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MONTHLY REPORT
FOR**

HW--82526

DE93 009175

By Authority of CG-PRZ
R. Steen 8-26-92
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Verified By PM Eick 9-2-92

MAY, 1964

Compiled By
OPERATION MANAGERS

June 22, 1964

**HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON**Work performed under Contract No. AT(45-1)-1350 between
the Atomic Energy Commission and General Electric Company.Classification reviewed for d
[redacted]
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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

MAY, 1964

I. SUMMARY

Production through May, as compared with the HAPO Production Forecast (HW-81863), is summarized below:

	<u>May</u>	<u>Fiscal Year</u> <u>To Date</u>
Separated plutonium nitrate	70	97
Separated uranium nitrate	78	98
Uranium oxide	72	98
Plutonium metal buttons	119	104
Fabricated parts	116	99

May production was below forecast for all products except plutonium metal buttons and fabricated parts. The low output of separated plutonium nitrate and separated uranium nitrate resulted from a Purex shutdown, which was caused by failure of the waste concentrator. Uranium oxide production was curtailed early in the month by a lack of storage containers.

Purex processing was continuous at 27.5 tons per day until May 23, when the plant was shut down to replace the F-6 waste concentrator which had developed a leak. Processing was resumed on May 30. During the operating period, all uranium product met specifications. The plutonium product also met specifications except for a brief period when maintenance was being performed on the plutonium ion exchange unit.

The differential pressure across the fore-filter in the Purex ventilation exhaust system remained unchanged during May. Laboratory studies on a filter model indicated that the plugging phenomenon, experienced during April, arose from humidity changes. Changes in humidity of the exhaust air cause agglomeration and bridging of the ammonium nitrate, which has accumulated in the filter media. Investigation of the problem is continuing.

Two neptunium purification runs were completed in Purex, yielding approximately 2.1 Kgs.

Four STT casks, loaded with 211,000 curies of cesium-137, were released for shipment on May 4. The HAPO II-1 cask, loaded with 120,000 curies of strontium-90, was released for shipment on May 18.

Redox operations were plagued all month with poor product recovery and fission product contamination of the uranium product stream. For the first time in many years, zirconium-niobium contamination of the final uranium product became a problem. The cause is not known but it is believed to be related to extremely difficult and erratic acid control in the solvent extraction columns. Additional processing through the silica gel facility was necessary to bring the uranium product within acceptable specifications.

The loading of normal uranium oxide unmilled powder into 55-gallon drums was started May 6, 1964. Only minor difficulties were encountered during the initial phase of the drumming operation. These were resolved and the loading is now proceeding satisfactorily.

Plutonium waste processing was started in the Plutonium Reclamation Facility on May 6, 1964. The first feed consisted of leach solutions from the incinerator and waste solutions from the laboratory, followed by oxalate supernatants and solutions of plutonium oxides from burned skulls. Generally, the new equipment performed satisfactorily.

A preliminary project proposal was transmitted to RLOO-AEC on May 12 which requested authorization for design of B Plant Waste Fractionization Facilities, procurement of engineered equipment and materials, and initiation of construction.

P. H. Reinken

General Manager
Chemical Processing Department

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

MAY 1964

II. ACHIEVEMENTS

A. PRODUCTION OPERATION

1. Production Statistics

a. <u>Percent of Forecast⁽¹⁾ Achieved</u>	<u>May</u>	<u>Fiscal Year to Date</u>
Separated plutonium nitrate	70	97
Separated uranium nitrate	78	98
Uranium Oxide	72	98
Plutonium metal buttons	119	104
Fabricated parts	116	99
b. <u>Purex</u>	<u>May</u>	<u>April</u>
Uranium nitrate produced (tons)	471	298
Average production rate during operation (T/D)	25	26
Total waste loss (%)		
Plutonium	0.41	0.33
Uranium	0.23	0.19
On-line efficiency (%)	72	66
c. <u>Redox</u>		
Uranium nitrate produced (tons)	175	89
Average production rate during operation (T/D)	8	8
Total waste loss (%)		
Plutonium	0.32	0.40
Uranium	0.37	0.29
On-line efficiency (%)	67	37
d. <u>Uranium Reduction (tons)</u>		
Normal UO ₃ loaded	571	300
Enriched UO ₃ loaded	141	71
Normal UO ₃ approved for shipment	0	400
Enriched UO ₃ approved for shipment	101	101
Normal UO ₃ shipped	0	400
Enriched UO ₃ shipped	101	101
Normal UNH backlog	172	272
Enriched UNH backlog	114	80

(1) HW-81863, HAP0 PRODUCTION FORECAST

e. Plutonium Metal Processing

	<u>May</u>	<u>April</u>
Reduction yield (%)	97	96
Product recovery output (Kgs)	53	38
Product recovery backlog (Kgs)	1 332	1 288
Waste disposal (grams)	939	1 729

f. Power

	<u>200-East</u>	<u>200-West</u>
Raw water pumped (gpm)	9 571	5 063
Filtered water pumped (gpm)	1 126	1 298
Maximum steam generated (lbs./hr.)	220 000	128 000
Average steam generated (lbs./hr.)	175 000	95 000
Total steam generated (M lbs.)	130 324	70 615
Coal consumed (tons)	6 597	3 643

May production was below forecast for all products except plutonium metal buttons and fabricated parts. The low output of separated plutonium nitrate and separated uranium nitrate resulted from a Purex shutdown, which was caused by failure of the waste concentrator. Uranium oxide production was curtailed early in the month by a lack of storage containers.

J. H. Warner
Manager, Production

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2. FISSION PRODUCT DATA

	<u>PUREX*</u> <u>RECOVERY</u>	<u>244-CR*</u> <u>INVENTORY</u>	<u>B-CANYON*</u> <u>INVENTORY</u>	<u>SEMIWORKS</u> <u>PRODUCTION</u>	<u>PRODUCT</u> <u>INVENTORY</u>	<u>PRODUCT</u> <u>IN CASK</u>	<u>PRODUCT</u> <u>SHIPPED</u>	<u>CUSTOMER</u>	<u>REMARKS</u>
Sr-90 (Kilocuries)	56	1310	950	--	2110**	--	120	ORL	HAPO II-1 5-18-64
Cs-137 (Kilocuries)							210	ORL	STT's 5-4-64
Ce-144 (Kilocuries)									

* Estimated figures based on Cs. calculations.

** Does not include 140 Kilocuries for rework.

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II. ACHIEVEMENTS (Continued)

B. PUREX OPERATION

1. Operating Continuity

Purex processing was continuous at a 3.3 capacity factor until May 23, 1964 when the plant was shut down to replace a failed first cycle acid waste concentrator (F-6). Production resumed May 30, 1964 at a 3.3 capacity factor.

Two neptunium purification runs were completed.

The HAPO II-1 cask, loaded with approximately 120,000 curies of Strontium-90, was released for shipment to Oak Ridge on May 18, 1964.

Four STT's, loaded with approximately 211,000 curies of Cesium-137, were released for shipment to Oak Ridge on May 4, 1964.

2. Processing Operation

All uranium product met specifications. Plutonium product met specifications except for a brief period in which maintenance work was performed on the plutonium ion exchange unit.

Seventeen sulfate runs for fission product recovery were completed in the Purex Plant Head End facilities.

Eight experimental peroxyacetate cerium-rare-earth separation runs were completed in B Plant. Initial data indicate recovery of 75 percent of the Promethium-147.

One thousand six hundred and seventy kilocuries of strontium product, recovered in last December's refining run, received additional treatment to meet calcium specifications. Two hundred kilocuries of Strontium-90 rework material were reprocessed to remove calcium and to make the product acceptable for the next purification run.

Sluicing of the 103-A Waste Tank to remove the sodium from the sludge layer continued uninterrupted on a day shift basis.

3. Equipment Experience

The canyon ventilation filter performed satisfactorily during the month.

The first cycle acid waste concentrator (F-6) failed May 23, 1964 when a hole developed in the west tube bundle canister. The used F-11 concentrator, which is not required for present production, was installed as a replacement.

The B-2 silver reactor was flushed and regenerated.

A failed dissolver tower from the B-3 position was loaded and shipped to Waste Handling and Decontamination Operation for possible reclamation.

Fifteen obsolete jumpers were removed from the 151 ER Diversion Box and placed in a concrete box for burial.

4. Radiation Experience

I^{131} emission was normal for the activities conducted during the month.

5. Analytical

An improved analytical method for measuring strontium was introduced in the laboratory as a routine procedure to meet the requirements of fission product recovery program.

Manager-Purex

WM Harty:AJW:gt

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II. ACHIEVEMENTS (Continued)

C. REDOX OPERATION

1. Operating Continuity

The Redox plant operated on a seven-day-per-week schedule during the month. Difficulties experienced with high product waste solutions, poor decontamination of the uranium product and repairs to cell equipment limited virgin E-metal processing time to approximately 67 percent of the time available, and only 95 percent of the expected production was achieved.

The Uranium Oxide plant operated at satisfactory rates. However, the production of depleted UO_3 was influenced early in the month by a shortage of storage containers.

2. Processing Operations

a. Redox Processing

Virgin feed processing was conducted approximately 67 percent of the time available. The remaining time was required to replace or repair failed equipment and to correct processing difficulties associated with column operation.

Poor product recovery and fission product contamination of the uranium product stream plagued the operation all month. For the first time in many years, Zirconium-Niobium contamination of the final uranium product became a problem for reasons unknown, but believed related to extremely difficult and erratic acid control in the columns. Additional processing through the silica gel facility was necessary to bring the uranium product within acceptable fission product specifications.

Difficulties with column acid control and/or entrainment of product in the overheads from the head-end oxidizer-concentrator are believed to be responsible for a sudden sharp upsurge in product losses to waste encountered this month. With only one operable tube bundle in the D-12 waste concentrator, clean-cut waste segregation was not possible, and it was necessary to shut down several times during the month for rework.

Process problems were further complicated on May 22 when the ferrous ion was omitted from a chemical make-up solution, and despite standard checks and procedures was subsequently used in the 1B partition column. The resultant failure of the uranium-plutonium partition, produced plutonium-contaminated uranium which required reprocessing through the partition and final cycles.

b. Uranium Oxide Processing

The loading of normal uranium oxide unmilled powder into 55-gallon drums was started on 5-6-64. Minor difficulties encountered during the initial phase of the drumming operation have been resolved and the operation is now satisfactory.

3. Mechanical Experience

a. Redox Plant

Numerous equipment failures were encountered this month which reduced the mechanical efficiency to approximately 84 percent. The major equipment pieces which failed and required replacement were: 1) the F-8 precycle feed pump; 2) the D-14 backcycle pump which required three replacements before satisfactory operation was obtained. In addition, process shutdowns were taken to: 1) repair leaking flange gaskets on the tube bundles of the G-3 hexone still and the D-12 waste concentrator; 2) unplug the drain line from the 1A precycle column.

Two attempts to repair the leaking flange gasket on the west tube bundle of the D-12 waste concentrator, mentioned above, were unsuccessful because the tube bundle could not be properly sealed. Replacement efforts were subsequently abandoned pending fabrication of a shorter coil-type tube bundle. Operations have continued using only one tube bundle, but with a decrease in capacity.

4. Waste Handling and Decontamination

Equipment valued at approximately \$361,000 was received from customers for decontamination, repair, inspection or burial during the month. Equipment valued at approximately \$64,000 was returned to customers, representing a savings of approximately \$4,000 based on the cost of new equipment.

5. Radiation Experience

Because of the increase in radioactivity detected in one of the laterals under the 107-SX waste storage tank during March, the process waste routing from the Redox plant was changed from the 107-SX to the 114-SX tank on 4-30-64. During May the radioactivity

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increased at an average daily rate of about 1600 counts per minute, reaching approximately 150,000 counts per minute on 5-31. There has been no change, however, in the "geometry" of the radiation in the lateral in which the radioactivity is being picked up; the peak activity is found in a band about one foot wide. The whole problem is being followed carefully and plans are being made to transfer the waste to another tank should it become necessary.

6. Analytical Experience

The Redox Analytical Laboratory provided: 1) special iron, aluminum nitrate nonahydrate, and plutonium analyses to determine the source of waste losses in the Redox plant's 1B partition column; 2) nitrogen determinations to evaluate for nitrate removal in synthetic waste solutions; 3) plutonium and uranium analyses in support of a program to define the factors critical to the dissolution of zircaloy-clad fuel elements; 4) gamma isotopic energy analyses of off-site flux monitors as part of the AEC Reactor Materials Testing Program; 5) silica, iron, and organic content of material removed from a reactor cooling rod strainer.

for *CB Foster*
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 carried out without interruption during the month. The preparation of unfabricated plutonium was also without significant interruption and normal feed supplies were depleted at month-end. Startup of the new reclamation facility was accomplished on May 6 and subsequent activity was satisfactory. Incinerator operation was interrupted by a one-week shutdown for heater replacement and by manpower priorities. The oxide dissolvers were operated only to the extent that the resultant solution could be consumed by other operations.

2. Processing Operations

a. Plutonium Fabrication

Information on plutonium fabrication activities is presented in Document HW-82674 (Atomic Weapon Data).

b. Plutonium Reduction

Scrap powders which had accumulated on the line during the past two months were processed in Hood 9-A to buttons for storage and future recovery. The hood is to be cleaned and shutdown for planned renovation and overhaul.

The last phase of the Dow shipper-receiver experiment was completed during May. The plutonium nitrate returned to HAPO from Dow, Rocky Flats Plant, was sampled, weighed and returned to the process.

c. Plutonium Reclamation

The new plutonium reclamation facility (Project CAC-880) started processing radioactive wastes on May 6, 1964. The first feed consisted of leach solutions from the incinerator and waste solutions from the laboratory. These were followed by oxalate supernates from regular button line production activity and by solutions of plutonium oxides from burned skulls. On May 15, the first plutonium nitrate was delivered to the button line. On May 18, slag and crucible fragments were charged to the dissolvers.

c. Plutonium Reclamation (Continued)

Operation of all this new equipment has been generally satisfactory. Chief problems relate to dissolver line plugging and control of flooding in the stripping column.

Recovery for the month from the new facility consisted of 25 kilograms of plutonium delivered to the button line. Waste losses were approximately one-half of one percent.

A total of 78 boxes of waste was processed through the incinerator during May.

The oxide dissolvers produced 26 kilograms of plutonium in solutions suitable for button line feed. Another 48 kilograms were dissolved but required processing through the reclamation facility prior to use as button line feed.

3. Mechanical Performance

Equipment performance was satisfactory in all areas of the plant except for continued fluorinator vacuum problems in the button line and the failure of the off-gas heater in the incinerator.

A complete check-out of all piping and the tightening of all hood panels was performed in the new reclamation facility.

The experimental use of a modified Delcon Ultrasonic Translator for leak detection on pipe and hood systems proved to be effective. Procedures have been instituted to check and correct leaks in the nitrogen and dry air systems, and to check in-leakage in the hoods supplied with nitrogen or dry air.

4. Radiation Experience

Radiation and contamination control statistics for May reveal satisfactory control.

Two cases of potential plutonium deposition were experienced when operators received finger cuts during the handling of plutonium turnings in the fabrication hoods. Excision of the wounds was effective in both instances and the whole-body counter revealed 1% MPBB in one case and less than detectable in the other.

5. Analytical Experience

Number of Samples Received	3,371
Number of Determinations	22,889

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5. Analytical Experience (Continued)

The startup of the new plutonium reclamation facility resulted in a significant increase in work in the laboratory. Technical help was provided on shifts to solve problems as they arose during the critical first two weeks of the startup.

WJ Gartin
Manager
Weapons Manufacturing

WJ Gartin:csj

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

E. FINANCIAL OPERATION

1. Production Cost Accounting

Issuance of FY 1965-66 budget data for CPD internal management use was completed in May.

RLOO-AEC was requested to allocate \$325,000 of additional funds for the Isotope Inventory balance. Notice from ORNL that no further Sr-90 shipments would be accepted in FY 1964 resulted in the need for this allocation.

Annual expenditures by CPD for purchase and installation of valves were estimated in response to a GAO request.

CPD's investment in inventories at April 30, 1964, compared with budgeted amounts, is as follows:

(in thousands)	<u>Balance 4-30-64</u>	<u>Control Allocation</u>	<u>Surplus (Deficit)</u>
<u>Inventories</u>			
Essential Materials	\$ 761	\$ 833	\$ 72
Spare Parts & Standby	1 543	1 615	72
Special Materials	134	103	(31)
Yttrium	<u>144</u>	<u>150</u>	<u>6</u>
Gross Inventories	<u>2 582</u>	<u>2 701</u>	<u>119</u>
<u>Reserves</u>			
Essential Materials	49	59	(10)
Spare Parts & Standby	424	404	20
Yttrium	<u>144</u>	<u>150</u>	<u>(6)</u>
Total Reserves	<u>617</u>	<u>613</u>	<u>4</u>
<u>Net Investment</u>	<u>\$1 965</u>	<u>\$2 088</u>	<u>\$123</u>

2. General Accounting

As of April 30, eighteen active projects had incurred costs of \$2,937,478 against authorized funds of \$4,044,800. Outstanding commitments totaled \$173,335.

During May one directive and one work authority were received from the AEC: Directive No. HW-555, Project CGC-132, Prototype and Mockup Waste Management Packaging Equipment, authorized funds \$290,000; Work Authority No. 4, Project CAC-970, Purex Essential Waste Routing System, for decrease in funds to new total of \$19,000.

Three new appropriation requests totaling \$17,600 were authorized during the month. In addition, the plants were notified to proceed with four appropriation requests totaling \$166,850 which had been held up due to the lack of O2 Equipment funds. The release of these four appropriation requests was made possible by the AEC approving our request for an additional \$270,000 of Equipment funds.

RA Connell
Manager - Finance

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (continued)

F. FACILITIES ENGINEERING OPERATION

1. Purex

a. Process Design Engineering

Increased Processing Flexibility - Purex

Phase I design criteria was distributed following Atomic Energy Commission approval.

Phase II design criteria is in final draft stage, with incorporation of comments received. The 3WB storage provisions are to be included. Design is being revised on the 2AF Tank and the proposed canyon sump.

Design problems have been discussed with Vitro Engineering Corporation, including the dumping of NRD fuels into the Purex multipurpose dissolver. A testing program will be carried out to obtain data needed to finalize the design.

Multipurpose Dissolver - Purex

Drawings of the mock-up and associated equipment for the initial phase of the dump test program were issued and fabrication has been started in the plant shop.

Sample Storage Area - Purex

Plans for this area adjacent to analytical laboratories were completed and are now being estimated by CPFF.

Remote Gaskets

Design was completed and issued for a new remote gasket gage ring assembly for the ammonia scrubbers.

pH Sampler

The study for the Analytical Laboratories to sample fission product solutions was completed and components are being made for a prototype.

"N" Cell

A full-scale mock-up is being made to test "N" Cell XA Column with a 4-inch rupture disc. Water foam tests were completed successfully in a large excess hood.

E-6 Neutron Monitor

Fabrication of the E-6 neutron monitor "pig" was completed. Two BF_3 tubes are expected from 300 Area Shops so that the monitor cell jumper will be completed in mid-June.

Ventilation Filter - Purex

The possible source of ammonium nitrate linked to the exhaust filter was investigated. The most probable source was attributed to stripping from the scrubber drain liquid by the air flow through the drain header due to differences in cell absolute pressures. Recommended corrections have been issued.

b. Project Engineering

Authorization to design a shielded laboratory for analysis of high-level activity waste samples will be requested through a preliminary project proposal being prepared.

c. Manufacturing Engineering

F6 Concentrator - TV Observation

Closed circuit television was used to examine the dunnage and the interior of the F6 Concentrator tube bundle wells. Leakage was observed under the west tube bundle well. A relatively small amount of sludge was observed in the wells and cross-over piping. The welds on the cross-over piping appeared to be in good condition, with some parent metal attack making the welds more predominant. In the west cross-over piping some pitting was observed on the top interior. It looked like cavitation. On the exterior of the vessel all dunnage was inspected and appeared to be in good condition with no loss of integrity. A follow-up examination, using the canyon crane optics, located a 5" x 8" hole in the west tube bundle well test plate. Metal attack in the weld-heat zone at the support ribs was noted.

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2. Redox

a. Process Design Engineering

Sand Filter, Stack & Dissolver Off-gas Monitors

Installation of the Redox sand filter stack and dissolver off-gas monitors was started on May 4, and is approximately 50 percent completed. Final completion is anticipated for June 19.

Bremsstrahlung Detection System

Installation of the Bremsstrahlung detection system for the promethium purification facility has been stopped until further progress is made on the facility, for which completion is expected by the end of June.

Redox Fire Protection Improvement

This engineering study was completed and forwarded to Redox Operation.

"D" Cell

Drawings have been issued for comment on the replacement steam lines into "D" Cell at the D-12 Vessel. Walls of the sample gallery will be core drilled for the lines to replace the failed piping.

3. Weapons

a. Process Design Engineering

Existing Button Line

Up-dating of existing drawings, drawing lists, and active drawings continues. Sixteen (16) drafting instructions were completed which included seventeen (17) existing drawings and the origination of thirteen (13) new drawings. Approximately 68 drawings were reviewed and voided from the active files. To date a total of 1,418 drawings have been voided.

Draft of an "Off-gas Scrubber Engineering Study" was made and recommends removal of the existing jet exhaust in glove boxes H-9A and HC-9B and installation, in a new separate glove box, of a disc and donut KOH scrubber. The primary reason is to eliminate the hazard associated with a potential water back-up into the fluorinator. Secondary benefits are the reduction of the D6 drain system load by about 50 percent, and removal of the jet high-pressure water supply line from the glove box interior.

Plutonium Reclamation Facility

A very successful "hot" start-up was made on May 6. All process cell equipment has demonstrated good operation performance and no major problems have been encountered. The fabrication oil wash column will be started up at a later date. Equipment is now being installed in the Miscellaneous Treatment Room - Glove Box 2, for skull dissolving; detail designs were completed on Glove Box 3 for ash and button dissolving. A status report was issued on the ventilation system of the 236-Z Building and recommends that air not be supplied directly to the cell and the exhaust capacity of Rooms 41 and 43 be increased.

Additional Controlled Temperature Glove Boxes-Inspection Facility

An engineering study to determine the scope of work necessary to place existing glove boxes HI-66-G and HI-67-G on controlled temperature with existing refrigeration equipment has been completed. Four (4) engineering study drawings have been completed for this work. A study on the feasibility of extending refrigeration to additional glove boxes has been discontinued.

General Purpose Glove Box - Euratom Order

Fabrication of the glove box is in progress. Most of the equipment is on order.

Slag and Crucible Grinder

An order has been placed for a new jaw crusher. This crusher will be installed in the new replacement hood for HC-17. Criteria work has been started on the equipment to be installed in the new hood such as conveyor, damper, and canner.

Sample Storage - Analytical Laboratory

A proposal is being submitted for storing of approximately 2,000 samples. Design will proceed after criticality review and general acceptance of proposal.

Dry Air System

Plans have been completed for installation of a cooler for "D" dryer and the additional instrumentation to permit better monitoring and control of the dry air system. This design will satisfy the recommendations as outlined in document HW-79276 - "Recommended Improvements to the Dry Air System-234-5 Building". A scan to locate leaks in the dry air supply system has been completed. The scan was made with an ultrasonic translator - Model 118.

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An engineering study of glove box dew points, glove box dry air distribution, glove box in-leakage rates, and dry air requirements for the 234-5 Building has been completed. A rough draft of a recommendation report based on the results of this study has been completed.

Neutron Counters

Three (3) process monitor counters were modified to up-date the circuitry. Observing these counters in use in the Waste Treatment Facility shows satisfactory results.

Loading Dock & Storage

Vitro has completed detail design of a loading dock for the 232-Z Building. They have also completed design for an additional storage area for the 234-5 Building office annex.

b. Project Engineering

Metal Stabilization Facility - 234-5 Building (CGC-987-R#1)

A project proposal revision requesting total project funds for the "Z" Plant Isostatic Press was approved by RLOO-AEC on May 21.

Mechanical drawings were submitted by Vitro to the Company for comment. The press vendor will re-submit the press yoke to the Company for approval. The press yoke was re-designed on the basis of subcontractor's suggestions.

Additional Plutonium Casting Facilities - RMA Line - 234-5 Building (CAC-110-R#1)

With mutual agreement of the Commission, preparation of a project proposal revision to abandon this project has been initiated.

Special Plutonium Preparation Facilities - "Z" Plant (CAC-138)

This project proposal, requesting \$410,000 for facilities for preparation of special unclassified plutonium compounds, was approved by RLOO-AEC on May 21; however funds are not immediately available.

c. Manufacturing Engineering

Final Inspection Work Cycle

The study to determine present inspection cycle time and fixed and variable factors affecting the cycle has been completed. The information will be used as a basis of measurement to better evaluate areas of potential improvement. Recommendations were made which will reduce handling and inspection time and improve work-load capacity.

4. General

a. Process Design Engineering

Waste Management Integration with Fission Product Purification

The concept of the Hanford Isotopes Production Plant has changed from a plant which would receive crude feeds from Waste Management processes to that of a plant which is largely dependent on Waste Management processes and equipment as a source of supply of purified strontium, cesium, and cerium and of crude promethium - rare earths. As a result of this increased dependence, the Commission is being requested to authorize a study of, and preparation of design criteria for, the inter-ties and equipment required to effect fission product purification in 221-B Building. Justification for making the study at this time is as follows: (1) the over-all cost of the fission product purification equipment can be reduced by early identification of inter-ties that should be installed during Phase III construction; and (2) more firm estimates of the capital and incremental operating cost for fission product justification in 221-B can be made once the study is completed. As a supporting activity, Purex Process Engineering has been requested to provide a flowsheet for these purification functions. In particular, they have been requested to reduce the Na-to-Cs ratio from 8:1 to 1:8.

Bedrock Waste Caverns

A study to determine feasibility of storing high-level wastes in underground caverns has been undertaken. Data and drawings are being prepared for preliminary cost evaluation purposes prior to initiation of a formal R and D program.

Sludge Removal and Waste Transfer

Design criteria was transmitted to the Commission for approval on May 1.

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NPR Cars and Casks

Preliminary procurement inquiries on the special NPR Cask Cars (two casks per car) for on-site shipment, indicate a cost of approximately \$140,000 per car. The use of smaller cars is being investigated to reduce over-all costs.

b. Project Engineering

Waste Management Packaging Equipment - Prototype & Mock-up (CGC-132)

This project to procure, mock-up, and test production-scale waste packaging equipment, was authorized by Directive No. HW-555, dated May 7.

Waste Fractionization - "B" Plant (CGC-144)

A preliminary project proposal requesting authorization of design of "B" Plant Waste Fractionization Facilities, procurement of engineered equipment and materials, and initiation of construction was transmitted to RLOO-AEC on May 12. A revised budget data sheet is being prepared as required to release funds from the Bureau of Budget reserve.

Log Radiation Monitors - 200 Areas (CGC-147)

A project proposal requesting high (1 mr/hr to 1000 R/hr) gamma radiation monitors and recorders for Purex, Redox, and "Z" Plants was transmitted to RLOO-AEC on May 25.

Gaging of Non-boiling Tanks - 200 Areas

Specific Chemical Processing Department actions for implementation of the plan developed with the Commission in managing the non-boiling waste tanks in the 200 Areas were outlined. Non-boiling waste tanks in the 200 Areas will be gaged on a weekly basis. Steel tape-electrode systems will be installed on most of the non-boiling waste tanks.

Waste Treatment Facility (CGC-912)

Acceptance testing has been completed. Cold runs are now being made with no major problems to date. It is expected that Americium Recovery Facility - Phase I completion will delay "hot" start-up.

Project Cost Information - as of 5/17/64

Total Authorized Funds - 18 active projects	\$ 4 086 000
Total Cost-to-date	3 002 000
Commitments & Open Work Releases	153 000
Unencumbered Balance	931 000
Costs Charged to Above Projects 4/12/64 to 5/17/64	168 000

c. Manufacturing Engineering

Vertical Well Monitors

The first of two vertical well monitors was completed and field-tested this past month. The unit performed satisfactorily and is being turned over to operating personnel. However, several possible improvements were recognized and steps are being made to incorporate them into the system. The second monitor should be completed and turned over to operating personnel by mid-June.

Irradiated Fuel Monitoring

The progress of experimental measurements of irradiated fuel to determine cooling time effects was reviewed with Irradiation Processing Department Reactor Design. Measurements have been in progress for approximately two months at 105-C Basin, taking gamma spectra of fuel elements. Measurements are scheduled to continue for two to three more months.

Plastic Development for Personnel Protection

A procedure has been developed for attaching and detaching a temporary plastic greenhouse to the doorway of a contaminated area allowing for multiple entries using the adhesion curtain technique for exit and re-entry. Drawing No. H-2-25601 has been issued for prototype construction of an adhesion curtain greenhouse. Framework is currently being constructed for this greenhouse which, when completed, will permit six (6) persons to work simultaneously within any contaminated area to which it is attached.

Shop Operation Job Planning System

A Shop Operation Job Planning System has been developed and presented to the Shop operation and includes the following:
(1) A work review and assignment subsystem; (2) A material

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identification and control subsystem; and (3) a job manpower planning subsystem.

This system is designed to provide necessary planning and control both before and during job accomplishment, on a consistent and timely basis, so foremen and their craftsmen can routinely be provided with complete and accurate job information.

Office Layout

A comprehensive twenty-office layout has been made for the Shop Operation. The recommended arrangement of the building and occupants is illustrated for the proposed consolidation of office personnel in the 274-W Building.

Shops

Normal services provided to operating facilities with major work progress or completions as follows:

a. Boiler Shop

The mock-up, testing, and as-building of the Purex J2 Tank was completed and placed in spare equipment status. With the placement of lead shielding, fabrications of Hoods HC-26 and HA-21-I are completed; on Hoods HA-31-TT, H-64-C, and H-65-C for 234-5 Building, fabrication is at 60 percent, with completion expected ahead of schedule. The vendor supplying the shell for the HAPO-IB3 Cask has been delayed in delivery until July; Shop fabrication will be resumed at that time. Dunnage for the new type Purex Dissolver Tower has been completed except for sandblasting and painting. Fabrication of a carbon steel prototype of a Purex Multipurpose Dissolver has been started.

The F6 Concentrator has been built and re-tested for possible emergency placement in Purex, pending decisions regarding existing failed concentrator. Panels 20 and 21 were placed in Purex "N" Cell and panels for 233-S Building are 75 percent complete.

b. Sheetmetal Shop

Process ventilation in the 224-UA Building is undergoing extensive repair and modification; similar work was done at Gilmont samplers in the 271-B Building. Evaporative air coolers have been readied. Panel work for hoods in plastic, and in replacement stainless steel with viewing windows, was completed for 234-5 Building.

c. Machine Tool and Die Shop

Completions included fabrications of: plutonium punch and die

set, drilling fixtures, styluses, LVD transformer cartridges, pump flanges, impact wrench positioner bars, flange clamps, and graphite bearings.

Work totaling 200 manhours was done for the 300 Area.

d. Jumper Shop

Fabrication and testing of 22 jumpers was completed. A rupture deck mock-up of Purex "N" Cell piping was fabricated for investigations of nitrated resin explosions. A replacement satisfactory shipment of 1.5-inch, Schedule 80 pipe permitted resumption of Redox D-14 Helical Tube Bundle fabrication.

e. Rotating Equipment Shop

Mock-up, testing, and delivery of five (5) pumps and two (2) agitators to process use or standby, was completed. One (1) Lawrence pump in mock-up developed a noise that will require re-checks and correction before release.

6. Power and Services

Steam and electrical services were provided without interruption to production facilities. Steam outages were scheduled for the J. P. Head contract to modify steam lines which are now 95 percent complete.

Boiler No. 4 in the 284-E Building was determined to be in good condition by third party inspection.

Complete painting of all high tanks (water) was started under contract with Puget Sound Painters, Incorporated of Seattle, Washington.

Manager - Facilities Engineering

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

G. RESEARCH AND ENGINEERING OPERATION

1. Purex Process Engineering

a. Ventilation

The differential pressure across the forefilter in the Purex ventilation exhaust system remained unchanged during the month at approximately 6.5 inches of water for 100,000 cubic feet per minute of air flow. Studies conducted by Hanford Laboratories on a filter model indicate that the crust material found in the ventilation exhaust forefilter resulted from humidity changes that caused agglomeration and bridging of ammonium nitrate accumulated in the filter media. Current plant operations show that ammonium nitrate is routinely generated in small amounts in the dissolver cells, possibly due to vents on the ammonia scrubber drains.

b. Solvent Extraction

Addition of ferrous sulfamate to the 2D Column scrub section through the 2DIS distributor rather than the 2DF tank was started early in the month on a process test basis. The 2DIS distributor is located at the mid-point of the 2D Column scrub section. Results to date have shown an improved control of plutonium contamination in the uranium product with reduced ferrous sulfamate usage. No increase in the uranium product iron content or decrease in 2D Column scrub section fission product decontamination performance resulted from the test.

Permanganate treatment of the process water was started in April. However, the water quality remains poor and according to laboratory tests, continues to decrease as the seasonal Spring run-off continues. The improved cartridges in the IC and 2E Columns make the plant less sensitive to water quality. However, increased aqueous to organic flow ratios have been required in both columns to maintain satisfactory uranium waste losses.

c. Product Treatment

The temporary pressure relief system in the plutonium ion exchange unit was replaced with blanks after fatigue failure of the platinum discs was observed in the XA Column. Resin

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decomposition studies in full-scale test equipment are underway to develop a more reliable pressure relief system.

d. Waste Treatment

On May 23, the E-F6 high level waste concentrator failed after 37 months of service. Television inspection of the unit in place showed the bottom of a tube bundle canister had failed. Severe corrosion was evident in the bottom of the canister with no easily visible corrosion of the canister sides.

Sluicing studies in the 241-A Tank Farm continued during the month. Analytical data indicate about one to two tons of sodium are dissolved per day and settling studies show that the undissolved sludge settles within three hours making decanting operations practical. Dip samples taken while the sluicer is operating contain about 10 volume per cent settled solids.

Temperature measurements in the 241-A Tank Farm waste tanks have often appeared low. Air purging the cold zone in the temperature wells between the top of the tank and ground surface has been effective in returning temperature readings to normal. A water reflux cycle within the temperature well is broken by the air purge.

e. Fission Product Processing

B-Plant

Eleven runs have been completed at B-Plant to evaluate the peroxyacetate process for separating cerium from the rest of the rare earths. The rare-earth fractions contained 70 - 80 per cent of the promethium and 10 - 20 per cent of the cerium. Each of the peroxyacetate runs was preceded by a lead removal step which consisted of a hydroxide precipitation using a sodium hydroxide to lead mole ratio of 8 or 12. In either case, about 50 to 60 per cent of the lead was solubilized with rare earth losses of about 2 - 3 per cent.

Prior to B-Plant hot start-up in July 1963, the tetrafluoroethylene gaskets in most of the jumpers were replaced with special Flexitallic* spiral-wound 304 stainless steel asbestos gaskets. The gaskets were designed to fit the existing connector heads. After nearly a year of service with concentrated fission product crudes, no spiral-wound gasket failure has been observed. During this period of time, a cerium storage tank and the strontium rare-earth separation centrifuge have been replaced and all jumpers containing the spiral-wound gaskets were reusable. In this same period, six jumpers containing tetrafluoroethylene gaskets have failed.

* Trademark of the Flexitallic Gasket Co., Camden, New Jersey.

Strontium Semiworks

Purified strontium product from SSW Run No. 6 was reworked for additional calcium removal. Batch solvent extraction techniques were used to lower the calcium content from 10 weight per cent to 5.5 weight per cent with an overall recovery of 97 per cent. The losses were combined with other rework and processed through the solvent extraction columns.

A short solvent extraction run was made on miscellaneous accumulated rework solutions containing about 150 kilocuries of strontium-90 to test plant solvent recently alkaline washed. This solvent had shown poor extraction and disengaging performance in SSW Run No. 6. The solvent performance during the run appeared to be nearly equal to virgin solvent. Normal pulse frequencies were used and near maximum rates were obtained in the generally limiting HA Column scrub section. Strontium losses to the HAW were less than 1 per cent and ECW losses were 5 - 10 per cent. About 90 - 95 per cent of the strontium was recovered with a decontamination factor from calcium of 4.0.

2. Redox Process Engineering

a. Hexone Washing

The in-line hexone washing system was activated and tested during this report period. In this system, hexone is returned to the O-2 storage tank from the process and is contacted with 5 per cent caustic in a turbo-mixer at the tank inlet. Washing is continuous until a batch is collected in the O-2 tank; the caustic is then decanted and the hexone is transferred to the O-3 tank where it is combined with the existing hexone inventory. During the first test a total of eleven batches were processed which resulted in a reduction of the nitroso compounds by an arithmetic factor of about five. Laboratory tests simulating the washing operation resulted in a decontamination factor of 3.6 per batch for nearly instantaneous mixing time, whereas a decontamination factor of 10 resulted after one minute of mixing. The decontamination factor for the in-line blender is an arithmetic 2.2 per batch which reduces to an effective 1.16 when the batch of washed hexone is mixed with the entire hexone inventory. It is apparent that although the turbo-mixer gives an approximate full stage of mixing, the contact time is too short for efficient decontamination.

b. 107-SX Leak

During March 1964, the background reading in one of the laterals under the 107-SX tank increased from 100 to 5500 counts per minute. At that time the 107-SX tank was receiving Redox waste and contained dilute boiling waste solution at a 1.35 specific gravity. During April the process waste was re-routed to the 114-SX tank and the 107-SX tank contents have been allowed to self-concentrate. The background activity in the one lateral continued to increase but at a slower rate, indicating that the leak is being sealed by crystallization as salt solution concentrates. The background readings of the other two laterals under the tank and the adjacent vertical wells have remained constant at less than 100 counts per minute.

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3. Plutonium Process Engineering Operation

a. Plutonium Reclamation Facility Start-Up

On May 5, 1964, plutonium processing began in the Plutonium Reclamation Facility with the processing of aqueous solutions stored in PR and SN cans. On May 6, 1964, the filtrate from the button line was routed to the new facility for concentration and processing.

During May, a total of approximately 60 kilograms of plutonium was introduced to the system, and approximately 31 kilograms of plutonium product was sent to the button line for further processing. The feed introduced to the facility was prepared from the following sources: (1) supernates from the button line, (2) solutions resulting from leaching operations in the incinerator hoods, (3) dissolved oxides from plutonium "skull" burning operations, (4) dissolved slag and crucible materials, (5) solutions drained from Recuplex tanks, and (6) laboratory solutions. One hundred ninety-six (196) PR and RC cans were emptied.

Overall plutonium waste loss for the first four weeks of operation was 0.56 per cent. The major portion of this waste loss resulted from column flooding during periods of leach solution and Recuplex solution processing. These solutions, when processed alone, contain high concentrations of emulsifying agents, which overload the clean-up capacity of the organic treatment system. Solvent extraction losses during good operating periods were 5 to 10 fold lower than the average overall loss.

In spite of the unstable operation frequently encountered, the purity of the plutonium nitrate solution produced was good. Data for the first five batches of product are summarized below:

<u>Parts per Million Parts Plutonium</u>		
	<u>Average</u>	<u>Range</u>
Total metallic impurities	1680	1000 - 2800
Aluminum	270	50 - 1000
Iron	270	90 - 600
Chromium	22	10 - 50
Sodium	580	200 - 1000
Calcium	420	200 - 1000
Other impurities reported	< 10	< 10

"Hot" start-up of the slag and crucible dissolvers was initiated on May 18, 1964. Approximately 70 cans, containing 2.5 kgs of plutonium, have been processed to date. Modifications made to the dissolver prior to "hot" start-up were apparently effective in eliminating the solids "carry over" and pluggage problems experienced during simulated cold runs.

Cold testing of the Waste Recovery Facility and Phase I (americium isolation, partial purification, and concentration) of the Americium Facility is in progress. "Hot" start-up is scheduled in June.

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4. Separations Chemistry Laboratory

a. Purex Process Improvement

Technetium Recovery

Investigations were started during the month on the available methods for the recovery and purification of technetium from Purex high level waste. The laboratory is chiefly concerned with the purification process which would start with a nitric acid eluate from an anion exchange resin. The purification process, as presently visualized, could be either a hydrazine-ammonia precipitation of TcO_2 or a low temperature ammonia precipitation of NH_4TcO_4 . The latter method yields a crystalline product of good purity which could be directly air dried.

b. Fission Product Process Improvement

Promethium Purification Program

The promethium purification demonstration facility is about 90 per cent completed. Piping changes inside the I-F cubicle are 95 per cent completed. The ion exchange columns are in position and most of the lines are connected to them. Major work still to be done is running the lines from the cask unloading station outside the building to inside the cubicle, installing sampling valves in the sample hood, building a lead shield for the gamma monitors, and installing the condenser on the product tank.

Strontium Cleanup

Laboratory tests were made to find a method for removing excessive amounts of calcium from a batch of strontium product. Using semi-works solvent (0.4M D2EHPA, 0.2M TBP in Soltrol) at an equilibrium pH of 2.2, distribution ratios of 4.7 and 0.06 for calcium and strontium, respectively, were obtained which indicate the potential for good separation at this pH.

c. Laboratory Improvement

Differential Thermal Analysis Study

The Differential Thermal Analyzer was received at mid-month and put into service at once. Only a few minor mechanical and electrical problems were encountered.

Thermograms of Permutit-SK anion exchange resin in the nitrated form were found to have a predictable pattern. As the sample temperature is increased, a large endotherm appears between 100° and 124° C, followed by two significant exotherms at 221° and 310° C. Both exotherms are rapid, discrete energy releases, and are found in either a reactive (air) or inert (nitrogen) atmosphere, indicating the resin needs no external oxygen source to support combustion. While the exotherms are reproducible between samples, the same sample did not exhibit any thermal events during a second DTA run, illustrating the reaction is complete the first time. The chloride form of Permutit-SK did not exhibit any exothermic events.

A resin sample was monitored for weight change after each thermal event. The sample weight was reduced 56 per cent, 4 per cent, and 11 per cent at 175°, 240°, and 375° C, respectively. The major loss over the endotherm between 100 and 124° C was due to dehydration and loss of nitric acid. At 240° C, the resin was very dark red in color and at 375° C, it was opaque and black, although the bead form was retained. Infra-red analyses of the residues showed little change at 240° C, but very little structure was discernable at 375° C, perhaps due to the opacity of the beads. A similar analysis of the gas released in nitrogen atmosphere showed mostly N-H_n structure.

A series of DTA analyses were made on Permutit-SK soaked in nitric acid solutions of increasing molarity. The major exotherm for the nitrated, water-washed sample was at 310° C. However, as the acid matrix approached 1.0M, the two exotherms were equal, and above 1.5M, the 221° C exotherm was the largest. Using macro samples (0.01 - 0.08 g), the resin could be made to explode. In the case of water-washed Permutit, 0.08 g gave an explosion at the 310 exotherm. For resin soaked in 2M HNO₃, 0.015 g would explode at 221° C, and following this event, no exotherm was observed at 310° C.

Preparation of Silicon Standard

Four silicon (in plutonium metal) standards have been prepared by Plutonium Metallurgy, Hanford Laboratories. They were cast into eight pins, 2 inches long and 1/4 inch in diameter, or 2 pins for each standard (25, 125, 500, and 1000 ppm). At present, the silicon content is being evaluated by wet chemical methods. Spectrographic analyses from the 234-5 laboratory indicate that the casting procedure was successful in producing homogeneous pins in the desired ranges.

Evaluation of Gallium Fluorescence Procedure

To perform this evaluation, standard metal niblets were prepared and analyzed by X-ray fluorescence and by flame photometry for comparison with the oxine fluorescence method used by the laboratory. The X-ray and flame methods essentially agreed at 1.105 and 1.103 per cent, respectively, while the fluorescent method appears to be biased low at 1.08 per cent for the gallium content in the sample.

Effect of Sample Environment

A series of tests were performed to determine the effect of mounting practices on the NaI(Tl) detection efficiency for positron emission. At essentially 2 π detection configurations, the positron annihilation peak was enhanced by 12½ per cent when the sample dish was taped to the mount with a double thickness of Scotch tape. An increase in detection efficiency up to 30 per cent has been noted in Redox wet mounts where the liquid sample aliquot is discharged on an absorbant pad and mounted as a dry mount with one layer of Scotch tape. Lower order enhancements have been noted in liquid samples when the total salt content is raised. In all these cases the detection efficiency for emission due to gamma is unaffected or slightly (less than one per cent) decreased.

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5. Plutonium Chemistry Laboratory

a. Stirred Fluidized Bed Contactor

Results obtained during operation of the latest version of the reactor are encouraging. The major change effected is a reversal of the bottom entry of feed and top removal of product. In spite of its greater absolute density, the plutonium dioxide has a tendency to collect at the top of an oxide-chloride bed, probably attributable to fines in the oxide. The result is that product removed from the top is diluted with unreacted powder. This dusting seems to occur almost immediately upon starting oxide feed, even though the initial bed may contain up to eight inches of plutonium chloride.

The current reactor design uses the same two inch vertical pipe with the product overflow line blocked off. A one-half inch screw and one and one-half inch hopper arrangement introduces oxide through a flanged section into the top of the reactor. The previous bottom feed pipe with screw is now the product removal pipe.

On the basis of incomplete evidence, the new product removal method is a marked improvement, utilizing the "dusting" characteristic of the oxide to retain unreacted material in the reactor. Test runs were made with differential feeding, since the required degree of control could not be realized for continuous operation. The mechanical practicability of removing the chloride at the bottom was demonstrated. These runs showed a high degree of product conversion.

b. Slip Casting of Yttria Cells

Crucibles were produced having densities ranging from 86 to 96 per cent of theoretical. The work is now in its terminal phase with actual production of a usable PRC III (electrowinning cell) as the next objective.

A final formulation of experimental slip proved to have satisfactory casting properties, and produced a body having 95.7 per cent theoretical density, improved thermal shock resistance, and molten salt holding capability. Molds are now being made based on the shrinkages measured.

c. Effect of Iodine on Reclamation Facility Solvent Extraction

The CA column becomes loaded with iodine from the dissolver, which might change the extraction performance of the column. To evaluate the effect of iodine, organic solutions ranging from 10^{-1} to 10^{-4} M I_2 were used to extract plutonium and were then stripped. The results show that the iodine has no effect on the extraction or stripping characteristics of the system.

d. Americium Recovery

The Phase I flowsheet (interim startup) has been modified on the basis of further laboratory testing. The following changes have been recommended:

- (1) Incorporate a scrub stage using 3 - 5M NaNO_3 and an L/V of 0.1 in the solvent extraction portion of the flowsheet.

The loading capacity for americium on cation exchange resin can be drastically curtailed due to saturation of the resin with plus three cations $[\text{Al}, \text{Fe(III)}]$. The source of these elements in the ion exchange feed (i.e., the solvent extraction product) will be entrainment of CWV.

The use of a combination de-entrainment-scrub stage between the extraction and stripping stages would eliminate this problem. Acid deficient aluminum nitrate and sodium nitrate were investigated as scrubbing agents. Aluminum nitrate has the advantage of an extremely high Am E_a^0 (i.e., low Am waste loss), but it is unacceptable because it is a plus three cation. Sodium is ideal as a scrub because americium will readily displace it from the cation resin. A compromise can be reached by using a scrub L/V of 0.1 with 3 - 5M NaNO_3 . A 10 per cent recycle loss will occur under these conditions.

- (2) Replace the ammonium nitrate cation exchange wash with 0.1M HNO_3 .

The ammonium nitrate wash of the cation column performed as expected for acid control of the system. However, ammonium ion began to elute americium and a high waste loss resulted.

- (3) Replace the 2.3M ANN elutant with 7M HNO_3 .

The ANN elution of the cation column does not perform as expected (i.e., 90 per cent elution in four column volume). Ten column volumes of ANN are required to elute 80 per cent of the Am. It is therefore recommended that 7M HNO_3 be used as the elutant.

e. Anion Exchange Resin Stability

Three runs were made in a constant temperature bath (100° C) to look for evidence of an exothermic reaction in larger-scale equipment. Two of the runs were made in a 4" ID open-top glass column using a 12" resin bed. The resin was washed with 8 N HNO_3 prior to being loaded into the column. In each run the column was heated in the bath for several hours. The centerline temperature of the resin never exceeded the 100° C bath temperature. The third run duplicated the first two except the column diameter was 5.5". Again the resin temperature did not exceed the bath temperature.

H. S. Frank
 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>4-26-64</u>	<u>5-31-64</u>	<u>4-26-64</u>	<u>5-31-64</u>	<u>4-26-64</u>	<u>5-31-64</u>
General Manager's Group	8	8	2	2	10	10
Financial	15	15	19	19	34	34
Research & Engineering	69	69	29	29	98	98
Facilities Engineering	101	100	216	215	317	315
Production	7	7	4	4	11	11
Redox	66	66	237	235	303	301
Purex	72	70	263	263	335	333
Weapons Manufacturing	<u>61</u>	<u>62</u>	<u>263</u>	<u>264</u>	<u>324</u>	<u>326</u>
Total	<u>399</u>	<u>397</u>	<u>1033</u>	<u>1031</u>	<u>1432</u>	<u>1428</u>

B. PERSONNEL CHANGES

K. G. Grimm, Manager - Finance, CPD, transferred to Contract and Accounting Operation as Manager-Contract Accounting, effective May 1.

J. E. McDonald, Financial Analyst-Business Programs, transferred to Contract and Accounting Operation as Manager - Financial Consolidations Operation, effective May 1.

J. J. Courtney, Manager-Plutonium Reclamation, Weapons Manufacturing Operation, transferred to Manufacturing Section, APED, effective May 28.

E. O. Swain, Manager-Plutonium and Weapons, Process Design Engineering, Facilities Engineering Operation, transferred to Mississippi Test Support Operation, effective May 28.

C. TRIPS

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To Other G.E. Components</u>		
J. H. Warren	New York, New York	Consult on Business Effectiveness. (5/5 - 6/64)
<u>To AEC and Other AEC Contractors</u>		
G. C. Oberg	Lawrence Radiation Lab. Livermore, California	Discuss product specifications and purity. (5/11 - 12/64)
W. S. Frank R. E. Tomlinson	U. S. AEC Washington, D. C.	Information meeting on isotopic power development and application. (5/18 - 20/64)
C. W. Smith	U. S. AEC Washington, D. C.	Isotopic Power Application. (5/18 - 19/64)
	E. I. du Pont Savannah River Plant Aiken, South Carolina	High concentration waste evaporation. (5/20/64)
<u>To General Industry</u>		
W. H. Koontz J. W. Vinyard	Smithco Mfg. Co. Tulsa, Oklahoma	Purex dissolver tower. (5/4/64)

D. VISITORS

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From Other G.E. Components</u>		
R. G. Barnes	Atomic Products Division Palo Alto, California	Unclassified discussions on separations technology. (5/26 - 27/64)
A. M. Bueche W. L. Robb	Research Services Schenectady, New York	" "
N. J. Hawkins	Engineering Services Schenectady, New York	" "
J. Waterman	San Jose, California	Discuss decontamination procedures; crane ride. (5/27/64)

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D. VISITORS (Continued)

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From AEC and Other AEC Contractors</u>		
J. J. Burke C. T. Smith	U. S. AEC Washington, D. C.	Inspect 200-West Area Shops. (4/24/64)
R. L. Delnay	The Dow Chemical Company Rocky Flats Plant Denver, Colorado	Plutonium shipping- receiving program. (5/4 - 7/64)
D. D. Balls	The Dow Chemical Company Rocky Flats Plant Denver, Colorado	Redox Section tours. (5/12 - 14/64)
D. Hamester R. Newton	Division of Reactor Development	Purex tour. (5/14/64)
H. Meyer	Albuquerque Oper. Office Albuquerque, New Mexico	Discuss Hanford weapons fabrication facilities and also tour facilities. (5/14/64)
R. Stone	AEC Headquarters Washington, D. C.	" "
A. Aikens D. S. Skovholt	U. S. AEC Licensing & Regulations Washington, D. C.	Discuss chemical operator qualifications. (5/14/64)
D. Hayes	AEC Industrial Safety & Fire Protection Germantown, Maryland	233-S fire investigation follow-up. (5/19/64)
J. E. Harrell	Oak Ridge National Lab. Oak Ridge, Tennessee	Product mixing and sampling. (5/20/64)
T. R. Workinger	U. S. AEC Germantown, Maryland	Discuss Redox thorium-U233 capability and decontamination procedures. (5/19 - 20/64)
B. J. Beer G. E. Brant R. B. Fischer R. D. Forest R. H. Karlsson P. B. Leeper, Jr. R. R. McDonald R. L. Moment R. C. Palan J. E. Pavlick A. W. Taylor C. E. Wickland J. F. Willging	The Dow Chemical Company Rocky Flats Plant Denver, Colorado	PWIEG Meeting. (5/19 - 20/64)

D. VISITORS (Continued)

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From AEC and Other AEC Contractors (Continued)</u>		
M. L. Holzworth V. I. Montenyohl	E. I. du Pont Savannah River Plant Aiken, South Carolina	PWIEG Meeting. (5/19 - 20/64)
J. W. Anderson R. D. Baker S. E. Bronisz E. A. Hakkila E. A. Kmetko W. J. Maraman F. Miley F. W. Schonfeld	Los Alamos Scientific Lab. Los Alamos, New Mexico	" "
E. M. Cramer C. R. Henry J. B. Long R. Parker W. J. Ramsey J. L. Robbins D. R. Walmsley D. H. Warner H. D. Weiss	Lawrence Radiation Lab. Livermore, California	" "
<u>From General Industry</u>		
R. H. Studebaker	Process Equipment Co. Tipp City, Ohio	Design of remote welder. (5/5 - 6/64)
B. W. Wilkinson	The Dow Chemical Company Midland, Michigan	Redox Section tours. (5/12 - 14/64)
R. T. Cassin	H. M. Harper Pipe Co. Los Angeles, California	Visited T-Plant (WH&DO) for crane demonstration. (5/14/64)
R. E. Romer G. Vacek	H. M. Harper Pipe Co. Morton Grove, Illinois	" "
R. Wischow T. Wiseman	Martin-Marietta Co. Nuclear Division Baltimore, Maryland	Underground stored strontium availability and quality. (5/21/64)

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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>Total</u>	<u>YTD</u>
Dis. Injuries									0	0
Ser. Accidents									0	1
Med. Treat. Inj.		8	10	12	7				37	214
Rad. Occur.		3	5		2				10	54
Contam. Wds.			2						2	9
New Dep. Cases			1*						1	12
Fires									0	5
Security Viol.			1			1			2	8

* Approximately 3% MPBB by inhalation, occurring 9/11/63.

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V. REPORTS

A. PREPARED AND ISSUED

- HW-69895 REV, Unclassified, "Present Practice in the Laboratory Standards and Referee Program of the Chemical Processing Department", dated May 1, 1964, by C. W. Pollock.
- HW-76571 REV ADD, Unclassified, "Criticality Hazards Control Specifications - Redox Plant. 2.50 - Fire Fighting", dated May 15, 1964, by R. E. Isaacson.
- HW-80298, Unclassified, "Promethium Purification at the Strontium Semi-works", dated January 15, 1964, by S. J. Beard, A. L. Boldt and J. B. Kendall.
- HW-81481, Unclassified, "Waste Management Program - Chemical Processing Department", dated March 24, 1964, by S. J. Beard, R. J. Kofoed, J. J. Shefcik, and P. W. Smith.
- HW-81566, Official Use Only, "Project Proposal, Log Radiation Monitors - 200 Areas - CGC-147", dated May 20, 1964, by L. W. Finch.
- HW-81958, Secret AWD, "FPT-64-14 - Inverted Cavity Molds for RMC Line Shape Casting", dated April 22, 1964, by C. M. Walker.
- HW-81959, Secret AWD, "C-Line Quarterly Summary Report, First Quarter, Calendar Year 1964", dated April 23, 1964, by A. E. Smith.
- HW-81960, Secret AWD, "A-Line Quarterly Summary Report, First Quarter, Calendar Year 1964", dated April 27, 1964, by A. E. Smith.
- HW-81988, Secret AWD, "A-Line Product Characteristics - March, 1964", dated April 24, 1964, by A. E. Smith.
- HW-82044 RD, Secret, "Casting Cycle Time and Material Cost", dated April 30, 1964, by J. D. Hourigan.
- HW-82068, Secret, "Americium Estimates", dated May 4, 1964, by M. J. Szulinski.
- HW-82069 RD, Secret, "Purex, Redox, UO₃ Production Schedule - May, 1964", dated May 1, 1964, by D. McDonald.
- HW-82070 RD, Secret, "234-5 Production Schedule - May, 1964", dated May 1, 1964, by D. McDonald.

- HW-82106, Official Use Only, "Preliminary Project Proposal, Waste Fractionization - 'B' Plant - Project CGC-144", dated May 6, 1964, by L. W. Finch.
- HW-82118, Unclassified, "Plutonium Reclamation Facility 'Hot' Run Plans - Phase I", dated May 6, 1964, by L. E. Bruns.
- HW-82149, Secret AWD, "Weapons Process Engineering Technology Report - April, 1964", dated May 4, 1964, by A. E. Smith.
- HW-82178, Secret AWD, "Corrosion Test Data", dated May 6, 1964, by A. E. Smith.
- HW-82254, Unclassified, "Nuclear Safety Guidance in the Use of Water to Fight Fires in CPD Facilities", dated May 15, 1964, by R. E. Tomlinson.
- HW-82283, Secret AWD, "Product Characteristics", dated May 15, 1964, by A. E. Smith.
- HW-82287, Secret, "Redox Essential Materials Process Standard", dated May 15, 1964, by A. L. Boldt.
- HW-82288, Secret, "Analysis of Brandy Batch-Purex Nos. 14 and 15", dated May 15, 1964, by J. H. Warren.
- HW-82294, Secret, "Button Purity Data - Letter No. 1", dated May 20, 1964, by R. J. Sloat.
- HW-82332, Unclassified, "Process Specifications and Operating Limits for the Waste Treatment Facility", dated May 22, 1964, by R. J. Sloat.
- HW-82338, Secret AWD, "A-Line Product Characteristics - April, 1964", dated May 19, 1964, by A. E. Smith.
- HW-82362, Official Use Only, "Ventilation System Status Report - Plutonium Facility", dated May 21, 1964, by D. C. Nelson.
- HW-82365, Secret, "Neptunium Conversion Data", dated May 20, 1964, by R. A. Yoder.
- HW-82380, Secret AWD, "Chemical Analytical Data on A-Line Parts", dated May 21, 1964, by A. E. Smith.
- HW-82383 RD, Secret, "DRD U-233 Study", dated May 22, 1964, by R. W. Lambert, R. T. Martell, and H. C. Rathvon.
- HW-82410, Secret, "Analysis of Isotopic Exchange Samples 1641, 1642, 4641 and 4642 with Analyses of LASL Std.", dated May 25, 1964, by O. F. Beaulieu.
- HW-82432, Confidential, "Waste Treatment Facility - Start-Up Flowsheet", dated May 28, 1964, by C. W. Nilsen.
- HW-82433, Confidential, "Unscheduled Shutdown - Purex Plant", dated May 25, 1964, by J. H. Warren.

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HW-82435, Secret AWD, "Waiver of Specifications", dated May 25, 1964, by
A. E. Smith.

HW-82462, Secret, "Ingot Density Specification", dated May 26, 1964, by
E. F. Krautter.

HW-82463, Secret AWD, "Military Thermal Cycle Data", dated May 27, 1964,
by W. J. Gartin.

HW-82465, Unclassified, "Americium Recovery Start-Up Flowsheet", dated
May 27, 1964, by M. J. Szulinski.

HW-82466, Secret, "Critical Mass Hazards Control Specifications - Redox
C-2 Pot-Type Dissolver", dated May 26, 1964, by R. E. Isaacson.

HW-82500, Unclassified, "ZPA and ZPC - Weapons Fabrication Process
Analysis - Special Request Reporting System - Feasibility Study",
dated May 27, 1964, by W. H. Johnson and W. L. Lawton.

HW-82523, Secret, "Analysis of Brandy Batch-Purex Nos. 15 and 16", dated
May 28, 1964, by J. H. Warren.

HW-SA-3536, Unclassified, "A Quantitative Separation for Magnesium,
Calcium, and Strontium Using Zirconium Molybdate Ion Exchange
Crystals", dated May 19, 1964, by M. H. Campbell.

B. PREPARED FOR SIGNATURE AND ISSUANCE

HW-82088, Secret, "Production - April, 1964", dated May 1, 1964, 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

NONE

P. H. Reinker

General Manager
Chemical Processing Department

END

DATE
FILMED

5 / 10 / 93