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HW--84354

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**CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
SEPTEMBER 1964**

OCTOBER 21, 1964

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AVAILABLE

HANFORD ATOMIC PRODUCTS OPERATION

RICHLAND, WASHINGTON

GENERAL ELECTRIC

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
FOR

SEPTEMBER, 1964

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October 31, 1964

HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON

By *R.H. 10/11/73*
Date *5-25-73*
U.S. AEC Division of Chemicals

Work performed under Contract No. AT(45-1)-1350 between
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CHEMICAL PROCESSING DEPARTMENT
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I. SUMMARY

September production, as compared with the HAPO Production Forecast (HW-83319), is summarized below:

	<u>September</u>	<u>Fiscal Year To Date</u>
Separated plutonium nitrate	110	113
Separated uranium nitrate	108	111
Uranium oxide	110	105
Plutonium metal buttons	105	114
Fabricated parts	101	89

For the second consecutive month, excellent production of all products was achieved. Redox performance was particularly good and output exceeded the previous record high for E-metal by 18.7 tons. The production of separated plutonium nitrate was also noteworthy, with output exceeding the record high established in June 1963 by 6.4 kg.

The Purex canyon ventilation filter continued to be a problem during September. Adequate air flow was maintained by flexing the filter more frequently but the fiberglass bed continued to recompress.

The HAPO I-B-1 Cask, loaded in August with approximately 350,000 curies of strontium-90, was released for shipment on September 11. Loading of four SIT casks with cesium-137 was also completed but shipment was delayed seven days until September 25 because of a pending railroad strike.

Approximately 400,000 curies of crude promethium-147 were recovered from supernatant from the 106-A Waste Tank.

Sustained operation on the modified acid-deficient precycle flowsheet, adopted during July, 1964, was successfully demonstrated at Redox during September. With the extraction batteries operating at near optimum rates for 676 hours, E-metal production reached a new record high of 233.5 tons. It was also evident that the flowsheet and the

new 1A precycle column were primarily responsible for better quality solvent, a factor of four reduction in corrosion rate in the backcycle concentrator, and twice the production capability between column flushes.

The processing of unclassified plutonium oxide was started for the Euratom program on September 24. Approximately half of the 175 kg order was completed by month-end.

J. I. Wanner
General Manager
Chemical Processing Department

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS

A. PRODUCTION OPERATION

1. Production Statistics

<u>a. Percent of Forecast⁽¹⁾ Achieved</u>	<u>September</u>	<u>Fiscal Year to Date</u>
Separated plutonium nitrate	110	113
Separated uranium nitrate	108	111
Uranium Oxide	110	105
Plutonium metal buttons	105	114
Fabricated parts	101	89
 <u>b. Purex</u>	 <u>September</u>	 <u>August</u>
Uranium nitrate produced (tons)	508	856
Average production rate during operation (T/D)	23	30
Total waste loss (%)		
Plutonium	0.45	0.28
Uranium	0.25	0.22
On-line efficiency (%)	92	99
 <u>c. Redox</u>		
Uranium nitrate produced (tons)	233	55
Average production rate during operation (T/D)	8	5
Total waste loss (%)		
Plutonium	0.30	0.54
Uranium	0.21	0.42
On-line efficiency (%)	94	32
 <u>d. Uranium Reduction (tons)</u>		
Normal UO ₃ loaded	721	676
Enriched UO ₃ loaded	152	102
Normal UO ₃ approved for storage	721	676
Enriched UO ₃ approved for shipment	152	102
Normal UO ₃ shipped	0	0
Enriched UO ₃ shipped	152	50
Normal UNH backlog	304	331
Enriched UNH backlog	219	232

(1) HW-83319, HAPO PRODUCTION FORECAST.

e. Plutonium Metal Processing

	<u>September</u>	<u>August</u>
Reduction yield (%)	97	97
Product recovery output (Kgs)	239	83
Product recovery backlog (Kgs)	1 280	1 380
Waste disposal (grams)	719	746

f. Power

	<u>200-West</u>	<u>200-East</u>
Raw water pumped (gpm)	6 001	12 128
Filtered water pumped (gpm)	1 210	1 111
Maximum steam generated (lbs./hr.)	110 000	205 000
Average steam generated (lbs./hr.)	91 000	170 000
Total steam generated (M lbs.)	65 411	122 471
Coal consumed (tons)	3 242	6 208

For the second consecutive month, excellent production of all products was achieved. Redox performance was particularly good and output exceeded the previous record high for E-metal by 18.7 tons. The production of separated plutonium nitrate was also noteworthy, with output exceeding the record high established in June 1963 by 6.4 kg.

M K Harmon
Acting Manager,
Production

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2. FISSION PRODUCT DATA (Kilocuries)

	Purex Recovery	244-CR Inventory	B-Canyon Inventory	Semiworks In-Process Inventory	Product Inventory	Product In Cask	Product Shipped	Customer	Remarks
Sr-90		380	1500		2220		350		
Cs-137							185		
Ce-144									
Pm-147		1100	5040	150					
Aged Pm in 002 CR		580							

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II. ACHIEVEMENTS (Continued)

B. PUREX OPERATION

1. Operating Continuity

Purex processing continued at a 3.6 capacity factor on regular metal until September 5, 1964 when rates were reduced to 3.0 to regenerate the "A" dissolver silver reactor. Unclassified metal was processed from September 9, 1964 until September 26, 1964 at a 2.8 capacity factor. A brief shutdown was taken to replace the HA column feed pump and control valve jumper on September 8, 1964. Another shutdown was taken September 26 and 27, 1964 to complete an SS Nuclear Material inventory and replace the 2A column (final plutonium cycle) interface jumper. Regular metal processing resumed on September 28, 1964 and rates were increased to a 3.6 capacity factor.

Neptunium purification run 20 was shipped on September 28, 1964 and run 21 was completed.

Eight promethium-147 recovery runs were completed at the Purex Head End during the month. Approximately 72,000 gallons of Tank 106-A supernatant were processed, yielding about 400 kilocuries of crude promethium.

The Technetium STT cask, loaded concurrently with the Cesium STTs, was moved to the Strontium Semiworks for elution of the technetium. Continuous sugar denitration of the 6 M nitric acid elutant was demonstrated at the Strontium Semiworks for the first time resulting in a twenty five-fold volume reduction. No unusual problems were encountered. The technetium in the product solution was reloaded onto a small (50 liter) resin column for fission product decontamination and then eluted into 55-gallon stainless steel drums for shipment to Separations Chemistry, Research and Engineering Operation.

B-Plant activity was limited this month to routine inventory surveillance.

2. Processing Operation

Purex uranium and plutonium met specifications except for one week when uranium batches exceeded specifications and required blending. Two plutonium batches exceeded specifications.

Calorimeter checks on the HAPO I-B-1 cask indicated a load of approximately 350 kilocuries of strontium-90. The cask was released to the

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Atomic Energy Commission for shipment to Oak Ridge Laboratory on September 11, 1964.

Loading of cesium-137 into the STT casks was completed on September 11, 1964. Release of the STT casks to the Atomic Energy Commission was made on September 25, 1964 after a seven day delay due to the possibility of a railroad strike.

3. Equipment Experience

Flexing of the Purex canyon ventilation filter to maintain adequate air flow became more frequent with the total differential pressure ranging from 6.4 to 13.4 inches of water and air flow ranging from 90,000 to 66,000 cfm. The Fiberglass filter bed has continued to recompress.

Through inspection the load cable to the 40 ton hoist on the Purex West Canyon crane was found to be defective. Repairs were made by replacing the load cable and making a complete mechanical inspection of all rotating parts - adjusting and repairing as required to place the equipment in satisfactory condition.

The cable guard on the lower block assembly to the 10 ton hoist on the Purex East Canyon crane broke and damaged the load cable to the hoist. Repairs were made by replacing the lower block assembly and load cable. The crane was returned to service and is operating satisfactorily.

The Purex process pump in Tank F-10 (backcycle collection) failed this report period causing electrical motor high amperage and low process solution flow. Replacement was made with a hot spare pump from the ready rack in the canyon.

Electrical and instrumentation systems were installed placing the Purex 2BW (final plutonium cycle organic waste) Alpha Monitor and X-Ray system in service. This work consisted of installing detection equipment at the 2BW sampler location in the Sample Gallery, amplification and converting equipment in the Pipe and Operating Gallery, and recording equipment in the Central Control Room.

The Tank 102-C pump in the 241-C Tank Farm failed electrically this report period. The failure was caused by a defective electrical wall nozzle in the power supply to the pump. Repairs were made and the pump was returned to service.

A new motor was installed on the Tank 102-A sluice pump at the 241-A Tank Farm. A sheet metal shroud, pressurized with outside dry air by a blower, was designed and is being installed over the pump motor. This will minimize the condensation of tank vapors in the motor and help prevent pump failure due to moisture.

Hydraulic testing of the existing line between 152-C and 154-B diversion boxes indicated that the old line is still sound.

Construction of the In-Tank Waste Solidification routings was continued with establishment of the Tank 103-BY and Tank 112-BY routes to Tank 101-BY.

B-Cell maintenance work at the Strontium Semiworks continued with the replacement of the HC column product valve and the HA column alternate waste valve, the removal of the HA column product, HC column waste, and HC column product ion chambers for repair, and the installation of the HA column scrub section differential pressure cell. The Tank 81 process solution pump in B-Cell was also repaired during the month.

4. Radiation Experience

The addition of eleven tons of Bentonite to the Gable Mountain Swamp was completed during September. Back-filling of the shore line of the swamp was undertaken to provide better confinement of water in the swamp. The water level in the swamp has shown sufficient increase during the month to preclude the need for further Bentonite addition in the near future. Radiation readings at the shore line are no longer a problem.

Iodine emission was normal except for the seven day period ending October 1, 1964 during which 2.28 curies were emitted. Mercuric nitrate has been added to the dissolved feed to suppress the emission rate.

5. Analytical

Installation of the wide-beta proportional counter was completed during September. Calibration and background checks are in progress. This counting instrument will provide the means to obtain greater accuracy and precision on analyses for the beta emitting fission product isotopes. Other potential uses, including the automation of repetitive counts for Irradiation Processing Department samples, are being investigated.

Manager - Purex

WM Harty:MLM:de

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

C. REDOX OPERATION

1. Operating Continuity

The Redox plant operated exceptionally well throughout the month and a new E-metal monthly production record was achieved. The previous record of 214.8 tons, established during January 1963, was exceeded by approximately 9 percent.

The Uranium Oxide plant operated satisfactorily throughout the month and the production of both depleted and enriched uranium oxide exceeded that expected.

2. Processing Operations

a. Redox Processing

E-metal processing was continuous throughout the month except for two short shutdown periods totaling approximately 36 hours for: 1) nitric acid flushing of the 1A precycle extraction column to correct flooding conditions; 2) replacement of the H-4 metal solution oxidizer steam coil which failed on 9-22-64.

Sustained operation on the modified acid-deficient precycle flowsheet, adopted during July 1964, was successfully demonstrated this month. The extraction batteries were operated at near optimum rates for 676 hours, or 96.8 percent of the time available.

Improved operating efficiency, particularly with respect to operating continuity, produced waste losses measured at 0.21 and 0.30 percent for uranium and plutonium, respectively. Forty-four tons of uranium, held in lag storage because of excessive ruthenium, were blended into specification with the currently produced material.

b. Uranium Oxide Processing

Processing operations were satisfactory throughout the month. Total downtime for equipment repairs was 44 hours, 24 of which were taken to complete preventive maintenance jobs.

One car of enriched UO_3 powder exceeded the sodium specification (55 vs 50 ppm) but was shipped on a waiver of specification from the customer. The National Lead Company has been requested to re-analyze the material.

3. Maintenance Experience

a. Redox Plant

The Redox processing equipment operated exceptionally well during the month and the mechanical efficiency for the period was 97 percent.

A restriction in the waste line from the 1A precycle column to the D-14 backcycle waste concentrator was encountered at August month-end, which reduced throughput rates to approximately 60 percent of nominal. A new LAW let-down jumper was fabricated and installed, which permitted rates to be increased to an average production throughput of 8.3 tons per operating day.

The steam coil in the H-4 metal solution oxidation tank failed on 9-22-64 and 15 hours of downtime was taken to install a new unit. Subsequent operation has been satisfactory.

Internal painting of the high pressure inert gas receiving tank was completed this month and the tank returned to service without incident.

b. Uranium Oxide Plant

The ring gear and sprocket on the X-30 calciner feed tank agitator failed on 9-10-64. Since replacement parts were not readily available, an air sparger was installed pending arrival of ordered replacement equipment. Operation to date has been satisfactory.

The ED-2 concentrator (100 percent UNH) was shut down this month for a general overhaul due to the erratic operation being experienced with the unit. Restrictions found in the recirculation, off-gas, and cyclone drain-lines were removed and a new trap was installed on the coil outlet. Operation of the unit has improved; however, vacuum limitations still restrict capacity and efforts to resolve the problem are continuing.

4. Waste Handling and Decontamination

Equipment valued at approximately \$85,000 was received from customers for decontamination, repair, inspection or burial during the month. Equipment valued at approximately \$35,000 was returned to customers, representing a savings of approximately \$30,000 based on the cost of new equipment.

5. Radiation Experience

The radioactivity detected in two of the horizontal laterals beneath the 108-SX waste storage tank during August, increased from 150,000 c/m to 260,000 c/m during September. However, there has been no change in the readings detected in vertical test well No. 29 and liquid level measurements indicate no loss of material. Checking of all waste transfer lines in the vicinity of both the 107 and the

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108-SX tanks is continuing and close surveillance will be kept to detect any changing trends.

6. Analytical Experience

The Redox Analytical Laboratory provided: 1) Thorium analyses to provide solvent extraction ratio data, and thorium oxide-nitric acid dissolution rates for the Materials and Process Chemistry Laboratory, HL; 2) analyses for dissolved uranium and plutonium content to provide information for the evaluation of a reactor decontamination study for the Coolant Systems Development Operation, HL; 3) iron, zinc, yttrium, neodymium, cerium and samarium determinations by X-ray spectrometer to provide performance data for the final "cold" run in the Separations Chemistry Laboratory promethium recovery facility; 4) low level uranium analyses in the presence of gross quantities of thorium to evaluate methods for the separation of uranium and thorium; 5) samarium-153 analysis of ceramic "SCRAM" balls which were exposed in the N-reactor.

S. H. Amolen

Manager - Redox

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II. ACHIEVEMENTS (Continued)

D. WEAPONS MANUFACTURING OPERATION

1. Operating Continuity

The fabrication of Model 1807 components and Model 74-C components was without significant interruption during the month. The production of unfabricated plutonium was interrupted at mid-month in order to process plutonium oxide for the Euratom program. This special processing continued through the end of the month. Operation of the reclamation facility was without significant interruption, except for the performance of the slag and crucible dissolver where solids accumulation continues to prevent normal operation. The miscellaneous treatment dissolvers and the laboratory-type dissolvers operated without interruption. The incinerator was started up following overhaul and operated at normal rates from mid-month.

2. Processing Operations

a. Plutonium Fabrication

Information on plutonium fabrication activities is presented in Document HW-84399 (Atomic Weapon Data).

b. Plutonium Reduction

Weapons-grade plutonium was processed to metal in the button line until mid-month. Unclassified metal production was then initiated and continued for several days. Following this, work was started on the preparation of approximately 200 kilograms of unclassified plutonium oxide to fill an order of 175 kilograms for the Euratom program. Production of the oxide was approximately 50 per cent complete at month-end. Calcium impurities were up to 200 ppm and sodium impurities were up to 500 ppm. The final Euratom contract will have to be drawn to allow this impurity level if this oxide is to be used for the order.

c. Plutonium Reclamation

Two hundred forty-one (241) kilograms of plutonium were delivered from the recovery facilities to the button line. Seventy-one (71) kilograms of this came directly from the laboratory-type (glass) oxide dissolvers.

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c. Plutonium Reclamation (Continued)

Thirty-seven (37) waste boxes and six packages of leachables were processed in the incinerator during the time it operated during the month.

In the waste treatment and americium recovery facilities, 7.6 grams of americium were separated and loaded into an RC can for storage. Americium concentration was about one-half gram per liter.

Operation of the slag and crucible dissolver continued to be curtailed by solids accumulations and was further complicated by the failure of the Teflon liner. Repairs were made and limited operation was resumed at month-end.

The extraction of the plutonium from the waste stream has been satisfactory in the new waste treatment facility but recovery of the plutonium from the extractant is inadequate. The flow sheet is being modified to correct this problem.

3. Mechanical Performance

Performance of equipment in fabrication, inspection, and the button line was satisfactory during September. No unusual repairs were required.

The slag and crucible dissolver (TK-06) in the reclamation facility continued to require excessive attention. In addition to the accumulation of solids, the Teflon liner of the tee section bulged and prevented the scrap containers from being properly immersed in the solution. The faulty section was replaced by one from the other dissolver (TK-04) which is being modified in the 300 Area shops. Five Chempump failures were experienced in the reclamation facility.

The inadequate flow rate of the CAW aqueous waste to the waste treatment facility was corrected by the addition of a pump in the delivery line.

The installation of the 24-C Hood (Gorton lathe hood from the "C" fabrication line) on the "A" fabrication line is 75 per cent complete.

The installation of the hood for the high-temperature calcination, milling and sampling of the Euratom oxide is 95 per cent complete.

Repairs to the emission spectrograph were accomplished following resolution of an optical alignment problem by the manufacturer's representative.

4. Radiation Experience

Radiation and contamination control statistics for September revealed satisfactory performance.

There were no cases of potential plutonium deposition.

5. Analytical Experience

Number of Samples Received	3,239
Number of Determinations	19,277

A heavy analytical load resulted from high recovery activity and the outage of the emission spectrograph. These problems and the termination of several Chemical Analysts resulted in a high overtime level in the analytical unit.

WJ Gartin
 Manager
 Weapons Manufacturing

WJ Gartin:csj

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

E. FINANCIAL OPERATION

1. Production Cost Accounting

Call letters for manpower and planned maintenance for the FY 1965 Midyear Budget Review were issued, with instructions that planning should be oriented towards remaining within currently available funds.

Funding problems are indicated in 02 and 03 Production, Isotope Inventory and 02 R&D.

Initial reporting on the Weapons Standard Cost System was issued to AEC and department management for the months of July and August. This report is scheduled for issuance on a quarterly basis beginning with September and ending with May. The report schedule was established to provide ample time to dispose of FY 1965 variances from standard prior to closing of the books at June 30, 1965.

Inventory of Precious Metals and Special Materials was taken at the end of September.

Special requests handled in September included the shipment of 1 kg of plutonium metal to Battelle, a plutonium oxide-shipper-receiver study, the burial of 204 drums of contaminated material for the University of California, and the processing of 6026 grams of plutonium scrap from HL (Project Whitney).

2. Business Programs

An estimate of Po-210 separations cost was prepared for inclusion in the over-all WAPC Po-210 production study. Separations operating cost was estimated at \$1,600,000 annually based on the given reactor production quantities. Separations cost is the major operating cost factor in this program.

The waste management supplement, detailing waste management costs included in the 02 Refined Reactor Cost Studies, was issued in September.

The CPD Data Book was revised and updated to include FY 1964 cost and activities.

3. General Accounting

As of August 31, 1964, nineteen active projects had incurred costs of \$3,208,922 against authorized funds of \$6,026,424. Outstanding commitments totaled \$533,447.

There were eight appropriation requests approved during September, 1964 authorizing expenditures of:

<u>AR</u> <u>No.</u>	<u>Description</u>	<u>Section</u>	<u>Amount</u>
56012	X-ray Fluorescent Spectrometer	Purex	\$25 030
56013	Plutonium Product Concentrator	Purex	30 000
56014	Solids Moisture Analyzer	WMO	7 250
56015	Surface Area Analyzer	WMO	9 500
56016	Electric Motor	Purex	2 000
56017	Arc Spark Stand	WMO	3 200
56018	Temperature Recorders	R&EO	8 500
56019	Infrared Spectrometer	R&EO	7 600
Total			<u>\$93 080</u>

R A Cornell
Manager - Finance

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II. ACHIEVEMENTS (continued)

F. FACILITIES ENGINEERING OPERATION

1. Purex

a. Process Design Engineering

Multipurpose Dissolver Inserts

The study drawings of the first three insert concepts were issued for preliminary review. Nine alternate proposals for stavewall construction are being reviewed by the nuclear safety consultants for feasibility. Neutron absorption tests are to begin shortly upon four alloys. Corrosion studies are in progress.

Dissolver Tower

Fabrication of the Purex Dissolver Tower and Knockout Pot is proceeding according to schedule and will be ready for tube installation as soon as the finned tubes are received on-site.

Purex Processing Flexibility

Part 1

Design Review - Fifty-one (51) drawings were reviewed this month. A revision to the design criteria has been sent to the Atomic Energy Commission for approval. This revision will permit usage of TK-11 in the Purex 211-A Tank Farm, a 100,000 gallon acid storage tank, for storage of NH_4NO_3 solution, and thus obviate the need for a new tank.

Purex Processing Flexibility (continued)

Part 2

Engineering Study

The engineering study for Part 2 has been completed and issued for distribution.

Variable Jet Feed Control

Engineering work was started during the past month on a control system for a variable jet in the Purex 3WF Stream. The jet will transfer solution from Tank F-10 to E-H4 Concentrator. Engineering of the system is now approximately 40 percent complete, and drafting is scheduled to start within the next few days. It is presently anticipated that fabrication work will be started by the end of October.

Re-design of Canyon Coaxial Connectors

Re-design of original in-canyon coaxial connectors has corrected all disadvantages. Also, use of commercial parts and standardizing of all holes to standard drill sizes has reduced cost of fabrication to 1/3 of former costs. (\$1,450 for one (1) complete set of connectors for one (1) head to \$450.)

b. Project Engineering

CGC-124 - Increased Processing Flexibility - Purex

Eighty-seven (87) drawings have been issued for comment; thirty-six (36) have been approved. Fabrication of moderators was started on September 9.

c. Manufacturing Engineering

Laboratory Dry Waste Handling System

Canning equipment to package Purex Laboratory dry wastes was received and installed for testing. Initial testing of the integrity of the can seal has been confined to simulated wastes. A study is now in progress to determine the best

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location of equipment control switches so that laboratories may receive a minimum amount of radiation during the packaging operation.

241-A Tank Farm Sluice Pump

Failure of the 125 horsepower pump motor on the sluice pump in the 102 Tank was caused by the steam atmosphere in the pump pit. Since only an open-type motor could be used on the existing pump, a replacement motor has been installed. This motor has been equipped with a shroud and furnished with air from outside the pump pit. The exhaust air is also collected and exhausted through a filter to outside the pump pit.

2. Redox

a. Process Design Engineering

Dissolver Off-gas I¹³¹ Monitor

The new Redox Off-gas I¹³¹ Monitor was put into service during the past month. The system is operating satisfactorily with one exception; the system sensitivity is too great. Although at the present time Redox is processing material that is quite old (should have very low I¹³¹ content) the monitoring system is counting about 5×10^4 counts per minute. This means that when Redox again starts processing relatively "green" feed, the count rate will be beyond the range of the instrument. As a result, steps are presently being taken to reduce the crystal size in the detector and also possibly to collimate the gamma beam.

In-Line pH Probe - Redox Stream

The in-line pH probe on the Redox LAS Stream is still inoperative. Failure was attributed to the reference electrode which was designed with an upper limit of 122° F. Temperature of the process stream has increased recently from less than 100° F to approximately 180° F. Temporary substitute electrodes were recommended for Redox and investigations have been started to obtain better electrodes for this application.

b. Project Engineering

None.

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c. Manufacturing EngineeringRedox D-14 Tube Bundle Insert

A replacement coil for the Redox D-14 Tube Bundle is being fabricated on an emergency basis by the Chemical Processing Department Shops. It is scheduled for installation on October 5.

3. Weapons Manufacturinga. Processing Design Engineering"C" Button Line

Two (2) replacement fluorinator bellows were received, and one (1) is being prepared for installation in HC-9B for evaluation. Equipment for removing PuO_2 in HC-9B has been fabricated and installed. Testing of the jaw-type crusher has proceeded satisfactorily with rocks as the material to be ground. The jaw crusher is intended as replacement for the hammermill in the HC-17DC, and is to be housed in a new hood.

"A" Button Line

Ten (10) drawings have been revised in preparation for the renovation of H-9A (fluorinator and calciner). Engineering was completed for installing vacuum systems on the 4th and 5th stations of the Ingotting Glove Box. Fabrication and installation have started for the 4th station.

Plutonium Reclamation

The TK-06 slag and crucible dissolver is now back in service after replacement of a tapered stainless steel spool piece with a teflon-lined spool piece and replacement of a teflon-lined tee in which the lining had bulged to prevent feed can passage.

Incinerator

Fabrication and installation of a two-unit inlet filter assembly to provide ventilation air from the room to the cyclone ash separator glove box has been completed. This installation precludes the need to supply ventilation air to this glove box from the ash canning glove box and allows the vent between them to be blanked, thus preventing dust passage from the canning section to the cyclone section through the vent. Engineering on removable insulation for the incinerator belt pulley housing has been

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completed. A nuclear safety review of the design is presently being made.

Plutonium Residue Survey Within "Z" Plant

A two-week period was devoted to survey of selected equipment within the "Z" Plant using 380 KEV gamma emission from Pu_{239} to detect any quantities of plutonium residues. The survey was limited to the 9A and 9B ventilation system within the duct level and to the incinerator building. A comprehensive report covering the results of this survey is being prepared. Preliminary results indicate no problems of criticality.

b. Project Engineering

CAC-987 - Stabilization Facility - 234-5 Building

Design was completed on September 8. All vendor drawings have been received and approved.

CAC-138, Rev. No. 1 - Special Plutonium Preparation Facility - Z-Plant

A project proposal revision, reducing the scope of work by one glove box and some minor equipment was transmitted to RLOO-AEC on September 21. The removed features are currently being provided by AR-46039 for processing Euratom material.

4. General

a. Processing Design Engineering

Waste Management Program

Design data and material establishing all the in-concrete piping and electrical services in Cell 15 - "B" Plant for the CGC-132 prototype equipment were completed and transmitted for continuation of detail design. This information fulfills scheduled requirements for this phase, except for control room and jumper criteria which are to be supplied April 1, 1965.

The design criteria document for Phase III WAFRAX was officially issued by the Atomic Energy Commission to Vitro for start of detail design. The design criteria document for Purex Shielded Analytical Laboratory was approved by RLOO-AEC.

FPCE Plant (Fission Product Conversion and Encapsulation)

All phases of this study requested last month by the Commission are proceeding on schedule. All drawings have been issued for comment and are scheduled for final reproduction during the first week of October. The document portion of the study is scheduled for completion in the following week.

b. Project Engineering

Project Cost Information (as of 9/13/64)	
Total Authorized Funds - 19 active projects	\$ 6 066 000
Total Cost-to-date	3 247 000
Commitments and Open Work Releases	713 000
Unencumbered Balance	2 106 000
Costs Charged to the above projects (8-23-64 to 9-13-64)	57 000

CAC-144 - Waste Fractionization - "B" Plant

Directive No. AEC-244, dated September 15, authorized \$100,000 for initiation of design.

5. Shops

Craft and equipment services were furnished the operating facilities as required, to assist in meeting processing schedules. In addition to accomplishments included with processing plant reports, the following completions were made in Shops work: 21 jumpers were fabricated, tested, and delivered to processing buildings; the Purex F-6 Demister was advanced to the 277-W Building mock-up cell for further work; the 24-C Machining Hood was re-located to the "A" Line in 234-5 Building; the HAPO I-B-1 Cask was loaded for off-site shipment and several plastic panels were fabricated for the 234-5 Building.

6. Power and Services

Steam and electrical services were provided without interruption to assure continuity of operation of production facilities. Renovation of the Purex high tank has been completed and the tank restored to normal service. This completes the high tank renovation program for CPD. Painting was completed on all 200-East and West general area steam transmission lines, and trap stations were upgraded.

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[Signature]
Manager - Facilities Engineering

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MONTHLY REPORTSEPTEMBER, 1964II. ACHIEVEMENTS (Continued)G. RESEARCH AND ENGINEERING OPERATION1. Purex Process Engineeringa. Critical Mass Control

Critical mass control in the Purex Plant has been augmented by the recent installation of two prototype systems. A plutonium neutron monitor has been installed on the HAF make-up tank, which receives plutonium rework, and the plutonium ion exchange backcycle line equipped with continuous plutonium gamma monitors. The new systems, in conjunction with the prototype IBXP neutron monitor, provides prompt in-line evidence of plutonium movement within the plant, especially noticeable during periods of high exposure plutonium processing or extensive plutonium rework.

b. Solvent Extraction

Process water quality has been monitored by uranium transfer rate measurements for over a year. Permanganate treatment of the water at the filter plant has been shown to be effective in removing organic material and maintaining water quality for stable operation of the uranium stripping columns. Recent laboratory studies indicate passing water through a bed of activated charcoal or adding charcoal to the alum water treatment step may be superior to permanganate treatment.

c. Uranium Product

The Purex uranium product zirconium-niobium specification for normal enrichment uranium was approximately doubled on a test basis to take advantage of the existing uranium oxide storage policy. The new specification will minimize the need for silica gel processing and will reduce the amounts of uranium that must be reworked. Long term use of the new specification is dependent on maintaining low radiation exposure levels in the uranium calcination plant.

d. Canyon Ventilation Filter

The differential pressure across the Purex Plant ventilation filter continues to oscillate with the trend indicating an increase in differential pressure. The differential pressure has been observed to increase from approximately six inches w.g. to as high as thirteen inches in an hour.

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In laboratory studies made with a sample of the crust from the plant filter, greater than sixty per cent of the ammonium nitrate in the crust was relocated by adjusting the relative humidity of the air to eighty-five per cent for three to four days.

2. Redox Process Engineering

a. Acid Deficient Precycle Flowsheet

Plant operation was continued using the modified acid deficient precycle flowsheet. The following benefits have been noted on this flowsheet:

1. Uranium product quality was improved. Decontamination was marginal on the acid flowsheet. Since the acid deficient flowsheet has been adopted, all uranium product batches have been well within specification.
2. The new flow pattern has reduced the potential for losses to waste and has resulted in a more stable operation.
3. The rate of solvent degradation was reduced. The acid flowsheet produced nitroso compounds which necessitated frequent organic washes.
4. Based on laboratory corrosion data, rates of corrosion of the HABS (D-14) backcycle concentrator have been reduced by a factor of about four.

b. HA Column Performance

In order to reduce the potential for flooding out the bottom of the column, the new HA Column was modified by introducing the organic into an enlarged conical section just above the packing support grating and the column was packed with Pall rings instead of Raschig rings. This column was installed in August. The new column was operated 18 consecutive days at an 8 ton per day rate before an acid flush was required. The best performance that had been achieved with the old HA Column was 15 days of continuous operation at a 5 ton per day rate.

3. Plutonium Process Engineering

a. Recovery

Three changes were made in the prototype slag and crucible thermo-syphon dissolver after the initial pluggage reported earlier for the month of July and August. A perforated tube was installed above the heating leg screen to permit the thermal circulation to continue in spite of large amounts of solids. A coarse screen was substituted for the fine screen in the heating leg, and a fine screen was installed in the lower cross piece. Thirty (30) cans had been charged to the dissolver following the changes when the first newly recommended 4 M HNO_3 flush was performed on the dissolver. Twenty (20) more cans had been charged when the second 4 M HNO_3 flush was required. However, slower reaction rates following

these charges indicated that the cans were not getting down into the dissolver as they should. The top cross piece "T" was removed, and the teflon liner was found in a bulged condition that prevented the charged cans from dropping all the way down into the dissolver. This bulged condition is believed to be due to overheating which occurred with the initial pluggage. The offending "T" was replaced and dissolving resumed. The reaction rates returned to the earlier experienced levels but quickly dropped off. Instrumentation indicated pluggage again after only 15 cans had been charged. After the 4 M HNO_3 flush, pluggage again occurred after only 4 cans had been charged. The bottom piece was removed and found to be plugged with solids upstream of the fine screen. This fine screen, which had a low free area has now been removed. Approximately 5 liters of solids were removed from the cross piece, and the plutonium content was estimated at less than 50 grams. Dissolving has not yet been resumed.

The prototype in-line plutonium monitor originally installed on the aqueous raffinate (CAW) stream was found unworkable on the CAW stream and has been moved to the stripped organic (CCW) stream. The monitor has worked quite well in the two weeks it has been in use on the CCW stream. The instrument is based on measuring an X-ray which is characteristic of plutonium.

The first americium has been removed from the Phase I (americium isolation, partial purification, and concentration) of the Americium Recovery Facility. Approximately 7.6 grams were removed on September 25, 1964, in 18 liters of solution. This amount has accumulated since start-up on August 6, 1964. However, not all available feed material from the Plutonium Reclamation Facility was processed through the Americium Recovery Facility due to early hydraulic difficulties between facilities and limited capacity of the flow-sheet. The plutonium concentration in the recovered americium solution was less than 0.01 g/l.

b. Incinerator

Solids have been found in the incinerator off-gas scrubber solution since initial operation. The solids have all been black and carbonaceous in appearance and slow to settle out. However, some gray solids were discovered last month on the tank bottom and sampled this month. The plutonium content of the solids was 0.16 per cent by weight, and the total volume of solids was estimated at approximately two liters. So far, laboratory attempts at dissolution of the solids have been unsuccessful.

4. Separations Chemistry Laboratory

a. Purex Process Improvement

Water Quality Studies

Additional tests were completed in an effort to define more closely the relationship between water quality and Purex extraction performance. Assuming that the uranium transfer rate (UTR) with distilled water to be optimum (100 per cent), other water samples were tested to determine the effectiveness of charcoal treatment (150 ppm) as follows:

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Raw Water	65 per cent
Clear-Well Water*	75 per cent
Raw water + Charcoal	89 per cent
Clear-well water + Charcoal	98 per cent
Distilled water	100 per cent

* Raw water + KMnO_4 + Alum + filtration

Infrared analyses of the charcoal extract were non-enlightening. Studies on water quality and de-ionizing methods are continuing.

b. Redox Process Improvement

Ceric Ion as Process Oxidant

Neptunium decontamination from fission products is most effectively carried out in an acid deficient cycle. However, the dichromate oxidation used to form the extractable neptunium⁺⁶ is not effective in an acid deficient system. Ammonium hexanitrate cerate was evaluated in the laboratory and found to be an excellent oxidant for neptunium in an acid deficient system even at ambient temperatures. This compound is very soluble in water and will permit the processing of neptunium through the Redox extraction columns on an acid deficient flowsheet during neptunium campaigns.

c. Miscellaneous Products Improvement

The "cold" run which started in August using yttrium as a stand-in for promethium was completed during the month. Essentially all of the yttrium was recovered at 98 per cent purity. The major metallic impurity was iron which amounted to 1.6 per cent. Total operating time for the "cold" run was 372 hours. Examination of the analyses of the column effluent streams indicates that operating time can be reduced to 30 to 40 hours per run by routing only the promethium band plus a portion of the preceding and trailing band to subsequent columns.

Piping changes have been made within the I-F cubicle to allow regeneration of a column or columns while eluting other columns, thus allowing more efficient use of the equipment. The silicone rubber gaskets between the columns and the column jackets are being replaced by rubber gaskets. The lead brick shielding is being installed in front of the valve rack. It is anticipated the "hot" run will start in October.

Americium Purification

Development work in Hanford Laboratories, which demonstrated the possibility of purifying americium in the same type chromatographic process as used for promethium, led to the decision to utilize the laboratory equipment in 222-S for demonstration of an americium purification process. Activities which will permit utilization of the chromatographic equipment for both promethium and americium purification have been started.

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d. Laboratory ImprovementChromatographic Method for TBP-DBBP

A gas chromatographic method was developed for TBP and DBBP in carbon tetrachloride. Separation was made on a 4' x 1/8" I.D. column of Apiezon "N" heated to 150 C. Under these conditions, TBP comes off the column two minutes after the DBBP begins elution. The peaks must be quantitatively resolved by subtracting the DBBP contribution to the TBP peak using the area under the dibutyl methyl phosphonate peak as reference. Concentrations of TBP and DBBP can be quantitatively measured down to 0.5 volume per cent while 0.2 volume per cent of either compound can be detected.

Atomic Absorption Development

Additional work with shop constructed hollow brass cathodes has satisfactorily demonstrated the feasibility of using these cathode sources in place of the more expensive glass-enclosed cathodes available on the open market. Lower levels of detection in ug/ml on cold synthetic samples have been demonstrated on impurities of interest as follows:

Ni - 0.05, Fe - 0.05, Cu - 0.02, Zn - 0.02, Pb - 0.20, Cd - 0.01, Ga - 0.05, Mg - 0.01, Na - 0.005, Ag - 0.02.

The flame area has been enclosed in a hood for contamination control and evaluation of performance on hot samples will be started in October.

Silicon Metal Analyses

The search for improved methods of analysis for silicon continued during the month. Experience with the colorimetric molybdate method has been discouraging because of non-reproducible results.

The X-ray fluorescence unit was tried for silicon detection using a chromium target tube and an ammonium dihydrogen phosphate grating with promising results. After extraction of the plutonium, a detection limit of 10 ug of Si was realized on the sample mount. This method appears to be promising and will be further developed.

Thermogravimetric Developments

The vertical tube thermobalance unit has been in routine use evaluating the reactivities of PuO₂ powders from Z Plant. Consideration is being given to the transfer of this equipment to the Redox Control Laboratory.

A small 1000° tube furnace has been purchased and it is being set up in a gloved box. This furnace will be equipped to perform pyrohydrolysis studies on fluorides as well as oxygen to metal ratios on metal oxides or on Pu-U mixed oxides for the Z Plant development program.

The uranium calciner and thermobalance has been revised and will be placed back in service. Approximately a month's work remains before the calcination reactivity studies can be completed satisfactorily.

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Multi-Channel Analyzer Development

The Multi-component Analytical Program (MAP) has been programmed on the 7090 computer. Analytical results of gamma energy standards will be submitted to this program for statistical analysis starting with the standards issued for the fourth calendar quarter of 1964. The program is available for other applications. A letter has been written to advise of this change and of the availability of the program.

Redox Analytical Laboratory has already started to record the results of the daily analysis of the "Response and Recovery" standard used to characterize the performance of the different combinations of detectors and pulse height analyzers. Sufficient data cards were submitted to provide a basis for statistical analysis and the results will be tabulated with the third quarter standards report.

Irradiated iron and titanium foils were sent to Geel, Belgium, as part of an intercalibration exchange of threshold monitor, activation product analysis by means of gamma energy analysis between HAPO and Euratom. A similar exchange with cobalt and nickel foils has been completed with excellent results.

5. Plutonium Chemistry Laboratory

a. CGC-912-W2 Column Problems

The difficulties experienced in stripping of the column with Na_2CO_3 and neutralizing the carbonate solution have been examined by simulating plant operation in laboratory batch tests. The lack of good material balance over the reacidification step has been attributed to the presence of an organic substance which is removed from the W-2 column organic phase due to its solubility in carbonate solution. This material then separates from the aqueous phase upon treatment with acid. This organic substance floats on the surface of the aqueous solution and extracts plutonium. Although this organic material constitutes considerably less than one per cent of the total solution, it extracts about $1/3$ of the plutonium by virtue of its high distribution coefficient $[\text{E}_d(\text{Pu}) \sim 10^3]$.

Although the organic substance has not been identified, it is reasonable to suspect it to be DBP, a degradation product of TBP, which has an appreciable solubility in water.

R. E. Tomlinson

Manager
Research and Engineering

liquid to slurry zone so rapidly that the liquid-slurry region is very short, thus producing a slurry buildup. It was thus concluded that the maximum feed concentration permitted by the calciner is 300 - 350 g/l.

A new 3000 watt Calrod unit was installed in the 18" furnace of the calciner. The existing 12" furnace was moved to the product end of the calciner and the new 18" unit placed at the feed-inlet end. The change will allow a greater heat flux to be maintained in the slurry zone of the calciner. It is now possible to increase the feed rate and lower the product volatility content.

b. Fluorination Reactivity Tests

Batch fluorination tests have established a SO_4/Pu ratio of 0.25 as the optimum additive ratio for maximum oxide fluorination. Tests were made on oxides having SO_4/Pu ratios of 0, 0.15, 0.25, and 0.5. The reactivity of the direct-calcined oxide varied from 70 to 100 per cent of that observed with Line oxide. The percentage of the oxide fluorinated varied from 40 to 80 per cent as determined by analysis.

c. Ion Exchange Resin Hazards

Several samples of Dowex 1 ion exchange resin were received from the vendor and were converted to the nitrate form.

The heats of combustion as a function of cross-linkage were measured in the Parr Bomb calorimeter. The results are tabulated below:

Resin	Heat of Combustion (Calories/Gram Dry Resin)*	
	Wet Drained Resin	Dried Resin
Dowex 1-X1	Would not ignite	6,450
1-X2	6,950	6,750
1-X4	7,350	7,100
1-X8	10,700	7,360
1-X10	9,125	7,180

(*) Average of at least two combustions.

At the present time it is difficult to account for the differences between the heats of combustion of the wet, drained resin and the same resin after it has been dried. Work will be continued to try and explain these discrepancies.

In earlier work it was found that Dowex 1 resin had about the same spontaneous ignition temperature as Permutit SK. When the newly received Dowex resins were tested, however, it was found that the nitrate form of the resin after being washed with water did not ignite at temperatures up to 230°C. The Permutit SK under similar treatment, on the other hand, ignites at about 200°C. The Dowex resin will now be tested after nitric acid washing to see if acid-washed resin also has a higher ignition than the Permutit acid-washed resin.

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d. Electrorefining Cells

The pure magnesia stirrers proved inferior to those made of Mix 41 ($MgO-MgTiO_3$). Four good-quality, crack-free, Mix 41 stirrers were made and will be available for the first refining tests. Stirrers of improved design are in process.

Improved heating cycles have been developed which will probably permit using the cells already produced. However, it has proved difficult to heat these cells without cracking them; hence a two-piece, bevelled, non-cemented cell has been designed which will withstand fairly rapid heating. The inner cup will be centered by fitting into the bevel of the outer crucible, and will be held down by the anode. Production is under way.

e. Fission Product Recovery

Recovery of aged promethium from the suspended sludge in TK-106-A continued during the month. Promethium-148 to promethium-147 ratios confirmed the average age of TK-106-A is in excess of two years. Even though cleanouts were made to minimize cross-contamination of aged promethium with green promethium from tank heels and line holdups, the equivalent age of the bulk of the recovered promethium was reduced to 600 days. The first 150 kilocuries was contaminated to an equivalent age of 450 days.

f. Technetium Recovery

A second technetium recovery campaign was undertaken in conjunction with a cesium loadout for Oak Ridge. The spare STT cask containing about 50 cubic feet of strong base anion resin was again operated in series with the cesium casks. After loading, the resin bed was washed with four column volumes of 1.0 M sodium hydroxide, 1.5 column volumes of 0.25 M nitric acid, and eluted with seven column volumes of 6 M nitric acid. During the elution, the nitric acid was continuously concentrated and destroyed with sugar in a concentrator. Stream flows and concentrator operations were adjusted so as to maintain a constant volume of 6 M nitric acid in the concentrator during the denitration. A sugar efficiency of 40 moles of acid destroyed per mole of sugar was measured with sixty per cent of the destroyed acid appearing in the condensate after passage through a single condenser.

g. Thorium Processing

Preparations for the six ton thorium process test in Purex are well along in terms of flowsheet definition and testing, product form specifications and handling, analytical methods development and definition of canyon routing needs. Laboratory and Semisworks studies indicate, however, that thorium dissolution in a nonrecirculating system is very slow. Means for improving dissolution of the six ton test material in the existing pot dissolver are under review.

Manager
Research and Engineering

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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>8-30-64</u>	<u>9-27-64</u>	<u>8-30-64</u>	<u>9-27-64</u>	<u>8-30-64</u>	<u>9-27-64</u>
General Manager's Group	9	9	1	1	10	10
Financial	16	16	28	28	44	44
Employee Relations	3	4	1	1	4	5
Research & Engineering	68	65	27	28	95	93
Facilities Engineering	100	97	214	207	314	304
Production	6	5	3	3	9	8
Redox	60	62	224	223	284	285
Purex	72	70	271	263	343	333
Weapons Manufacturing	<u>62</u>	<u>60</u>	<u>267</u>	<u>263</u>	<u>329</u>	<u>323</u>
Total	<u>396</u>	<u>388</u>	<u>1036</u>	<u>1017</u>	<u>1432</u>	<u>1405</u>

B. PERSONNEL CHANGES

P. H. Reinker, General Manager - Chemical Processing Department, transferred to Fuel Recovery Study Operation, APED, effective September 1, 1964.

Effective September 1, 1964, J. H. Warren transferred from Manager - Production, to General Manager - Chemical Processing Department.

Effective September 1, 1964, H. B. Lindberg transferred from Relations and Occupational Health Operation to the position Specialist - Communications and Community Relations.

W. S. Frank, Manager - Research Engineering, transferred to Electronics Component Division as General Manager - Electronics Specialist Capacitor Products Section, Irmo, S.C., effective September 14, 1964.

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C. TRIPS

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To Other GE Components</u>		
M. H. Curtis	Vallecitos Pleasanton, Calif.	Discuss mixed oxide technology. (9/9/64)
J. H. Warren H. P. Shaw	New York, N.Y.	Manufacturing and Engineering Services. (9/15,16/64)
M. D. Alford	Pleasanton, Calif.	Fission products. (9/24,25/64)
E. M. Johnston	King of Prussia, Penna.	Packaging seminar. (9/29,30/64)
<u>To AEC and Other AEC Contractors</u>		
H. T. Fullam	Oak Ridge National Lab. Oak Ridge, Tennessee	Solgel process. (9/15/64)
	Argonne National Lab. Lemont, Ill.	Fluoride volatility. High temperature reactor fuels. (9/16,17/64)
	Mounds Laboratory Miamiburg, Ohio	Plasma chemistry. Oxide technology. (9/18/64)
A. E. Smith L. L. McGregor	Bendix Corp. Kansas City, Missouri	Attend IMOG Steering Committee meeting. (9/22,23/64)
<u>To General Industry</u>		
H. D. Haberman	Pacific Steel Products, Inc. Seattle, Wash.	Testing of Loading Station Equipment. (9/22,23/64)
<u>To Conventions and General Meetings</u>		
G. C. Oberg M. D. Alford	Las Vegas, Nevada	Attend 54th National Meeting of American Institute of Chemical Engineering. (9/21-23/64)

D. VISITORS

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From Other GE Components</u>		
P. C. Bisonette	Idaho Falls, Ida.	Fission Products. (9/29/64)
<u>From AEC and Other AEC Contractors</u>		
W. A. Morrill	Bureau of Budget Washington, D.C.	Tour of Purex, B Canyon, SSW and Waste Facilities. (9/9/64)
J. D. Yates	Division of Military Application,	" "
T. M. Yakimchick	AEC Division of Production	" "
J. D. Moseley	Dow Chemical Co. Rocky Flats Plant Denver, Colorado	Plutonium nitrate shipper- receiver demonstration. (9/21-25/64)
<u>From General Industry</u>		
M. F. Ohman	Dow Chemical Co.	Plant tour of Purex and
I. B. Venable	Midland, Michigan	B Plant. (9/3/64)
H. D. Doan, President	Dow Chemical Co.	Tour of Purex and B
A. P. Beutel, Vice Pres.	Midland, Michigan	Plant. (9/11/64)
W. J. Rave	" "	
M. F. Ohman	" "	
I. B. Venable	" "	
W. K. MacCready, Consultant	" "	
C. R. Maul	Stearns-Rogers, Denver, Colorado	Fabrication of Pulse Generators. (9/18/64)
J. W. Dickinson	Linde Co. Seattle, Wash.	Welding Equipment In- stallation. (9/21/64)
J. E. McCune	HUICO, Pasco, Wash.	Welding Equipment.
J. W. Uhler	" "	(9/23/64)
F. M. Cochran	University Industrial Co.	" "
J. V. Pearson		
S. Davis	United Nuclear White Plains, N.Y.	Fission Product Processes. (9/28-29/64)

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D. VISITORS (Continued)

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From General Industry (Continued)</u>		
A. J. Cassell	Monsanto Chemical Co. Dayton, Ohio	Fission Product Processes. (9/28,29/64)
P. Crutchfield	Martin-Marietta Co. Baltimore, Md.	Purex and Fission Products. (9/29/64)
<u>From Other Government and Foreign Agencies</u>		
J. Klitgaard	Eurochemic Mol, Belgium	Separations processing, fission product, waste management programs. (9/22-24/64)

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IV. SAFETY AND SECURITY

<u>Operation</u>	<u>General</u>	<u>Purex</u>	<u>WMO</u>	<u>FEO</u>	<u>Redox</u>	<u>R&E</u>	<u>Finance</u>	<u>Prod.</u>	<u>Empl. Rel.</u>	<u>Total</u>	<u>YTD</u>
Dis. Injuries										0	0
Ser. Accidents										0	4
Med. Treat. Inj.		13	7	11	4				1	36	368
Rad. Occurrences		2	4		6					12	93
Contam. Wds.					2					2	15
New Deposition Cases			*2							2	15
Fires					**1					1	10
Security Violations		1	1			1				3	22

*Both caused by inhalation occurring 6-22-64, 1% MPBB or less.

**Fire 64-10, September 18. An ash tray was emptied into a waste container with a plastic liner, igniting waste paper.

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V. REPORTS

A. PREPARED AND ISSUED

- HW-69730 REV, Unclassified, "Critical Mass Control Specification - Storage of Plutonium in Room 172, 234-5 Building", dated September 14, 1964, by R. J. Sloat.
- HW-81242, Secret AWD, "Button Specifications", dated March 9, 1964, by R. E. Van der Cook.
- HW-82294 L7, Secret, "Button Purity Data - Letter No. 7", dated September 3, 1964, by R. J. Sloat.
- HW-82294 L8, Secret, "Button Purity Data - Letter No. 8", dated September 17, 1964, by R. J. Sloat.
- HW-83600, Unclassified, "Design Criteria - Purex Analytical Laboratory Additions", dated August 3, 1964, by L. R. Michels.
- HW-83636, Secret, "200 East Area Water Study", dated August 11, 1964, by J. W. Barnes.
- HW-83735, Secret AWD, "Proposal: Direct Ingoting of Unpickled Buttons for Economic and Product Quality Gains", dated September 21, 1964, by R. H. Bond.
- HW-83736, Secret AWD, "Preparation of Delta-Stabilized Plutonium by Direct Alloy Blend Techniques", dated September 21, 1964, by R. H. Bond.
- HW-83772, Official Use Only, "Project Proposal, Rev. No. 1 - Special Plutonium Preparation Facility - Z Plant (Project CAC-128)", dated September 11, 1964, by C. A. Lyneis.
- HW-83774, Secret AWD, "Plutonium Ignition", dated August 26, 1964, by A. E. Smith.
- HW-83802, Secret AWD, "Addition to FPT 64-25 - Alternate Feed Preparation Methods", dated August 26, 1964, by S. T. Field.
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B. PREPARED FOR SIGNATURE AND ISSUANCE

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DECLASSIFIEDCHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORTSEPTEMBER 1964VI. 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.

INVENTORTITLE

Rudolph DeJong, Facilities Engineering

A Process Solution Control System Providing Criticality Safeguards in Nuclear Vessels and To Accurately Regulate Solution Transfer Flow Rates Between Related Nuclear Processing Equipment.

Edward F. Stell, Facilities Engineering

Sampling of Bulk Solids In Granular and Powdered Form.

R. H. Bond, Research & Engineering

Direct Ingoting of Unpickled Plutonium Metal Buttons.

General Manager
Chemical Processing Department~~SECRET~~

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