to route the 3EW stream into the G-1 Organic Receiver Tank. This flow change has reduced the amount of organic fed to the 1-O Organic Stripping Column and G-3 Hexone Stripper by 27 percent. The concentration of uranium and fission products in the 3EW stream is low, and no significant contamination of the organic system has resulted from the flow change. Jumpers were also installed to improve the venting of the 1-O organic header and the problem of aspiration (air locking of the organic overflow line) at the 3E Column has been eliminated.

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3. Plutonium Process Engineering

a. Metal Finishing Operation

1. Button Line

Button density was excellent throughout the month, with only 1.6% rejects. The feed to the button line consisted of 22% dissolved oxidized skull solutions, 69% Purex product, 6% Redox, and 4% eluant from the oxalate supernatant ion exchange columns. The oxidized skull solutions contained 0.1 M free fluoride ion since no ANN was added. An increase of corrosion impurities was noted in the feed, but a corresponding increase in decontamination across the oxalate precipitation step minimized iron-chromium-nickel build-up in the buttons.

2. OGC-978 Oxalate Supernatant Ion Exchange Facility

The ion exchange facility handled all the supernatants during the month. In addition, seven cans of miscellaneous plutonium scrap solutions (analytical lab wastes, development lab wastes, and button pickling solutions), 13 cans of killed oxalate supernatants from previous months, and filter cartridge leach solutions were processed through the ion exchange columns. Prior to processing these solutions, the waste losses from the ion exchange system were 0.7% of the plutonium in the supernatants; the loss increased to 2.4% after the extra solution additions were initiated. The overall loss for the month was 1.1%.

The average concentration of the product eluted from the columns was 44 grams per liter. Approximately 60% of the eluant went directly to Task I feed, the remainder went to Purex for further concentration.

Pressure drop across the beds increased and backflushing of the resin columns was necessary. Each of the three columns was successfully backflushed.

3. D-7 Sump Tank

Another survey of the D-7 tank solids was made after the flush discussed in last month's report. Neutron monitoring of the remaining solids showed no appreciable drop in counts/minute from the original monitoring. The tank was entered, and about three gallons of solids were scraped up and removed. The removal of the solids decreased the neutron count to near-background levels. Preliminary analytical work on the solids indicates about 35 grams of plutonium in the three gallons of solids. This amount of plutonium caused the bulk of the neutron monitor reading (originally estimated as 100 - 600 grams, based on PuO_2 as a standard).

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4. CAC-880 Plutonium Reclamation Facility

The air pulser from the Recuplex process was removed to 300 Area, where development work will be resumed. The prototype pulser was in a shakedown status when the Recuplex process was discontinued. All the essential apparatus was "cold", with the exception of one cyclic valve which was successfully decontaminated.

Recuplex experience, along with new development data, has indicated the need for a new facility for processing of fabrication oils. A prototype design has been recommended (HW-76017).

5. CGC-912 Waste Treatment Facility

Further studies on annular tanks as geometrically favorable replacements for large diameter tanks have revealed increases in allowable annuli thickness if masonite covered with cadmium is used as the core material, in place of cadmium-concrete. Annulus widths can be increased as much as 0.4-inch under these new core conditions.

6. Hood 227

Operations in hood 227, a leaching facility, were resumed during the month. Hood 227 consists of geometrically unfavorable tubs for leaching of such things as filter cartridges and valves or any bulky material containing small amounts of plutonium. Several filter cartridges were successfully leached, and the resulting filtered solution was sent through the ion exchange facility.

7. Critical Mass

A timer-recorder-alarm mechanism has been fabricated and provided for installation in Task I for reminding the operator that Task I hoods should be inspected for plutonium accumulations. An alarm rings at preset intervals (nominally one hour), at which time the operator initials the moving tape of the recorder, signifying that an inspection has been made.

8. Miscellaneous

Additional storage for aluminum "bird cages" containing buttons was required. A document, "Critical Mass Control Specification - Vault 106 Storage - Aluminum "Bird Cages" Containing Plutonium Buttons", was issued covering the new storage.

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b. Uranium Reduction Operation

UO₃ reactivity improvement studies were continued during December, with completion of Process Test 62-1-T-3 early in the month. Test conditions included the calcination of nominally 100% UNH containing 4000 ppm sulfur and 20,000 ppm ammonia (uranium basis) at a bed temperature of 245° C. Nitric acid and the ammonia (24% aqua) were added to the 60% UNH prior to concentration. The extra nitric acid was added to reduce the possibility of precipitates forming during concentration. Concentrator operation during the test was restricted but not as severely as during a previous test in June, 1962. Calciner operation was also slightly affected, as evidenced by erratic control of the trough shell temperatures.

Two containers of UO₃, one produced from ammoniated UNH and one from non-ammoniated UNH, have been forwarded to Oak Ridge for pilot plant studies.

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4. Separations Chemistry Laboratory - O. F. Beaulieu

a. Purex Process Assistance

On December 27 a joint meeting was held by HLO and CPD representatives interested in the "water problem" in the Purex process. The following courses of action were agreed upon:

- (1) Change to a new anion exchange resin (perhaps Duolite A-30B).
- (2) Install facilities for the addition of permanganate to the process water stream in the 283 Bldg.
- (3) Routinely monitor the river water by a) determining permanganate demand on a fixed basis, b) performing uranium transfer rate studies at two-week intervals.
- (4) Continue the addition of sulfite following chlorine treatment.

The first sludge sample from Tk-241-A-102 has been dissolved with H_2O and HCl in Separations Chemistry hot cell. The sample appears to be much the same as 103-A sludge except the residue (silica?) after HCl treatment seems larger.

b. Redox Process Assistance

Investigation of Used Ion Exchange Resin

After having been in service for approximately 150 days, the resin from the L-18 contactor was investigated in the laboratory. Examination of the resin beads indicated that approximately 30% of the beads were cracked with only about 5% being actually broken into pieces. Breakage and cracking was more prevalent among the larger beads than the smaller ones. Since it was desired to operate through January with minimum shut-downs, immediate replacement of the resin was recommended.

c. Neptunium Purification

Neptunium purification runs 63 and 64 were made during the month. In run 63, 301 grams of Purex neptunium was added to 43 grams of rework neptunium and 491 grams of Redox neptunium which was contaminated with over 14 curies of rutherenium. High neptunium waste losses and insufficient ruthenium DF resulted in a neptunium product containing 11.4 uc Ru/g Np (specification is 2). Run 64 which consisted of 75 grams of waste rework from run 63 plus 723 grams of Purex neptunium resulted in a neptunium product containing 5.2 uc Ru/g Np. Both batches were shipped to Savannah River after the Ru specification was verbally waived.

A ruthenium DF of 1500 was achieved in run 63. However, when the ruthenium is associated with particulate matter, as was evidently the case with the Redox neptunium, the particles are filtered out in the resin bed and in effect "poison" the bed resulting in ruthenium contamination of the product in following runs containing little

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promethium in the feeds. For example, run 64 had a Ru DF of only 80, which was inadequate to produce specification material.

d. Laboratory Assistance

- 1) A newly designed transistorized preamplifier for the automatic ASP system was put in service. Initial tests show this unit is at least as good and possibly better than the tube version found in an ordinary ASP. Resolving time will be determined and a more exhaustive test will be performed to determine the instrument's serviceability.
- 2) A set of concentrates from samples of raw, sanitary and demineralized water (Purex) were prepared by vacuum distillation at 55 C. Concentration factors of 10^3 to 2×10^3 were attained in each case. Each of the concentrates prepared were yellow colored, and in the case of raw water, a flocculent precipitate of inorganic salts was obtained.

During the coming month, the infra red spectra and interfacial tension of each concentrate will be determined. Uranium transfer rates will also be run. Since this is water from the lowest river level, the same tests will be repeated at higher run-off levels.

- 3) A procedure for separating promethium and the higher atomic number rare earths from yttrium, cerium, and praseodymium was developed. The method consists of absorption on a Dowex resin in the nitrate form from a methyl alcohol- HNO_3 matrix and subsequent elution with a similar matrix at lower H ion concentrations.
- 4) Procedures have been developed and supplied to Redox Analytical laboratory which will enable them to provide the plant with quantitative valence state analyses during neptunium purification. Total neptunium by recording spectrophotometer as well as each valence state is now available to the process.
- 5) Six thermobalance runs were completed on plutonium oxide samples from the Plutonium Chemistry laboratory. Good chlorinations were obtained on all but one sample and the percent volatiles were found to be variable from 23% to 40%. The furnace programmer has been very unreliable and much of the work has been accomplished on manual control.

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5. Plutonium Chemistry Laboratory

a. Acid Insoluble Material in Plutonium Trichloride

The acid-insoluble compound in plutonium trichloride preparations is primarily PuO_2 with a negligible chloride content. In order to evaluate the efficiency of a chlorinator, the chloride content of the product is determined. When a sample is dissolved in acid solution, a yellow precipitate is formed. The composition of this precipitate is of interest, since it may contain chloride, which would not be determined in the titration step.

An investigation of the insoluble material was undertaken by dissolving representative samples of PuCl_3 in acid solution. The precipitate was collected and analyzed. No significant impurities were found, and X-ray diffraction showed the insoluble material to be PuO_2 .

Therefore, the insoluble material would not introduce error into the chloride analysis, and the present method is satisfactory.

b. Continuous Electrowinning - Off-Gas Analysis

Carbon monoxide and carbon dioxide in the off-gas indicate the reduction of plutonium dioxide.

A sampling system has been installed to permit removing off-gas samples periodically for gas chromatography. The columns have been designed so that clean CO and CO_2 peaks are observed.

The quantities of CO and CO_2 observed during recent runs have fluctuated considerably within runs. However, in general, these gases are only seen when current is flowing; also, the greater the current, the more gas evolved. Thus, the gas emission is related to an electrochemical process.

Two pertinent observations were made. First, when plutonium trichloride feed high in oxide content was used, the CO and CO_2 increased sharply. Second, in a tungsten cell free of any ceramic oxide, the use of feed containing plutonium dioxide resulted in CO and CO_2 peaks. This is clear evidence that the oxide feed is being reduced and dissolved in the chloride system.

c. Molten Salt Studies

An LiCl-KCl melt aids in melting down unconsolidated metal.

Tests were made to determine the best system for treating unconsolidated metal (fines, BB's) from the electrowinning runs. Several salt mixtures were used, including BaCl_2 -KCl, NaCl-KCl, and LiCl-KCl. The mixtures were heated at 900 - 1000° C and evidence of consolidation was looked for.

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The KCl-LiCl melt gave the best results, with KCl-rich melts somewhat better than LiCl-rich melts. The best run was one in which KCl-LiCl was used and a sparge of HCl gas employed. Approximately 90 percent of the plutonium consolidated into a single button. The rest of the material was apparently converted to soluble PuCl_3 .

d. Plutonium Reaction with Hydraulic Fluids

Evaluation tests are under way.

Glycerine was unsatisfactory due to rapid reaction and gassing. Shell "Aeroshell" hydraulic fluid showed some reaction and sediment formation after 17 days contact. Humble Oil Company "Univis P-38" showed similar but less pronounced behavior.

e. Recovery of Plutonium from Z-9 Crib

Leaching tests are under way to find the best reagent.

Several samples of soil from the recent core sampling tests conducted in the Z-9 crib were combined and dried at $40 - 60^\circ \text{C}$ for two days. These samples of dry soil will serve as a stock sample for the recovery experiments. Five samples were sent to the control laboratory to determine the average plutonium concentration.

Weighed samples of the stock soil were contacted for two days at room temperature with the reagents: 0.1 M HNO_3 , 5 M HNO_3 , 15.8 M HNO_3 , and other solutions containing complexing and reducing agents. Results are pending.

A. S. Frank

Manager
Research and Engineering

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

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II. ACHIEVEMENTS (Continued)

H. FINANCIAL OPERATION

1. Production Cost

AEC was provided additional O3 Program, Midyear Budget Review data during the month in document HW-75960.

The following requested studies were completed in December:

1. Cost of Nuclear Weapons Production at HAPO - Document HW-76036. (Phase I of ALOO request).
2. FY 1962 Costs of Dry Waste Burials (AEC request).
3. Eliminable and non-eliminable costs under shutdown conditions (Phase II of No. 1 request above).

Special requests handled for billing during the month included two shipments of unclassified plutonium to NUMEC, two for APED, and one each for New Brunswick, Monsanto, and UCRL. In addition, burial costs of contaminated waste from the University of California were booked and ROO-AEC was billed for costs of renovating the 2720-E Building and constructing six birdcages.

CPD's investment in inventories at November 30, 1962 compared with budgeted amounts is as follows:

(in thousands)	Balance 11-30-62	Control Allocation	Surplus (Deficit)
<u>Inventories</u>			
Essential Materials	\$ 763	\$ 832	\$ 69
Spare Parts & Standby	1 735	1 400	(335)
Special Materials	119	100	(19)
Gross inventories	<u>2 617</u>	<u>2 332</u>	<u>(285)</u>
<u>Reserves</u>			
Essential Materials	61	62	(1)
Spare Parts & Standby	636	350	286
Total Reserves	<u>697</u>	<u>412</u>	<u>285</u>
<u>Net Investment</u>	<u>\$1 920</u>	<u>\$1 920</u>	<u>-0-</u>

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2. Financial Analysis

A proposed accounting treatment of operating costs involved in Waste Treatment-Fission Product facilities (planned for completion in 1966) was developed and routed to interested General Electric management personnel for financial review.

3. General Accounting*

As of November 30, 1962, twenty active projects had incurred costs of \$9,606,173 against authorized funds of \$11,884,200. Outstanding commitments totaled \$432,277.

During December, Directive No. HW-548 was received from the AEC which authorized \$350,000 for design on Project CGC-981, "Fission Product Packaging Facility - B Plant". Directive HW-522, Modification No. 3 extended the completion date of CGC-912, "Waste Treatment Facility - Z Plant" to April 15, 1963.

During the month, there were five Appropriation Requests approved, authorizing expenditures of \$50,400. These were:

<u>AR Number</u>	<u>Description</u>	<u>Section</u>	<u>Amount</u>
36038	400 Channel Analyzer	Redox	\$22 500
36027	Cleaning Hood and Dilution Station	Purex	17 000
36029	Impact Wrenches	P&CM	6 500
36028	Oxygen Analyzer (5th Stokes)	R&EO	3 000
36026	Wet - Dry Sander	P&CM	1 400
	Total		<u>\$50 400</u>

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

Manager - Finance

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**CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT****DECEMBER, 1962****III. PERSONNEL ACTIVITIES****A. FORCE SUMMARY**

<u>Operation</u>	<u>Monthly Salaried</u>		<u>Weekly Salaried</u>		<u>Total</u>	
	<u>11-30-62</u>	<u>12-31-62</u>	<u>11-30-62</u>	<u>12-31-62</u>	<u>11-30-62</u>	<u>12-31-62</u>
General Manager's Group	11	11	2	2	13	13
Financial	13	13	15	15	28	28
Research & Engineering	61	64	29	29	90	93
Facilities Engineering	63	61	22	22	85	83
Power & General Maintenance	38	36	243	241	281	277
Production	6	6	4	4	10	10
Redox	57	57	239	236	296	293
Purex	65	63	248	247	313	310
Weapons Manufacturing	<u>51</u>	<u>49</u>	<u>221</u>	<u>223</u>	<u>272</u>	<u>272</u>
Total	<u>365</u>	<u>360</u>	<u>1 023</u>	<u>1 019</u>	<u>1 388</u>	<u>1 379</u>

B. PERSONNEL CHANGES

Effective December 3, 1962, R. G. Barnes was transferred from Manager, Redox Process Engineering to the Atomic Power Equipment Department, Advanced Planning Operation. Effective the same date, R. E. Isaacson was transferred from Senior Engineer to the manager position vacated by R. G. Barnes.

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C. TRIPS

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To Other G.E. Components</u>		
R. W. McCullugh	Crotonville, New York	Shop Management. (12/3-5/62)
P. H. Reinker	Atomic Power Equipment Dept.	Meeting of Sub-Group of
H. P. Shaw	San Jose, California	Technological Hazards
R. E. Tomlinson		Council (held at Palo
L. L. Zahn		Alto, California). (12/17/62)
<u>To AEC and Other AEC Contractors</u>		
P. W. Smith	Oak Ridge National Lab. Union Carbide Nuclear Co. Oak Ridge, Tennessee	Waste fixation and fission product re- covery. (12/3-4, 10-11/62)
H. P. Shaw	US - AEC	Shipment of radio-
C. W. Smith	Germantown, Maryland	active materials. (12/3-5/62)
L. L. Zahn		
J. W. Kolb	Oak Ridge National Lab.	Processes and building
L. R. Michels	Oak Ridge, Tennessee	design for isotope power sources. (12/10-11/62)
R. B. Hershey	Dow Chemical Company Rocky Flats, Colorado	Dimensional inspection. (12/10-11/62)
I. N. Taylor, Jr.	Los Alamos Scientific Lab.	Discuss power roll
R. E. Van der Cook	Los Alamos, New Mexico	forming processes. (12/10-11/62)
R. B. Hershey	Lawrence Radiation Lab.	To attend Non-Destructive
R. E. Van der Cook	Livermore, California	Testing Meeting. (12/12-13/62)
A. T. Biddle	Dow Chemical Company Rocky Flats Plant Denver, Colorado	Discuss development progress on optical groove gages. (12/26/62)
<u>To Conventions and General Meetings</u>		
P. W. Smith	American Nuclear Society Mtg. Gatlinburg, Tennessee	Thorium Fuel Cycle Symposium. (12/5-7/62)

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C. TRIPS (continued)

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To Conventions and General Meetings (continued)</u>		
W. G. Browne	Chamber of Commerce Prosser, Washington	Spoke on "The Fabulous Three-Way Split", as member of GE Speaker's Bureau. (12/17/62)

D. VISITORS

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From Other G. E. Components</u>		
C. D. Beaumont William Wagner	GE - APED San Jose, California	Testing prototype six-decade gamma monitor. (12/27/62)
<u>From AEC and Other AEC Operational Contractors</u>		
Major John A. Delistraty	Division of Military Application Washington, D.C.	Observe Floturn Test. (12/3/62)
<u>From General Industry</u>		
D. L. Cook W. B. Finnegan Fred London	Cutler-Hammer, AIL Division Deer Park, Long Island	Gaging problems discussed. (12/10/62)
<u>From Colleges and Universities</u>		
Geo. Watt	University of Texas Austin, Texas	Purex Process. (12/13/62)

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IV. SAFETY AND SECURITY

<u>Operation</u>	<u>FEO</u>	<u>Finance</u>	<u>WMO</u>	<u>P&GM</u>	<u>Purex</u>	<u>Redox</u>	<u>Prod.</u>	<u>Rel. Prac.</u>	<u>REE</u>	<u>Total CPD</u>	<u>YTD</u>
Dis. Injuries											3
Ser. Accidents											2
Med. Treat. Inj.	1	1	6	13	14	7	1			43	473
Rad. Occur.			3		6	5		1		15	196
Contam. Wd.						1				1	15
Pu Dep.										2	33
Fires								1		2	
Sec. Viol.		1								2	17

* These involve less than one (1) percent MPBB, they were associated with inhalation.

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CHEMICAL PROCESSING DEPARTMENT
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V. REPORTS

A. PREPARED AND ISSUED

- HW-65268, Rev. #2, Unclassified, "HAPO IB Fission Product Shipping Cask Design Evaluation Report", dated December 28, 1962, by C. W. Smith.
- HW-66936, REV 1, Confidential, "Critical Mass Control Specification - Hoods 7-C and 9-B", dated December 14, 1962, by R. J. Sloat.
- HW-72676, Secret, "Design Scope of the "Z" Plant Metal Control Facility - Project CGC-944", dated March 12, 1962, by H. D. Haberman.
- HW-75443, Official Use Only, "Project Proposal, Rev. #3 - Waste Treatment Facility - 'Z' Plant - Project CGC-912", dated December 14, 1962, by L. W. Finch.
- HW-75627, Confidential, "Nuclear Safety Review, Chemical Processing Department", dated November 28, 1962, by G. R. Kiel and R. L. Stevenson.
- HW-75648, Secret, "Process Design Bases, Metal Blank Preparation, RMA Line", dated November 20, 1962, by M. E. Borgeson, et al.
- HW-75667, Secret, "Progress Report - Weapons Process Engineering - November, 1962", dated December 5, 1962, by Members of the Weapons Process Engineering Operation, Research and Engineering.
- HW-75675, Unclassified, "Flowsheet and Bases for Equipment Specifications - New Leach Hood", dated December 3, 1962, by L. E. Bruns.
- HW-75704, Secret, "Analysis of Three Groups of 5th LU-Blanket H Material, November, 1962", dated December 13, 1962, by R. P. Ringle.
- HW-75705, Secret, "Analysis of Three Groups of LU-Blanket H Material, October, 1962", dated December 13, 1962, by R. P. Ringle.
- HW-75754, Secret, "Hanford Plutonium Metal Forecast, FY 1963 Through FY 1965", dated December 6, 1962, by J. H. Warren.
- HW-75762, Secret, "Attack Threat Control Facilities - CPD", dated December 10, 1962, by D. E. Braden, et al.
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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

DECEMBER, 1962

VI. PATENT SUMMARY

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

INVENTOR

TITLE

NONE

P. H. Reinken

General Manager
Chemical Processing Department

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END

**DATE
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