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HW 77795

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
FOR

HW-77795

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MAY, 1963

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HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON

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CHEMICAL PROCESSING DEPARTMENT
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I. SUMMARY

Production through May, as compared with the April 29, 1963 HAPO Production Forecast (HW-77320), is summarized below:

	<u>Percent of Forecast Achieved</u>	
	<u>May</u>	<u>Fiscal Year To Date</u>
Separated plutonium nitrate	92.5	98.7
Separated uranium nitrate	99.2	97.1
Uranium oxide	98.8	97.8
Plutonium metal buttons	98.5	97.2
Fabricated parts	52.7	100.2

May production was below forecasted quantities for all products. Contributing factors were: 1) an extended shutdown of the Redox plant to complete the D-Cell renovation; 2) replacement of two columns in the Purex plant which delayed startup; 3) feed shortage at the Uranium Oxide plant; and 4) maintenance problems on the button line. The output of fabricated parts fell below forecast because delivery requirements were reduced by the AEC.

Following replacement of the HA and HS first decontamination cycle columns, processing was resumed in the Purex plant on May 6. An average rate of 30.8 tons per day was sustained for the remainder of the month despite two brief outages to replace failed equipment. All plutonium product met specifications; however, approximately fifty tons of uranium product will require rework to reduce the plutonium content.

Operability testing of the Purex neptunium purification system, Q-Cell ion exchange unit, was continued during May. On the first run, neptunium waste losses and fission product decontamination were satisfactory but metal impurities in the product exceeded specifications by 40 percent. The second purification run was underway at month-end.

HAPO-II-2 cask, containing 155,000 curies of strontium-90, was released for shipment on May 31. The HAPO-II-1 cask, which was loaded with 160,000 curies of strontium-90, is currently undergoing pressure checks prior to releasing for shipment. The recently completed E-Cell storage facilities at the Strontium Semiworks were used to load both casks. In addition, 188,000 curies of cesium-137 were loaded into four STT casks, which were released for shipment on May 24.

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A series of special runs was initiated at the Strontium Semiworks to prepare a semi-purified rare-earth fraction. The first test run attempted to separate cerium from the rare-earth by oxidizing cerium with potassium permanganate and to extract the Ce (IV) into organic (D2EHPA). A stable emulsion, between the produced manganese dioxide and the organic, prevented the cerium from separating. At month-end, the cerium and rare-earths were being treated (batch - contacted) to eliminate manganese, preparatory for a second separation attempt.

All process flow diagrams, process flowsheets, and cell arrangement drawings have been completed for the proposed Hanford Isotope Plant (HIP). Forty-two drawings were prepared in the course of the engineering study. Studies have now been initiated on the casks for shipping the encapsulated HIP sources.

In the Redox plant, a major engineering and maintenance milestone was achieved during May with the completion of extensive repairs to the floor of the waste processing cell by wholly remote operations. Crane optics and closed circuit TV were the only means of observing the repair operations, which included the remote installation of stainless steel floor liners, which were then grouted in place with concrete. The major portion of the work was accomplished in eighteen days. Six additional days were required to flush the processing equipment and replace several jumpers which had become damaged or distorted during the rehabilitation job. E-metal processing was resumed in the Redox plant on May 27.

A technique for recovering plutonium from spent resin was developed and demonstrated on 88 liters of spent resin, which had been accumulated since startup of the 234-5 Building plutonium anion exchange unit. Employing a hot water spray over the spent resin, held in a screening basket, 750 grams of plutonium were successfully reclaimed. A neutron count of the leached resin showed a plutonium content of 20-25 grams, indicating a recovery of about 97 percent.

P. H. Reinker

General Manager
Chemical Processing Department

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS

A. PRODUCTION OPERATION

<u>1. Production Statistics</u>	<u>May</u>	<u>Fiscal Year to Date</u>
<u>a. Percent of Forecast⁽¹⁾ Achieved</u>		
Separated plutonium nitrate	92.5	98.7
Separated uranium nitrate	99.2	97.1
Uranium oxide	98.8	97.8
Plutonium metal buttons	98.5	97.2
Fabricated parts	52.7	100.2
<u>b. Purex</u>	<u>May</u>	<u>April</u>
Uranium nitrate produced (tons)	669.07	13.12
Average production rate during operation (T/D)	30.8	26.5
Total waste loss (%)		
Plutonium	0.34	2.2
Uranium	0.36	5.3
On-line efficiency (%)	76.9	6
<u>c. Redox</u>		
Uranium nitrate produced (tons)	35.0	184.23
Average production rate during operation (T/D)	8.2	7.2
Total waste loss (%)		
Plutonium	0.29	0.31
Uranium	0.29	0.21
On-line efficiency (%)	18	85
<u>d. Uranium Reduction (tons)</u>		
Normal UO ₃ loaded	472	482
Enriched UO ₃ loaded	106	122
Normal UO ₃ approved for shipment	540.58	491.06
Enriched UO ₃ approved for shipment	150.82	98.22
Normal UO ₃ shipped	441.39	689.49
Enriched UO ₃ shipped	100.55	98.28
Normal UNH backlog	308	107
Enriched UNH backlog	16	87

(1) HW-77320, HAPO PRODUCTION FORECAST, dated 4/29/63.

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e. Plutonium Metal Processing

	<u>May</u>	<u>April</u>
Reduction yield (%)	98.50	98.69
Product recovery output (Kgs)	128	166
Product recovery backlog (Kgs)	1202	1260
Waste disposal (grams)	272	251

f. Power

	<u>200-East</u>	<u>200-West</u>
Raw water pumped (gpm)	11,139	3,583
Filtered water pumped (gpm)	1,135	1,115
Maximum steam generated (lbs./hr.)	220,000	125,000
Average steam generated (Lbs./hr.)	185,621	65,585
Total steam generated (M lbs.)	138,102	48,992
Coal consumed (tons)	6,943	2,551

May production was below forecasted quantities for all products. Contributing factors were: 1) an extended shutdown of the Redox plant to complete the D-Cell renovation; 2) replacement of two columns in the Purex plant which delayed startup; 3) feed shortage at the Uranium Oxide plant; and 4) maintenance problems on the button line. The output of fabricated parts fell below forecast because delivery requirements were reduced by the AEC.

J. H. Warren
(Manager, Production)

2. FISSION PRODUCT DATA

	<u>PUREX*</u>	<u>244-CR*</u>	<u>B-CANYON*</u>	<u>SEMIWORKS</u>	<u>PRODUCT</u>	<u>PRODUCT</u>	<u>PRODUCT</u>	<u>CUSTOMER</u>	<u>REMARKS</u>
	<u>RECOVERY</u>	<u>INVENTORY</u>	<u>INVENTORY</u>	<u>PRODUCTION</u>	<u>INVENTORY</u>	<u>IN CASK</u>	<u>SHIPPED</u>		
Sr-90 (Kilocuries)	-	779	-	-	2070	630	155	NYO	HAP0 II-2 Cask 5-31-63
Cs-137 (Kilocuries)							188	ORNL	5-24-63
Ce-144 (Kilocuries)									

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*Estimated figures based on Cs. calculations

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II. ACHIEVEMENTS (Continued)

B. PUREX OPERATION

1. Operating Continuity

The plant started on 5-6-63 after replacement of both HA and HS first cycle columns. The HS column was replaced in April because of a leak in the bottom section. The HA column was inspected and replaced because of a broken cartridge which could not be removed. Processing continued through the month except for brief outages to replace the leaking 2-DF pump (2nd Uranium Cycle) and the HA column static pressure jumper.

2. Processing Operation

The Neptunium Purification Facility (Q Cell) continued receiving hot feed with one loadout completed and another hot run in process.

Strontium Semiworks E-Cell Storage Facilities received purified Sr-90 and were utilized in loading two casks. The HAPO II-2 cask was loaded with 155,000 curies of Sr-90 and was released for shipment on 5-31-63. The HAPO II-1 cask was loaded with 160,000 curies of Sr-90 and is undergoing pressure checks prior to shipment. The HAPO I-B-1 cask, loaded in December with 470,000 curies of Sr-90, remains in its buffer awaiting shipping approval from the AEC.

Four STT casks were loaded with 188,000 curies of Cs-137 and released for shipment on 5-24-63.

Experimental recovery of technetium was attempted by routing cesium loadout effluent through another resin loaded cask in series. The technetium cask became plugged and elution will be necessary to determine test results.

Strontium recovery runs 61 and 62 were completed in Purex head-end. Run 61 was modified to obtain a cerium-rare earth fraction for a cerium extraction test run now in process at Strontium Semiworks.

Supernatant was transferred out of 105-C tank to provide emergency storage space in the event of a leak in one of the 241-A waste tanks.

Three risers in 103-A tank were used in the initial lance testing of sludge penetration. About two feet of sludge was penetrated in ten minutes with the special nozzle using hot water at less than 100 psi.

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3. Mechanical Experience

1. The F-7 pump (acid waste feed to formaldehyde reaction tank) was replaced to improve pumping rate.
2. The K-1 pump (2nd cycle uranium feed) was replaced because of leakage at the upper shaft seal.
3. The E-6 (batch feed makeup tank) neutron monitor was installed.
4. In B Plant Minor Construction started trench jumper welding and plant forces are regasketing cell jumpers with stainless steel fiber Flexotallic gaskets.

4. Radiation Experience

The total iodine 131 emission for the month was 3.36 curies. Maximum seven-day emission was 1.17 curies.

Manager-Purex

PR McMurray:JDMc:gt

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

C. REDOX OPERATION

1. Operating Continuity

A major plant engineering and maintenance milestone was achieved in the Redox Plant during May with the completion of extensive repairs to the floor of the waste (D) processing cell by wholly remote operations. The concrete floor of the cell and vessel support pads had been badly damaged by corrosion from process leaks. Stainless steel floor liners were installed remotely and grouted in place with concrete under intense radiation fields. Crane optics and closed circuit TV were the only means of observing the repair operation. The installation of the liners and placement of the vessels was made in approximately eighteen days.

The production and shipment of both depleted and enriched uranium from the Uranium Oxide Plant was satisfactory.

2. Processing Operations

a. Redox Processing

The Redox Plant was shut down as planned on 5-2-63 for the rehabilitation of D-cell and replacement of the D-14 backcycle concentrator. Flushing of the processing tanks and associated piping was completed on 5-4-63 and dismantling of the cell equipment for the rehabilitation work was started on this same date. Processing operations were resumed on 5-27-63.

A new bellows-operated, air-pulse generator was installed on the L-18 ion exchange contactor during the D-cell renovation. The new pulser, a prototype unit designed to accomplish resin movement by the pulsating action of a bellows, is expected to increase the operating efficiency of the L-18 contactor.

Recent partition cycle testing in the Redox Plant indicated that routing the LBP stream directly to the 2AF feed tank (E-5) was feasible and practical. The necessary jumpers were installed during the extended shutdown and the new flow pattern was adopted when operations were resumed on 5-27-63. Operation to date has been satisfactory. The new flow pattern removes two tanks from plutonium service, allows completion of the automation system for the plutonium cycle, and effects a potential 3 percent saving in essential materials or approximately nine dollars per ton of uranium processed.

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Advantage was taken of the extended shutdown period to review, update, and revise as appropriate, all existing operating procedures. A thorough safety inspection and house cleaning campaign was also conducted in all operating areas. Also, practice Nuclear Excursion Evacuations were conducted on 5-14, 5-15 and 5-16-63. All personnel in the Exclusion Area at the times of the tests participated.

b. Uranium Oxide Processing

The production and shipment of both depleted and enriched uranium oxide was satisfactory for the month, although processing was curtailed on several occasions because of feed shortage, a shortage of shipping containers, and the failure of several shear pins on the agitators of the H and K calciners.

3. Mechanical Experience

a. Redox Plant

Essentially, all of the maintenance activity this month was confined to the rehabilitation of the waste processing cell and replacement of the D-14 back-cycle concentrator. The D-cell work, which was the first attempt to rehabilitate a canyon cell in an operating separations plant, included: 1) removal of all D-cell processing equipment; 2) clean-up of the corroded concrete from the cell floor; 3) installation of three stainless steel cell floor liners in the D-12, D-13 and D-14 positions; 4) grouting beneath the liners; 5) re-installation of all cell equipment.

A prototype charcoal packed filter was installed in the canyon exhaust air stream, on the downstream side of the 291-S sand filter, on 5-25-63. The new filter is expected to provide better radioactive iodine containment.

b. Uranium Oxide Plant

The off-gas wet filter scrubber on the G-cell enriched uranium calciner was replaced this month. This completes the replacement of the scrubbers on all six calciners because of corrosion failure in the metal shell. The new filters were fabricated from a new design which is expected to double the four-year life of the original filter scrubbers.

The H and K-cell depleted uranium calciners were both taken out of service this month for periods of approximately two weeks for complete overhauls. The overhauls were necessitated by the failure of several shear pins on the agitator paddles of both units. At the end of the month both calciners were back in service and operating satisfactorily.

4. Waste Handling and Decontamination

Equipment valued at approximately \$190,000 was received from the processing plants for decontamination, repair, inspection or burial

during the month. Equipment valued at approximately \$155,000 was returned to customers, representing a savings of approximately \$67,000 over the cost of new equipment.

5. Radiation Experience

When the D-12 waste concentrator tower was raised to the Redox canyon deck in preparation for the D-cell rehabilitation work, the radiation level at the 202-S Building entrance increased to 70 mr/hr. Since this radiation condition was intolerable, both the tower and pot were placed in the multi-purpose equipment transfer box and sent to the 221-U Building for storage below the canyon deck level. Radiation levels through the steel lined concrete box during transfer were 35 r/hr at 50 feet and 100 mr/hr in the locomotive cab behind 13 spacer cars (650 feet). The equipment was subsequently returned to the Redox Plant in a similar manner, for re-installation after the D-cell repair work was completed. No significant exposure to personnel or other difficulties were encountered during these contaminated equipment moves.

6. Analytical Experience

The 222-S Analytical Laboratory is continually experiencing new analytical service requests from both old and new customers. Technical skills and assistances were provided in the training of NRD operating personnel in the performance of routine analytical control procedures. Particle size determinations via electrolytic techniques supplied the Uranium Oxide Operation with data to help determine the optimum hammer mill operation; Plutonium Metallurgy Development, HL, was given particle size data on powdered plutonium-zirconium alloy. Analyses for the special projects of Materials and Process Chemistry, HL, provided data for: the development of a thorium metal processing flow sheet; the extraction of plutonium and neptunium from Purex waste using tri-lauryl amine; a Purex study involving analyses of uranium valence ratios; uranium, plutonium and thorium analyses in carbon tetrachloride solution for the testing of a proposed Weapons Manufacturing flow sheet.

The capabilities of multichannel analysis were expanded and improved to provide analyses for manganese⁵⁶, tellurium-iodine¹³², protactinium²³³, praseodymium¹⁴², lanthanum¹⁴⁰, and iodine¹⁴². This increases to 40 the number of gamma emitting isotopes that can be determined.

Customer requirements provide a continuing and expanding use for the newly acquired X-ray Emission Spectrometer in the determination of plutonium, uranium, neptunium, thorium, lead, zirconium, nickel and iron.

A spectrophotometric procedure for the determination of silica in the feed water to the NRD demineralization unit has been developed and calibration curves prepared for a range of 0 to 248 ppb silica.

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M. K. Harmon
Manager - Redox

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

D. WEAPONS MANUFACTURING OPERATION

1. Operating Continuity

The fabrication of plutonium weapon components was curtailed as directed by AEC changes in the interplant delivery schedule. The production of unfabricated plutonium was limited somewhat by equipment maintenance problems. Recovery activities included the dissolution of skull material and continued efforts to clean out the Recuplex stripper-concentrator vessel. The incinerator remained out of service during the month.

2. Processing Operations

a. Plutonium Fabrication

Information on plutonium fabrication activities is presented in Document HW-77840 (Atomic Weapon Data).

b. Plutonium Processing

Normal feed and dissolved metallurgical scrap were in satisfactory supply during the month. Hood 9-A continued in use and production rates were satisfactory, but equipment maintenance problems restricted the output. Plugging of the ion exchange equipment was also a source of difficulty during the month. Work continued on the removal of the hard polymer of plutonium from the J-26-A vessel (Recuplex stripper-concentrator). Twice, portions of the vessel have been cut away to permit access to the contents. At month end approximately 4 kilograms (of an estimated 6 kilograms) of plutonium have been recovered from this vessel.

Corrosion resulted in the failure of two valves in the Recuplex Reception and Blending Hood. The failures resulted in the leakage of low concentration aqueous waste from the L-3 tank to the floor of the hood. The condition will slow the removal of sludge from the floor of the hood.

3. Mechanical Performance

Fabrication equipment required only normal maintenance during the month. A new drive pulley of larger diameter was installed on the flo-turn machine in order to increase torque and to reduce surface speed.

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3. Mechanical Performance (Continued)

Plugging of the overflow from the reactor to the vacuum drum filter occurred several times during the month. Rodding efforts on this line resulted in three broken reactor vessels. Because of the stresses resulting from installation of this glass vessel, it is particularly vulnerable to damage from slight movement. As a remedy, a stainless steel vessel has been fabricated for the next replacement.

A relatively inexpensive ball valve (prototype) was installed in place of the complicated and costly "B" valve (star valve with wipers) on the fluorinator discharge of the continuous processing unit. Performance to date has been satisfactory.

Buckling of the platinum disc in the bottom of the M-1, teflon-lined dissolver (for plutonium metal) resulted in inefficient heating and dissolution. It was necessary to remove the disc and to substitute a teflon ring. Subsequent operation has been satisfactory.

4. Radiation Experience

Radiation and contamination control statistics reveal a slight upward trend in control problems.

5. Analytical Experience

	<u>April</u>	<u>May</u>
Number of Samples Received	3,651	3,122
Number of Determinations	23,531	21,732
Total Impurities, Buttons (Average)	1,910 ppm	1,930 ppm
Buttons Rejected	4.96%	2.40%
Pu 240, Normal Buttons (by Neutron Count)	6.10%	6.00%
Pu 240, Unclassified Buttons (by Neutron Count)	None	None

W. J. Gashin
Manager
Weapons Manufacturing

CHEMICAL PROCESSING DEPARTMENT
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. II. ACHIEVEMENTS (Continued)

E. POWER AND CRAFTS OPERATION

1. Operating Continuity

There were no unplanned interruptions of steam, water and emergency electrical services that affected continuity of operations; however, a planned outage of the steam supply to Redox and the Uranium Oxide facility was effected May 25. The outage was of eleven hours' duration, and was for the purpose of installing a limitorque valve on the main supply header. All other main steam headers in the 200 Areas are similarly equipped.

2. Inspection, Maintenance and Repair

An entire top assembly was fabricated and installed on a one-quarter-scale model of a HAPO-I cask, for destructive test purposes. This action was in connection with a study being conducted by Facilities Engineering Operation to evaluate the hazards associated with the shipping of fission-product casks.

Fourteen new lucite hood panels were made up and installed in the process areas as replacements for in-service panels in which transparency was impaired.

All phases of fabrication, modification, mock-up and installation of the D-cell liners for Redox facility were completed. The work included alterations to the D-13 Waste Receiver and the D-14 Backcycle Concentrator, as new floor elevations were involved. The cell liners were required to prevent further corrosion damage to the vessel-locating pads.

Installation of the new sample disposal and dilution hoods for the Purex facility was completed during the month.

Fabrication of an H-4 oxidizer heating coil for the Redox facility was in progress at month's end. Special emphasis is being placed on strict adherence to the new corrosion-resistant welding specifications for this coil.

Seven new process pumps were made ready for service and placed in stand-by status. A D-14 backcycle pump was sent to Redox as a replacement for a failed unit.

Piping arrangements were modified and a temperature control system installed in the 302 tank at the 211-U Chemical Tank Farm, to prepare the tank for temporary storage of ANN.

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Thirty-one cell pipe jumpers were fabricated to meet plant requirements, as listed below:

Purex	11
Redox	20
Total	<u>31</u>

A high-vacuum-induction heating system was installed in the 231-Z facility, for use in plutonium-casting studies.

A 100' ribbon of concrete, 3' wide, was poured parallel to the railroad tracks at the 200-East Area coal-unloading site, to facilitate smooth performance of the car-puller cable lug when spotting cars over the unloading hopper.

A third-party inspection of No. 3 boiler in the West Area power house was completed. The report disclosed the unit to be "satisfactory for continued operation."

In furtherance of the 200 Area weed-control program, 242 acres of ground area were sprayed with 2-4-D.

A prototype of a sluicing nozzle was installed on the 103 tank at the 241-A Tank Farm, to determine the feasibility of its use in the "in-tank solidification" program.

Upon arrival on plant-site of the HAP0 II-1 and 2 cask cars for refilling, the cask pedestals on both cars were found to have been damaged. Repairs were in progress at month's end.

Services rendered other departments included rebalancing the supply-and-exhaust ventilation systems in the 1706-KER Building for the Irradiation Processing Department

Manager
Power and General Maintenance

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (continued)

F. FACILITIES ENGINEERING OPERATION

1. Purex

a. Process Design Engineering

Pulse Columns

Design of the Purex HS Column has been reviewed and issued for procurement. New drawings are being prepared for the HA Column according to current process design. The new column will have 26" column diameter and a single long cartridge. Since the cartridges for both the HA and HS Columns have failed from progressive fatigue and high local stresses, their design is being reviewed for corrective action.

E-1 Sampler Gamma Monitor

The E-1 Sampler is a gamma spectrum analyzing system for use primarily in the fission product program. The purpose of the sampler is to analyze quantitatively high activity level samples for Ce-144, Zr-Nb, and other isotopes.

Installation of the electronics components of the system and the interconnecting wiring from the sampler cell to the Purex Laboratory was completed despite the severe contamination which existed in the sampler. The contamination of the sampler also prevented the installation of the planned dual-collimator assembly. Only one collimator was installed.

Initial operation has begun using the 400-channel analyzer. Electronically, the system appears to be operating satisfactorily; however further work is underway to obtain more representative samples.

b. Project Engineering

CAC-945 - New Waste Storage Tanks - Purex

The bid package for the fixed-price portion of the construction work was mailed out to prospective bidders on May 31. The bid opening date is scheduled for July 2. The work authority, revised on May 21, authorized \$33,000 in new funds to the Company, making a total authorization of \$208,000.

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CAC-964 - Equipment Disposal - Purex

The bid package for the fixed-price portion of the work was mailed to prospective bidders on May 10, and the bid opening is scheduled for June 5. All work required before start of fixed-price work has been completed.

CAC-970 - Purex Essential Waste Routings System

Directive No. AEC-218, Mod. No. 1, dated May 8, authorized design funds in the amount of \$76,000. On May 14, the Company was authorized \$6,000 for technical guidance of design. The drawing schedule shows one hundred drawings required. Efforts are being directed toward a completion of detail design by September 15.

2. Redox

a. Process Design Engineering

Redox Sand Filters Monitor & Stack Monitors

Designs of the proposed Redox Sand Filter Monitor and Stack Monitors are awaiting further investigation of the stack gas. The current amount of I-131 is too small to detect with the proposed system; so two alternatives are being considered. They are: (1) move the system so as to include the dissolver off-gas, or (2) design a system to concentrate the I-131 before measuring it.

Renovation of Processing Cell

A major achievement during May was completion of renovation of Redox Processing Cell by a wholly remote operation. Stainless steel liners were remotely installed and grouted in place in three vessel positions of "D" Cell in the Redox Canyon under intense radiation fields. Also, the cell equipment was oriented and placed by observation through the crane optics and closed circuit television. This installation, the first of its kind to be accomplished remotely, was made in 18 days.

b. Project Engineering

AR-36046 and MA-40 - Panel Board Consolidation - Redox

An Appropriation Request and a Contingency Maintenance Request cover funds to consolidate the Redox instrument panel boards. The AR is for the capital portion (\$77,000) and the CMR is for the expense portion (\$50,000). The AR was approved on April 3 and the MA-40 was authorized on May 6.

3. Weapons Manufacturing

a. Process Design Engineering

RMC Fabrication Line

Investigations are being made to determine the material and method for gasketing the air lock doors. Design was completed for installation of nitrogen gas meters on all of the inert atmosphere glove boxes and supply headers, as a part of the program to reduce nitrogen usage. Drawings for all necessary tooling and work gages for the 74 Model are completed. The hardware is being built in the project shops.

RMA Fabrication Line

Re-location of the hydraulic units on the new mezzanine for the HA-27 Floturn has been completed satisfactorily. Other changes and adjustments are being made to improve operation.

A new glove box, blank preparation and shearing - HA-29, is being designed to contain a sprue removal lathe, a shearing mechanism to cut up reject parts, and gage floturn blanks prior to rolling. This hood is to be built and installed by Plant Forces.

The finishing and re-work - HA-46 glove box and equipment is nearing completion in project shops, and is targeted for installation during June.

Designs have been issued for comment detailing a larger bell jar stack assembly in the HA-29BI casting furnace. This larger bell jar stack is required when handling the larger molds anticipated on the RMA Line.

b. Project Engineering

CGC-912 - Waste Treatment Facility - "Z" Plant

Revision #4 of the project proposal was transmitted to the Commission on May 2. The revision requests an extension of the completion date (scheduled for April 15) and the funds (\$158,000) necessary to improve the nuclear safety of the project. Construction work is awaiting Commission action on the revised proposal.

CGC-968 - Additional Plutonium Storage Facilities - 234-5 Building

Beneficial use was attained on glove box HA-23S on May 10, five weeks ahead of schedule. The water wall shielding

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and the man-lift are yet to be installed, but their absence does not prevent limited usage of the glove box.

CGC-983 - Plutonium Ingotting and Auxiliaries Facility - RMA
Line - 234-5 Building

Glove box HA-20MB, mold make-up, and break-out facility, was placed in production on May 1.

4. General

a. Process Design Engineering

Hanford Isotope Plant

All process flow diagrams, process flowsheets, and cell arrangement drawings have been completed. Forty-two drawings were prepared in the course of the engineering study. Visual aids comprising charts, color photographs, and slides dealing with H.I.P. were completed. Construction of a 3-dimensional scale model of the plant is underway. Studies have been initiated for casks to ship encapsulated H.I.P. sources.

"B" Plant - Phase II - Waste Packaging

A letter of intent was submitted to the Commission to state the combined research and engineering work in support of the Phase II Waste Management Program for FY-1963, 64, and 65. The program involves expenditures of approximately \$210,000 during the two-year-plus period for fabrication of mock-up facilities and procurement of prototype equipment.

Waste Management

The Hazards Review Documents were issued for the "B" Plant Waste Management Program - Phase I (HW-77379) and the Strontium Semiworks (HW-76925). The scope document (HW-77163) for Phase II was issued.

The proposed Hot Pipe Trench Sparing System (long permanent jumpers with Purex-type heads, which can be connected with short remoteable jumpers) was reviewed with those concerned and was favorably received. Therefore, work is proceeding on a revision of the Phase II scope to reflect the necessary changes to provide all welded Hot Pipe Trench piping where feasible. A preliminary cost estimate of the proposed sparing system indicates an increase of approximately \$35,000 and \$150,000 for the Phase II and Phase III projects, respectively.

b. Project Engineering

Project Cost Information -
as of 5/19/63

Total Authorized Funds -	
15 active projects	\$ 5,551,000
Total Cost-to-date	4,250,000
Commitments and Open Work Releases	463,000
Unencumbered Balance	838,000
Costs Charged to Above Projects -	
4/21/63 to 5/19/63	179,000

Projects dropped from active status during this period:

<u>Project No.</u>	<u>Authorized Funds</u>	<u>Total Cost</u>
CGC-948	\$ 169,300	\$ 161,816
CAC-950	46,000	44,208

Manager - Facilities Engineering

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

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II. ACHIEVEMENTS (Continued)

G. RESEARCH AND ENGINEERING OPERATION

1. Purex Process Engineering -

(a) Solvent Extraction

Solvent-extraction performance was excellent following installation of the new HA and HS Columns last month. Rework of two batches of concentrated waste (TWW) and most of a batch of hydrolyzed sump waste was accomplished with no adverse effects on the process. However, near the end of the hydrolyzed sump waste processing, a severe upset occurred in the HA Column causing a sharp rise in the gamma activity level of intercycle streams. A batch of "cold" uranium was recycled to stabilize the column and a short plant shutdown was made to permit emptying the uranium concentrators for recycle and rapid purging of the activity from the system. Since the upset, First Cycle waste loss performance has been good but fission product decontamination performance has been below normal. Also, the bulk of the gamma activity has remained with the uranium product (ICU) stream.

Performance of the Final Plutonium Cycle was excellent during the month, with typical decontamination factors of 3500 and losses to the Backcycle Waste Systems remaining normal. Except for a brief period during the upset in the HA Column, when the 2BP was routed directly to the product concentrator, all product was within limits for processing through the Plutonium Anion Exchange Cycle.

Final Uranium Cycle performance was generally good during the month, with decontamination factors typically 1200 to 1500. However, due to the above normal gamma activity in the uranium product from the First Cycle, treatment through the Silica-Gel facility was required. A plant test was initiated to investigate the feasibility of substituting hydrazine for ferrous sulfamate as a reducing agent for plutonium in the Final Uranium Cycle Feed (2DF). The hydrazine was added to the ICU Concentrator to give a concentration of 0.01 molar in the 2DF. Addition of hydrazine concurrently with ferrous sulfamate additions at 70 per cent of flowsheet decreased the plutonium contamination in the uranium product by two to three-fold. However, complete elimination of the ferrous sulfamate caused a sharp increase in plutonium contamination.

Neptunium accumulation in the plant has been good. Above normal losses were experienced during the startup after the upset in

the HA Column, but otherwise have been very low. A large batch of neptunium was accumulated in the Neptunium Recovery System, decontaminated, and transferred to the Neptunium Ion Exchange Unit. The quality of the ion exchange feed was excellent, with uranium contamination negligible, plutonium contamination non-detectable, and fission product contamination about thirty-fold less than flowsheet specifications.

(b) Product Treatment

The Neptunium Ion Exchange Unit operability testing and "hot" startup continued. The first batch of purified product met all specifications except the metal impurity limit was exceeded by 40 per cent. Neptunium waste losses and fission product decontamination performance was satisfactory. The second purification run was underway at month's end.

(c) Waste Storage

Hot water lancing tests in two risers of the 103-A boiling waste storage tank indicated a total sludge layer of about 41 inches. The sludge was easily penetrated and the tank bottom contacted with less than 5 psig water pressure on the lance.

(d) Fission Products

The four Oak Ridge National Laboratory (ORNL) cesium casks were received and loaded during the month. In conjunction with this cesium campaign, a process test was made to demonstrate concurrent technetium recovery. A spare ORNL cask was filled with Amberlite-401 resin and connected in series with the cesium casks. The technetium cask plugged after processing about 1000 gallons of feed and was bypassed. Efforts to unplug the cask were only partially successful and the duration of the run was too short to evaluate the technetium loading behavior. At month end, the cask had been water-washed and plans to inspect the cask were underway.

A series of special runs were made in the Purex fission product equipment to prepare a semi-purified cerium rare-earth fraction for a process test at the Strontium Semiworks. The prepared solution was transferred to the Strontium Semiworks in a large volume solution cask.

At the Strontium Semiworks, an attempt was made to separate the cerium from the rare-earths by oxidation of the cerium to Ce-IV with potassium permanganate and extraction with di(2-ethylhexyl) phosphoric acid (D2EHPA). The cerium was subsequently stripped from the solvent with nitric acid and hydrogen peroxide. The run was unsuccessful with essentially all of the cerium remaining with the rare-earths. A batch-contact operation was underway at month end to separate the cerium and rare-earths from manganese in preparation for another cerium separation attempt.

The new Purified Strontium Storage and Loadout Facility (E-Cell) at the Strontium Semiworks was used for the first time to load a HAPO-II slurry filter cask. No difficulties were encountered, but the filtrate strontium loss was 8 per cent. The reasons for the excessive filtrate loss have not been determined.

2. Redox Process Engineering -

a. 1B Column Flowsheet

During the month of May, the 1B Column was operated at a 1.10M ANN concentration instead of a 1.30M ANN concentration. This flowsheet change has resulted in savings of \$9 per ton for essential materials and \$3.50 per ton for waste storage depreciation charges with no adverse effect on column performance.

b. HAW Recycle

The necessary jumpers were installed to route a portion of the HAW stream back to the HABS Concentrator, thus eliminating the need for recycling concentrated salt waste to the HAF Oxidizer Tank. This change in flow pattern has resulted in the following:

- 1) A 35 percent increase in HAF make-up capacity;
- 2) A 50 percent decrease in flow through the waste processing and sampling system;
- 3) Better control of the precycle flowsheet; and
- 4) Removal of one source of solids from HAF feed tank. Solids have been responsible for frequent pump failures.

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3. Plutonium Process Engineering Operation

a. Button Line

The average button density was XX.30, with 1.6 percent rejects. Feed to the button line consisted of 57 percent Purex, 10 percent Redox, 28 percent dissolved oxidized skull solutions, and 5 percent eluant from the filtrate ion exchange process. The percentage of feed plutonium in the oxalate filtrate was 6.8.

b. Plutonium Oxide Dissolution

The high dissolution rates noted during initial operation of the hood 42 teflon pot dissolver decreased markedly on continued operation. Studies indicated that the major contributing cause was poor heat transfer which resulted when a gas pocket formed between the platinum and stainless steel layers of the heat transfer surfaces. The thin platinum protective sheet was removed and dissolution rates returned to the earlier high values ($\sim$ 200 grams/hr). However, corrosion of the stainless steel surface introduced sufficient impurities that addition of the dissolver solution to button line feeds must be carefully controlled to minimize button impurity problems. To minimize button impurity problems, new immersion heaters fabricated from more resistant materials are being considered (materials considered include cast 310 stainless steel, cast Corronel 230, and platinum cladding).

c. Chloride Waste Conversion

Approximately one kg of plutonium chloride waste has been converted to plutonium nitrate by precipitating the plutonium away from the chloride as oxalate, filtering and redissolving the plutonium oxalate residue in 16 M HNO_3 , 0.1 M HF. Both chloride (less than 1500 ppm) and impurities were low enough to permit sending the resulting solution directly to the button line. Two precipitations were made on each batch before the main chloride solution was cribbed. Waste losses averaged less than 0.5 percent. Each batch of chloride cribbed was followed with large volumes of water to minimize chloride corrosion in the lines.

d. Spent Resin Leaching

Elution of spent resin has been conducted in hood 227. A screening basket has been designed in which the resin is placed. A spray technique effectively removes the plutonium from the spent resin, using a hot water spray. Sufficient nitric is associated with the resin to prevent polymerization. Approximately 750 grams of plutonium have been removed from 38 liters of resin. Although the method has proven effective in leaching plutonium from spent resins, some difficulty has been encountered in determining the plutonium content in discard resin. Conventional package counting techniques have not given adequate results. Modified techniques are being investigated.

e. Recuplex Deactivation

Removal of plutonium-bearing solids from the J-26 A evaporator continued throughout the month. To date, about 4 kgs of plutonium have been removed, with both HF-HNO₃ and HCl solutions required to dissolve the solids. The neutron counter indicates that about 75 percent of the plutonium has been removed. The chloride leach solutions are being treated by the tri-oxalate precipitation process.

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4. Separations Chemistry Laboratory -

a. Purex Process Improvement

Ruthenium distribution ratios were run between plant feed (2DF) and solvent. No differences of significance were found between lab solvent and #1 or #2 plant solvent.

Uranium transfer rates which test the quality of plant demineralized water have been run since January. All samples through May appear to be essentially the same as the January sample except the sample for March which showed a little deterioration in transfer characteristics.

An inspection was made on solid material removed from the filter on the PR can unloading line at Z plant. Material processed during the period originated in Purex, Redox, and Z plant (recycle). The material resembled a moist black paste. It was high in Pu content, contained about 9 W/O carbon with evidence of Fe, Cr, Ni, Al, Cu, and Si. Microscopic inspection disclosed the presence of whole and partial resin beads along with other undefined solids. The material did not dissolve in mineral acids nor HF-HNO_3 . The alpha activity was mostly Am^{241} . Because of the mixed source of feeds represented, the source of the solids could not be ascertained.

b. Redox Process Improvement

The feasibility of reprocessing solutions of plutonium oxide from Z plant through the Redox plant was investigated using representative material. Laboratory results indicate that the material can be readily adjusted to the +4 state using present plant procedures and that the 70-58 can be separated out through the use of the present anion exchange units.

c. Fission Product Process Improvement

Rate studies on the destruction of nitric acid-rare earth mixture with sugar were investigated in the laboratory. The reaction was found to be quite rapid above 3M HNO_3 where each mole of sugar destroyed around 20 moles of acid. Below 2.5M HNO_3 the reaction becomes so slow as to be impractical for plant operation.

The physical characteristics of the oxidation of cerium with potassium permanganate and the extraction of Ce(IV) into D2EHPA were studied in the laboratory. MnO_2 , formed by the reduction of HInO_4 , forms a stable emulsion with the organic phase making phase separation impossible. Laboratory tests showed that by adding the permanganate in three 0.014 increments during the 30 minute contact time, rather than one 0.042 addition at the start of the contact, the permanganate color lasted longer and the two phases disengaged reasonably well.

d. Laboratory Improvement

The initial test of the isotopic dilution technique, using a uranium-233 spike to find uranium concentration in dissolver solution, was very

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satisfactory. Two Purex dissolver solution composites were analyzed for uranium by this method while plutonium was determined by the usual technique. The resulting plutonium:uranium ratios checked those found by the usual analyses within $\pm 0.4\%$. Analyses performed on the synthetic D-5 standard solution checked the assigned uranium value within $\pm 0.1\%$. This analysis will be performed on each monthly composite of dissolver solution for the rest of the year to give an independent verification of the plutonium:uranium ratio.

Apparatus for measuring beta emitting isotopes on a scintillating anion exchange resin was developed and tested. The resin was contained in a lucite column fixed to a photomultiplier tube. In this way, the effluent from an ordinary ion exchange column could be quantitatively monitored without preparing mounts of successive fractions. A single channel analyzer was used to record an integral count on a time base (the base line was set to discriminate against most of the photomultiplier noise). When promethium-147 was passed through a scintillating anion exchange resin at a constant rate, the areas under the elution peaks agreed within $\pm 1.5\%$ at 10^3 to 5×10^3 d/m/ml concentrations. Tests with a scintillating cation exchange resin are also being performed.

The results of the second intercalibration exchange of irradiated test foils for the Irradiation Effects on Structural Materials Committee have been received and published. The goal of the exchange was agreement within ten percent on the activity analysis for the irradiated foils by all participating laboratories. This goal has been exceeded in all labs save one. The irradiated test foils were issued by this laboratory, together with activity analysis obtained on each foil. The participating laboratories re-analysed the foils and submitted the data to HAPO for evaluation. This has been the most wide spread and most successful comparison of gamma energy analytical capabilities attempted to date.

Gamma calibrations of the 3×3 " NaI(Tl) detectors at Redox have been completed for Te^{132} , Mn^{56} , I^{132} , and Np^{237} . Seventy photopeaks, representing 43 isotopes have now been calibrated. The $3 \times \frac{1}{4}$ " detector has been calibrated for 37 isotopes.

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5. Plutonium Chemistry Laboratorya. Direct Calcination Of Plutonium Nitrate

The "oxide" product from the recent screw calciner run SC-8, with $\text{SO}_4 = \text{Pu} = 0.05$, showed an unexpectedly high reactivity.

The product "oxides" from recent screw calciner runs SC-8, SC-9, and SC-10 have been tested for reactivity to hydrofluorination and to chlorination. All were completely converted under the standard test conditions. The "oxide" from SC-8, $\text{SO}_4 = \text{Pu} = 0.05$, was not expected to be highly reactive since "oxides" having sulfate-to-plutonium ratios of zero and 0.10 had previously been shown to be relatively unreactive. Thus, the threshold sulfate level for adequate activation, once thought to be at a ratio of 0.10, has not been adequately defined. This threshold may depend on the mode of preparation, as well as composition.

b. Chlorination Of Plutonium Dioxide

Upflow chlorination of PuO_2 with phosgene in batch reactors added credence to earlier observations that 95 percent conversion of the oxide can be readily obtained.

The 4" diameter by 5" high batch reactors produced two 500-gram charges of PuCl_3 in a routine operation at a maximum temperature of 450 C and a residence time of 6-3/4 hours. Phosgene flow was about 228 g/hr. The powder bed under these conditions is partially fluidized and no caking results.

c. Electrowinning Of Plutonium Metal

Two variations in the design of the cone-shaped anode bottom resulted in efficiencies of 73 and 80 percent, respectively. An average rate of 300 grams per hour was obtained for both runs.

The aim this month was to investigate the effect of anode configuration on cell resistance. To decrease the cell resistance by increasing the amount of effective parallel anode-cathode area, graphite rods were added to the bottom of the anode, as shown in Figure 1. The first configuration reduced the resistance in the first part of the run, but the rods eroded badly and the resistance increased with time. It is felt that this severe corrosion was due to oxide from the feed getting through the anode. The length of the rods was such that the basket was raised too far out of the melt so that the chlorination time was not sufficient. This allowed the oxide to enter the region below the anode.

The second configuration showed a good efficiency, but a high resistance. It was found that the anode connector was poor, causing a bad electrical connection. This anode was very efficient

for moving the chlorine out through the anode. This was evident both during the run and by marked decrease in corrosion of the cell walls.

The last few runs have proven the efficiency of this cell configuration. The main concern now is to increase the throughput. All parts of the D.C. system will be changed to reduce the resistance. Also, the diameter of the cell will be increased by one inch. This will allow for heavier components and more anode and cathode area.

FIGURE 1
GRAPHITE ANODE

A. S. Frank
Manager
Research and Engineering

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

H. FINANCIAL OPERATION

1. Production Cost

Extensive revisions were made in operating report formats for the purpose of improved cost-budget comparisons and to better define cost and revenue sources.

Studies completed and special reports issued during the month included:

- (a) Analysis of CPD internal overheads, FY 1958 through FY 1965 (two years budget).
- (b) Completed first draft of neptunium costing for use in FY 1964.
- (c) Assisted Redox in preparation of PRTR billing estimates for FY 1964.
- (d) Revised Purex E code system for easier analysis and segregation of neptunium costs.

Special requests activity in May included:

Shipment of unclassified Pu to Australia
Shipment of classified Pu to Dow Chemical
Receipt of 8084 grams of Pu scrap material for reprocessing
40,235 grams of Pu scrap material received from offsite
were processed in May.

CPD's investment in inventories at April 30, 1963 compared with budgeted amounts is as follows:

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(in thousands)	<u>Balance 4-30-63</u>	<u>Control Allocation</u>	<u>Surplus (Deficit)</u>
<u>Inventories</u>			
Essential Materials	\$ 803	\$ 825	\$ 22
Spare Parts & Standby	1 679	1 600	(79)
Special Materials	<u>50</u>	<u>103</u>	<u>53</u>
Gross Inventories	<u>2 532</u>	<u>2 528</u>	<u>(4)</u>
<u>Reserves</u>			
Essential Materials	61	58	3
Spare Parts & Standby	<u>556</u>	<u>481</u>	<u>75</u>
Total Reserves	<u>617</u>	<u>539</u>	<u>78</u>
<u>Net Investment</u>	<u>\$1 915</u>	<u>\$1 989</u>	<u>\$ 74</u>

2. General Accounting*

As of April 30, 1963, seventeen active projects had incurred costs of \$4,371,884 against authorized funds of \$5,717,200. Outstanding commitments totaled \$331,960.

During May, four modifications were received from the AEC: Work Authority No. AEC-204, modification No. 3, Project CAC-945, New Waste Storage Tanks - Purex, for increase of funds to \$208,000; Directive No. HW-537, Modification No. 1, establishing AEC management and modification No. 2 for increase in funds to \$31,000 on Project CAC-964, Equipment Disposal - Purex; Work Authority No. AEC-218, modification No. 2, Project CAC-970, Purex Essential Waste Routing System for increase in funds to \$6,000.

There were seven Appropriation Requests approved during May, 1963 authorizing expenditures as follows:

<u>AR Number</u>	<u>Description</u>	<u>Section</u>	<u>Amount</u>
36070	Sprue Removal Hood	WMO	\$48 500
36067	Absorption Spectrophotometer	R&E	8 500
36069	Dismantling Enclosure Equipment	FEO	6 365
36066	Recorders	"B"	5 335
36068	Sump Alarms	WMO	4 500
36064	Water Still	Redox	3 500
36065	Refrigeration Unit Redox Crane	Redox	<u>3 000</u>
Total			<u>\$79 700</u>

3. Personnel Accounting

The exempt salary audit was completed this month and results forwarded to the Department General Manager.

K. H. Rimm

Manager - Finance

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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>4-28-63</u>	<u>5-26-63</u>	<u>4-28-63</u>	<u>5-26-63</u>	<u>4-28-63</u>	<u>5-26-63</u>
General Manager's Group	11	11	2	2	13	13
Financial	13	13	14	15	27	28
Research & Engineering	65	63	29	28	94	91
Facilities Engineering	61	63	22	24	83	87
Power & Crafts Operation	38	38	236	234	274	272
Production	6	6	4	4	10	10
Redox	57	58	233	232	290	290
Purex	64	66	261	262	325	328
Weapons Manufacturing	<u>49</u>	<u>49</u>	<u>223</u>	<u>218</u>	<u>272</u>	<u>267</u>
Total	<u>364</u>	<u>367</u>	<u>1 024</u>	<u>1 019</u>	<u>1 388</u>	<u>1 386</u>

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C. TRIPS

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To Other G.E. Components</u>		
B. M. Dobbs	Phoenix, Arizona	Consultations on budgeting. (5/2 - 3/63)
W. L. Lawton, Jr.	Flight Propulsion Lab. Cincinnati, Ohio	To study power roll forming. techniques. (5/6 - 7/63)
R. E. Tomlinson	Big Rock Point Plant Charlevoix, Michigan	Attend 11th meeting of the Technological Hazards Council. (5/14 - 15/63)
H. H. Hopkins, Jr. T. S. Soine	Advanced Technology Labs. Schenectady, New York	Discuss electrowinning methods. (5/21 - 22/63)
C. T. Groswith	Crotonville, New York	Business effectiveness. (5/27 - 29/63)
J. H. Warren	Manufacturing Services New York, New York	MTP Program (5/31/63)
<u>To AEC and Other AEC Contractors</u>		
J. H. Warren	U.S. AEC Germantown, Maryland	Curium program. (5/1/63)
	E. I. du Pont de Nemours Aiken, South Carolina	Curium program. (5/2 - 3/63)
A. E. Smith	Dow Chemical Company Rocky Flats Plant Denver, Colorado	Product specification discussion. (5/3/63)
R. Y. Lyon R. J. Sloat M. K. Harmon J. W. Fillmore	Union Carbide Nuclear Co. Paducah, Kentucky	Discussions on uranium oxide process technology and production coordination. (5/6 - 8/63)
Ditto above.	National Lead Co. of Ohio (Fernald Plant) Cincinnati, Ohio	Ditto above. (5/9 - 10/63)
R. E. Tomlinson	Argonne National Lab. Lemont, Illinois	Attend meeting of Advisory Committee on Reactor Technology. (5/8/63)
G. R. Kiel R. L. Stevenson	U.S. AEC Div. of Licensing & Regulation Washington, D.C.	Meeting of Industrial Nuclear Safety Group. (5/7 - 9/63)

C. TRIPS (Continued)

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To AEC and Other AEC Contractors (Continued)</u>		
L. L. McGregor	Los Alamos Scientific Lab. Los Alamos, New Mexico	To attend 6th Interagency Mechanical Operations Group Subgroup meeting. (5/7 - 8/63)
S. J. Beard J. S. Buckingham	Oak Ridge National Lab. Oak Ridge, Tennessee	Fission product production and technology. (5/9 - 10/63)
H. H. Hopkins, Jr.	Argonne National Lab. Lemont, Illinois	Attend symposium. Discuss plu- tonium processing. (5/15 - 17/63)
T. S. Soine	Mallinckrodt Chemical Co. Weldon Spring, Missouri	Discuss electrowinning methods. (5/15/63)
	E. I. du Pont de Nemours Aiken, South Carolina	Discuss electrowinning methods. (5/16 - 17/63)
	Oak Ridge National Lab. Oak Ridge, Tennessee	Discuss chloride volatility process. (5/20/63)
C. E. King	Sandia Corporation Livermore, California	Shop equipment. (5/20 - 22/63)
H. H. Hopkins, Jr. T. S. Soine	Dow Chemical Co. Rocky Flats Plant Denver, Colorado	Discuss plutonium process technology. (5/23 - 24/63)
A. E. Smith W. J. Gartin	Lawrence Radiation Lab. Livermore, California	Discuss product specifications. (5/27 - 28/63)
J. H. Warren	U.S. AEC Germantown, Maryland	Curium program. (5/28 - 29/63)
<u>To General Industry</u>		
G. L. Hanson	Diamond Drill Contracting Co. Spokane, Washington	Consult on sludge sampling from Redox waste storage tanks. (5/2/63)
L. L. McGregor	Sheffield Corporation Dayton, Ohio	Consultations on gaging equipment. (5/17/63)

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C. TRIPS (Continued)

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To Conventions and General Meetings</u>		
L. L. Zahn	New York, New York	ASA - N-5.5 Subcommittee (5/1 - 2/63)
S. J. Beard	Buffalo, New York	Attend American Institute of Chemical Engineers Convention. (5/6 - 8/63)
R. E. Tomlinson	Buffalo, New York	Present paper at the American Institute of Chemical Engineers Convention. (5/6 - 7/63)
H. C. Rathvon	Argonne National Lab. Lemont, Illinois	Attend Transplutonium Element Symposium. (5/15 - 17/63)
L. L. McGregor	Newark, Ohio	Attend American Ordnance Association Meeting. (5/15 - 16/63)
A. E. Smith	Las Vegas, Nevada	Attend 8th Interagency Mechanical Operations Group Steering Committee Meeting. (5/21 - 23/63)

D. VISITORS

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From Other G.E. Components</u>		
R. B. Richards	Atomic Power Equipment Dept. San Jose, California	Technological hazards review. (5/2/63)
J. W. Healy	Engineering Services New York City	Technological hazards review. (5/2/63)
F. E. Crever	Atomic Products Division Palo Alto, California	Technological hazards review. (5/2/63)

D. VISITORS (Continued)

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From AEC and Other AEC Contractors</u>		
E. Tuthill G. Weth	Brookhaven National Lab. Upton, L.I., New York	Purex waste processing. (5/22/63)
J. Cochrane	The Martin Company Quehanna, Pa.	Fission product technology. (5/23/63)
A. Sorenson	U.S. AEC Washington, D. C.	Tour facilities. (5/28/63)
R. Forest M. Thompson	Dow Chemical Company Rocky Flats Plant Denver, Colorado	Observe flo-turn forming process. (5/27/63)
J. L. Schwennesen	Division of Production AEC - Washington, D.C.	Plant tour. (5/28/63)
<u>From General Industry</u>		
A. M. Weis C. S. Caldwell	Numec Corporation Appolo, Pa.	Fission product applications. (5/2/63)
Mr. Booth	Associated Industrial Fabricators Spokane, Washington	Fission product applications. (5/2/63)
G. C. Loud	Davison Chemical Company Erwin, Tennessee	Decontamination and safety. (5/6/63)
Dr. H. L. Monroe G. C. Loud	Davison Chemical Company Erwin, Tennessee	Decontamination and safety. (5/7/63)
C. Luft	DuBois Chemical, Inc. Walla Walla, Washington	Chemicals. (5/9/63)
W. J. Vasil	Perine Machinery & Supply Company Seattle, Washington	Shop equipment. (5/8/63)
W. Hamilton	Buckner-Weatherby Company Seattle, Washington	Shop equipment. (5/9/63)
R. E. Allen R. M. Freeborg T. Y. Griswold F. J. Jones A. M. Rogers E. C. Stokes	Bechtel Corporation San Francisco, Calif.	Designs for connectors and other process equipment. (5/22/63)

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D. VISITORS (Continued)

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From General Industry (Continued)</u>		
Z. M. Schapiro	Numec Company	Waste Management Fission
K. H. Puechl	Apollo, Pa.	Product Recovery.
A. M. Weis		(5/28/63)
H. K. Nason	Monsanto Research Corp.	Isotopes.
	St. Louis, Missouri	(5/29/63)
J. J. Morris	Precision Engineering Co.	Vacuum blast furnace.
	Seattle, Washington	(5/31/63)
<u>From Colleges and Universities</u>		
George Watt	University of Texas	General discussions.
	Austin, Texas	(5/22/63)

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IV. SAFETY AND SECURITY

<u>Operation</u>	<u>General</u>	<u>FEO</u>	<u>Finance</u>	<u>WMO</u>	<u>P&CO</u>	<u>Purex.</u>	<u>Redox</u>	<u>Prod.</u>	<u>R&E</u>	<u>CPD</u>	<u>Total</u>	<u>YTD</u>
Dis. Injuries												3
Ser. Accidents												0
Med. Treat. Inj.	1		1	15	25	10	4	1	1	58	217	
Rad. Occur.				9		2	5		1	17	62	
Contam. Wd.				2							9	4
Pu Dep.				2							2	6
Fires												
Sec. Viol.												

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V. REPORTS

A. PREPARED AND ISSUED

- HW-75293 REV, Unclassified, "Critical Mass Control Specification - Revision 1, Filtered Ion Exchange Facility", dated May 17, 1963, by R. J. Sloat.
- HW-76553 REV, Unclassified, "Critical Mass Control Specification - Hood 9-A", dated May 31, 1963, by R. J. Sloat.
- HW-76939, Official Use Only, "Project Proposal, Rev. #4, Waste Treatment Facility - 'Z Level' - GCG-912", dated April 12, 1963, by M. N. Raile.
- HW-77163, Unclassified, "CGC-981 Process Design Engineering Waste Management Program - Phase II", dated March 31, 1963, by H. L. Caudill.
- HW-77226, Secret-AWD, "Chemical Processing Department Budget for FY-1965 - Revision of Budget for FY-1964 PAC", dated May 15, 1963, by L. L. Zahn.
- HW-77234, Official Use Only, "Chemical Processing Department Budget for FY-1965, Revision of Budget for FY-1964 PAC", dated May 15, 1963, by L. L. Zahn.
- HW-77379, Unclassified, "CPD Hazards Review Task Force Report - Waste Management Program - Phase I (CGC-897)", dated April 29, 1963, by H. L. Caudill et al.
- HW-77413, Secret AWD, "Progress Report - Weapons Process Engineering - April 1963", dated May 3, 1963, compiled by members of the Weapons Process Engineering, Research and Engineering Operation.
- HW-77513, Unclassified, "Flowsheet and Bases for Equipment Specifications - Prototype Incinerator Scrubber Solution Recovery Process", dated May 3, 1963, by R. Y. Lyon.
- HW-77534, Unclassified, "Report of Invention - A Novel Circulator Design for Evaporation by Hot Gas Sparging", dated May 8, 1963, by J. J. Shefcik, Jr.
- HW-77537, Secret AWD, "Quarterly Summary Report and Associated Data for 234-5 Building Final Product Shipped During the First Quarter of CY 1963", dated May 6, 1963, by A. E. Smith.

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- HW-77569 RD, Secret, "Purex Plant Production Schedule - May 1963", dated May 8, 1963, by D. McDonald.
- HW-77570 RD, Secret, "Redox Plant Production Schedule - May 1963", dated May 8, 1963, by D. McDonald.
- HW-77571 RD, Secret, "UO₃ Plant Production Schedule - May 1963", dated May 8, 1963, by D. McDonald.
- HW-77572 RD, Secret, "234-5 Plant Production Schedule - May 1963", dated May 8, 1963, by D. McDonald.
- HW-77589, Secret, "Promethium Availability - CPD", dated May 9, 1963, by R. E. Smith.
- HW-77622, Unclassified, "Purex Sludge Removal and Waste Transfer - 200-East Area", dated May 15, 1963, by E. Doud.
- HW-77641, Secret AWD, "Plutonium Isotopic Determination", dated May 15, 1963, by R. J. Dal Ponte and N. S. Wing.
- HW-77655, Secret AWD, "Request for Methods Approval for 74C, 79C and 88C Components", dated May 16, 1963, by A. E. Smith.
- HW-77661, Secret, "Additions to Purex Essential Material Specifications Required by Routine Strontium Production", dated May 17, 1963, by S. J. Beard and B. F. Judson.
- HW-77693, Unclassified, "Critical Mass Control Specification - Room 227, 234-5 Building", dated May 31, 1963, by R. J. Sloat.
- HW-77706, Secret, "Redox Neptunium Measurements", dated May 23, 1963, by C. W. Malody.
- HW-77715, Unclassified, "Trip Report - Meeting of Industrial Nuclear Safety Group, Washington, D. C. - May 7, 8, 9, 1963", dated May 23, 1963, by E. D. Clayton, C. L. Brown, R. L. Stevenson, G. R. Kiel.
- HW-77722, Secret AWD, "Approval of Proposed Inspection for Certification of Parts While in the Machining Fixture", dated May 27, 1963, by W. S. Frank.
- HW-77724, Confidential, "Operating Plans for Redox - June and July", dated May 27, 1963, by J. H. Warren.
- HW-77728, Secret AWD, "Richland Plutonium Metal Forecast - FY 1963 Through FY 1965", dated May 27, 1963, by J. H. Warren.
- HW-77741, Unclassified, "Trip Report - Oak Ridge National Laboratory", dated May 23, 1963, by S. J. Beard, J. S. Buckingham and G. L. Richardson.

HW-77765, Secret, "Americium Recovery Study", dated April 26, 1963, by
P. H. Reinker.

B. PREPARED FOR SIGNATURE AND ISSUANCE

HW-77505, Secret, "Production - April, 1963", dated May 1, 1963, by
W. E. Johnson.

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VI. PATENT SUMMARY

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

INVENTOR

TITLE

E. F. Stell, Facilities
Engineering

Bearing-Less Pump Operation

P. H. Linker

General Manager
Chemical Processing Department

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**DATE
FILMED**

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