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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
FOR

APRIL, 1962

HW--73525

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Compiled By
OPERATION MANAGERS

May 21, 1962

By Authority of CG-PR-2

RM Iten 8-10-92

TL Phillips 8-13-92

WJ Kucher 8-13-92

HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON

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

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STAFF

General Manager, Atomic Products Division	L. R. Fink
General Manager, Hanford Atomic Products Operation	W. E. Johnson
General Manager, Chemical Processing Department	P. H. Reinker
Manager, Production	J. H. Warren
Manager, Purex	P. R. McMurray
Manager, Special Separation Processing and Auxiliaries	C. T. Groswith
Manager, Finished Products	W. J. Gartin
Manager, Power and General Maintenance	T. G. LaFollette
Manager, Facilities Engineering	H. P. Shaw
Manager, Research and Engineering	W. S. Frank
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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

APRIL, 1962

I. SUMMARY

Production through April, as compared with the May 5, 1962, HAPO Production Forecast (HW-73531), is summarized below:

	<u>Percent of Forecast Achieved</u>
	<u>April *</u> <u>Fiscal Year</u> <u>To Date</u>
Separated plutonium nitrate	100 93.0
Separated uranium nitrate	100 92.8
Uranium oxide	100 92.8
Plutonium metal buttons	100 109.1
Fabricated parts	100 99.5

* Forecasted production for April was revised to coincide with actual production.

April production was below that expected, because of a criticality incident which occurred in the 234-5 Building on April 7, 1962. As a result of the incident, Purex operation was restricted to a low rate, UO₃ Plant operation was suspended until April 16, and Z-Plant operations, except for limited fabrication activities which were resumed on April 23, were shut down the remainder of the month. Redox plant was shut down all month to complete the installation of equipment associated with Project CGC-913, "Project Birch-Redox."

The Purex plant operated at a rate varying from 19 to 25 tons per day during April. Operations were interrupted six times, with outages lasting from four hours to six days. The six-day shutdown was taken to perform tests in the final uranium decontamination cycle, where uranium losses continued to be abnormally high. The other outages were necessary to change from unclassified metal processing to normal processing, and to make four equipment changes. Despite these process interruptions, plus marginal performance of the final uranium decontamination cycle, all production met specifications.

In early April, insufficiently aged irradiated metal was inadvertently charged to a Purex dissolver, and subsequent iodine¹³¹ emissions to the atmosphere exceeded the operating control limit for a brief period. Dissolution of the short-cooled metal was discontinued until it ages sufficiently to permit processing without releasing excessive amounts of iodine¹³¹.

During the April Redox shutdown, a Higgins anion exchange contactor was installed in the 233-S Plutonium Concentration Building as a replacement for the final plutonium decontamination cycle, 3A-3B columns. This change, plus other modifications which were made to equipment, will permit Redox to recover and decontaminate neptunium without interruption of uranium processing. Operability testing of equipment was in progress at the end of the month.

Advantage was also taken of the Redox shutdown period to perform dissolution and conversion ratio analyses on special batches of fringe and E-N load material from the 100-H Reactor. To date, thirteen one-bucket charges have been processed through the Redox dissolver.

The Bore-Tun Company completed a lateral of satisfactory alignment under the 110-SX underground waste storage tank from the existing caisson near 113-SX tank. This demonstration of capability opened the way for negotiating a contract to complete construction on Project CAC-928, "Leak Detection - High Level Waste Tanks - Redox and Purex."

An additional \$32,000 was authorized by the AEC for Project CAC-950, "Cesium Load-Out Facility, 241-C Tank Farm." The authorization included procurement, jumper fabrication, and technical direction of a Cost-Plus-Fixed-Fee contractor.

General Manager
Chemical Processing Department

CHEMICAL PROCESSING DEPARTMENT
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APRIL 1962

II. ACHIEVEMENTS

A. PRODUCTION OPERATION

<u>1. Production Statistics</u>	<u>April</u>	<u>Fiscal Year to Date</u>
<u>a. Percent of Forecast⁽¹⁾ Achieved</u>		
Separated plutonium nitrate	100	93.0
Separated uranium nitrate	100	92.8
Uranium oxide	100	92.8
Plutonium metal buttons	100	109.1
Fabricated parts	100	99.5
<u>b. Purex</u>	<u>April</u>	<u>March</u>
Uranium nitrate produced (tons)	302.39	305.04
Average production rate during operation (T/D)	15.3	15.5
Total waste loss (%)		
Plutonium	.64	.20
Uranium	.35	.16
On-line efficiency (%)	66.0	63.6
<u>c. Redox</u>		
Uranium nitrate produced (tons)	0.84	81.61
Average production rate during operation (T/D)	0	8.8
Total waste loss (%)		
Plutonium	0	.48
Uranium	0	.31
On-line efficiency (%)	0	41.0
<u>d. Uranium Reduction (tons)</u>		
Normal UO ₃ loaded	334.45	235.92
Enriched UO ₃ loaded	99.66	104.04
Normal UO ₃ approved for shipment	299.58	202.09
Enriched UO ₃ approved for shipment	93.87	95.60
Normal UO ₃ shipped	250.32	302.67
Enriched UO ₃ shipped	46.40	98.12
Normal UNH backlog	233	238
Enriched UNH backlog	29	110

(1) HW-73531, HAPO PRODUCTION FORECAST, dated 5-9-62

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e. Plutonium Metal Processing

	<u>April</u>	<u>March</u>
Input to Task I (batches)	8	35
Reduction yield (%)	96.4	96.9
Product recovery output (Kgs)	9.72	113.80
Product recovery backlog (Kgs)	883.84	866.26
Waste disposal (grams)	178	880

f. Power

	<u>200-East</u>	<u>200-West</u>
Raw water pumped (gpm)	8,728	3,340
Filtered water pumped (gpm)	964	889
Maximum steam generated (lbs./hr.)	254,000	110,000
Average steam generated (lbs./hr.)	184,000	65,000
Total steam generated (M lbs.)	132,505	46,548
Coal consumed (tons)	7,086	2,578

April production was below that expected, because of a criticality incident which occurred in the 234-5 Building on April 7, 1962. As a result of the incident, Purex operation was restricted to a low rate, UO₃ Plant operation was suspended until April 16, and Z-Plant operations, except for limited fabrication activities which were resumed on April 23, were shut down the remainder of the month. Redox plant was shut down all month to complete the installation of equipment associated with Project CGC-913, "Project Birch-Redox."

VR Chapman
for Manager - Production

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II. ACHIEVEMENTS (Continued)

B. PUREX OPERATION

1. Operating Continuity

During this period the plant operated intermittently at a throughput rate ranging from 19 to 25 tons per day. There were six shutdowns during the period which varied from four hours to six days in length. These outages were caused by a change to regular feed from unclassified material on 4-2-62, two failures of the High Level Waste feed pump (F-7), tests of the second uranium cycle, and replacement of the G-7 to G-5 organic pump jumper in Solvent Recovery System #1.

All production met specifications during the period. Uranium losses via the organic wash from the second cycle uranium system continued higher than normal. These uranium bearing wash solutions are being stored for subsequent recovery or disposal.

2. Processing Experience

Operating rates were limited by a restriction of the organic flow in the No. 1 Organic Recovery System, and by removal of C-3 metal dissolver from active service. Piping changes to restore the organic flow to normal by temporarily bypassing the restriction were installed on 4-30-62.

The HAFO II-1 Cask was loaded with purified strontium-90 at the Hot Semi-Works and is currently undergoing final testing. Approximately three hundred and eleven kilocuries of semi-refined strontium-90 were recovered in E-Cell during the month. Analyses of last month's recovery runs were completed and indicated that the total recovered in March was two hundred and fifty-four kilocuries.

Two 500-gallon casks of miscellaneous waste from the 300 Area High Level Cells were unloaded and the contents transferred to underground storage. One hundred fifteen thousand gallons were transferred from C Tank Farm to BY Tank Farm to make room for Purex Coating waste.

3. Mechanical Experience

The Waste Rework Tank (F-8) which had developed a leak in the coil was decontaminated and moved to 200 West Area for disposition. A leaking tube bundle on the F-6 Acid Concentrator was replaced with a new unit. Other equipment changes included replacement of the High Level Waste feed pump (F-7) twice and installing one new and six replacement jumpers.

4. Radiation Experience

Insufficiently cooled metal was received and charged to C dissolver early in the month. Emissions of iodine to the atmosphere exceeded the operating control limits during the initial transfers of material from the dissolver. As a result, this material is being stored in the dissolver until it is aged sufficiently to allow processing without excessive iodine release.

The total radio-iodine emission for the period was 45.7 curies with a maximum seven day emission of 38.3 curies. There were twelve cases of skin contamination during the month.

5. Analytical Experience

Analytical evaluation of the cesium determination method for measuring uranium losses in coating wastes was completed. This evaluation indicated the method is the best available for estimating uranium in coating waste solutions. The average waste loss as determined by the cesium method was 0.21%, five times greater than previously estimated.

Recalibration of the 400 channel gamma spectrometer was completed. This included installation of a permanent mounting device to assure precise and consistent alignment of samples and crystals. These changes have made the analyzer more flexible and more accurate.

6. Events Influencing Costs

The process condensate line to the 216-A-10 crib ruptured on 4-6-62 and has been unable to take the entire condensate flow. Consequently part of the stream has been diverted to the abandoned A-5 crib while a new stainless steel transfer and distributor line is installed. A Contingency Maintenance Request for \$27,600 was issued for this work.

PRM-Murray

Manager - Purex

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

C. SPECIAL SEPARATION PROCESSING AND AUXILIARIES OPERATION

1. Operating Continuity

The Redox Plant was shutdown on March 21 and was to remain down until April 23 to make major equipment installations associated with the continuous neptunium recovery project (CGC-913). However, this work was delayed for more than a week while all but standby crews were excluded from the area as a result of the Z-Plant criticality incident. It is now expected that plant revisions will be completed and operations resumed in the second week of May.

2. Processing Operations

The Redox Plant was shutdown the entire month for the installation of an ion exchange contactor in the 233-S Plutonium Concentration Building and other modifications which will allow accumulation, recovery and decontamination of neptunium without interference with normal solvent extraction processing. The shutdown, which started on March 21, was originally planned to extend through April 22, and normal processing was to have been resumed on or about April 23. However, as a result of the criticality incident which occurred at Z-Plant on 4-7-62, all work activity in the area was suspended from approximately 1100 on 4-7-62 until 2400 on 4-15-62. Consequently, the shutdown period has been extended and normal processing will not be resumed until the new equipment has been tested for operability, safety and criticality conditions. Normal processing is not expected to be resumed until about May 14.

Advantage was taken of the shutdown period for dissolution and conversion ratio analyses on special batches of fringe and E-N load material from the 100-H reactor. To date, thirteen one-bucket charges have been processed through the Redox dissolver. All material is currently being held in storage pending resumption of plant operations.

All of the remaining high gamma UNH inventory (12,000 gallons) was reduced to shipping specifications by reozonation and silica gel treatment this month. Approximately one half (6,000 gallons) has already been shipped to U-Plant for final processing.

Two separate 20 percent HNO_3 - 3 percent HF flushes of the F-7 and F-8 metal solution feed tanks and a separate flush of the 1A first cycle extraction column were completed during the month. A total of 305 pounds of uranium and 274 grams of plutonium was recovered

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in the tank flushes. Five pounds of uranium and five grams of plutonium were recovered in the 1A column flush. The HF-HNO₃ flushes were prompted by evidence of siliceous solids in the equipment which was not removed by normal 60 percent nitric acid flushing.

On 4-16-62, approximately 440 pounds of uranium in solution, were inadvertently sent to the 276-S crib. This material was mistakenly identified as part of the calibration water, which had resulted from a recalibration test on the 151-2 UNH storage tanks on April 4 and 5, 1962. AEC Form 283 has been processed.

3. Mechanical Experience

The major maintenance activity this month involved plant revisions and major equipment installations in the 233-S Plutonium Concentration Building associated with the continuous neptunium recovery project. By the end of the month the project was essentially complete and operability testing of the equipment was in progress.

The major 202-S Canyon cell activity was also in connection with the neptunium project. The E-5 and F-8 pumps were replaced with the combination pump-agitator type. The agitation is needed to blend the feeds to the 2A and 1S extraction columns respectively. Sixteen cell jumper installations were also made, all except one being in connection with the neptunium project.

The leaking east tube bundle (helical type) in the D-12 waste concentrator was replaced with a reclaimed bayonet type exchanger on 4-6-62. The bayonet exchanger was installed because the helical exchanger, which was returned to the vendor earlier in the year for repair of the weldments, has not been returned.

The agitator in the L-16 recycle tank in the 233-S Plutonium Concentration Building was replaced with a new unit on 4-17-62. The replacement was made as a precautionary measure since erratic operation indicated imminent failure.

4. Waste Handling and Decontamination

Three off-site waste shipments were received and buried this month without incident.

<u>Date</u>	<u>Shipper</u>	<u>No. of 55 Gal. Drums</u>
4-3-62	Coors Porcelain Company Golden, Colorado	139
4-13-62	Bureau of Mines Albany, Oregon and Lockheed Company Sunnyvale, California	34

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<u>Date</u>	<u>Skipper</u>	<u>No. of 55 Gal. Drums</u>
4-25-62	Dow Chemical Company Rocky Flats, Colorado	50

Equipment valued at \$21,000 was received from the processing plants for decontamination, repair or inspection during the month. Equipment valued at \$61,000 was returned to customers after decontamination and repair and represents a savings of approximately \$34,000 over the cost of new replacement equipment.

A total of 402 manhours was charged to the decontamination of railroad, automotive and heavy equipment. The following is a breakdown of the major items decontaminated.

<u>Item</u>	<u>Operation Charged</u>
Gondola Car No. 4611	Purex
Well Cars No. 37, 41, 45, 98, 99	CPD
Pickup No. 1C-169	Purex
Auger Truck	Transportation
UNH Trailer Tractor	Purex
Hanford Connector Wall Heads (30)	Project CG-897
Column Sieve Plates, Spacers & Rods	Purex
Hanford Connector Heads (16)	Minor Construction

5. Radiation Experience

Two skin contamination cases and three radiation occurrences were recorded during the month. The maximum skin contamination was 100,000 d/m on the hands of a pipefitter and occurred while working in the greenhouse in the 233-S Plutonium Concentration Building. Decontamination was successful and the hand contamination was reduced to non-detectable. None of the radiation occurrences was significant and no serious lapse of control was indicated.

The Hayden Well Drilling Company completed the drilling of 49 vertical monitoring wells within the SX Tank Farm. There were no radiation dose rates involved in this work nor was there any detectable contamination encountered.

The demonstration lateral under the 110-SX waste tank, from the existing caisson at 113-SX, was completed this month. The work, which was done by the Boring and Tunneling Company, Houston, Texas, was completed per contract date despite the one-week exclusion from the 200-W Area as a result of the Z-Plant criticality incident. The lateral met project specifications.

On three occasions this month the plutonium concentration of the canyon air at the 221-T Equipment Reclamation Facility reached fresh air mask levels. In all cases the increase occurred during the remote decontamination of a Purex Plant processing centrifuge. Until normal canyon air conditions were restored (2 to 4 hours), entrance to the canyon proper was restricted.

Removal of the inoperable silo column carrier tunnel door was started on 4-27-62. Since the radiation dose rates inside the tunnel averaged 20 rads/hr three feet above the floor, a means of reducing personnel dose rates was mandatory. A three-sided plywood box with a three-quarter inch lead floor and sand-bagged sides was used as a radiation shield. Additional shielding was supplied in the form of a concrete plug one foot thick, which was inserted into the silo doorway to shield out radiation from the silo columns. The above shielding techniques reduced the working dose rates from 20 rads/hr to an average of 350 mr/hr. The inoperable tunnel door was subsequently removed without incident.

6. Analytical Experience

The Redox Analytical Laboratory will be providing analytical service for a new customer, Non-Metallic Materials Development, Hanford Laboratories Operation. This work is a result of the Atomic Energy Commission's program for the investigation of radiation damage to reactor metals which is to be carried out by ten laboratories throughout the United States. HLO has been selected to be responsible for coordinating the analytical results of the participating members and the Non-Metallic Materials Development group has been charged with the responsibility of conducting the program at Hanford. A program has been established whereby the Redox Analytical Laboratory will evaluate a variety of control discs establishing referent values. These discs will then be sent to each of the ten participating laboratories and will be the basis for analytical determinations throughout the program.

AK Harmon
for Manager - Special Separation
Processing and Auxiliaries

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

D. FINISHED PRODUCTS OPERATION

1. Operating Continuity

Operating continuity for all Finished Products facilities was interrupted on April 7, 1962, when a criticality incident took place in a Recuplex tank. Uranium reduction activities were resumed on April 16, and plutonium fabrication started again on April 23. Other operations remained out of service through the end of the month.

2. Processing Operations

a. Plutonium Fabrication

Information on plutonium fabrication is presented in Document HW-73613 entitled "Chemical Processing Department, Finished Products Operation, Z Plant Monthly Report, April, 1962," which is classified "Secret, Atomic Weapon Data, Production Rate and Stockpile Quantity Information."

b. Plutonium Processing

The facilities for the production of unfabricated plutonium were occupied with the processing of "unclassified" plutonium until April 7, at which time operations were discontinued because of the criticality incident in Recuplex. Resumption of operations is being delayed pending installation of piping to permit the filtering and loadout of the supernates from the oxalate precipitation step so that this material can be processed through the primary plants. This change was made necessary by the indefinite startup date of the Recuplex facility which normally handles this recycle.

In the Recovery operation (Recuplex) on Saturday, April 7, during a system flush, a nuclear excursion occurred in the solvent holding tank, K-9. The automatic alarms functioned satisfactorily, and evacuation was prompt. Three persons were exposed to high radiation levels but no injuries resulted. There was no equipment damage and no spread of contamination in the building. A joint AEC - GE committee is investigating the occurrence, and a full report is to be issued. The exact cause of the incident had not been determined at month end and, consequently, the Recuplex facility is to remain out of service for an indefinite period.

c. Uranium Reduction

Operations at the Uranium Reduction Plant were normal during the first and last weeks of the month. The plant was out of service for one week following the Recuplex criticality incident and startup was gradual. Concentration is again being performed at 125 psi steam pressure following the correction of the organic breakthrough problem encountered in March.

3. Mechanical Performance

Equipment operation was satisfactory during the month with no significant failures being experienced. The automatic equipment (ventilation, instrument air, process air, vacuum, etc.) demonstrated good reliability during the time the 234-5 building was completely evacuated.

All criticality instruments and alarms have been tested, repaired as needed, and returned to service since the incident.

At month end, the Button Line and Incinerator piping is being modified to accommodate the transfer of supernates and leaching solutions to PR containers.

4. Radiation Experience

During the nuclear excursion, the automatic alarms and the evacuation procedures resulted in prompt exit from the 234-5 building. The "quick-sort" procedure for induced activity in the urine confirmed the identity of the significantly exposed individuals (four out of twenty-three). Latest data indicate that exposure for these individuals ranged from 110 rem to 1.4 rem, with no permanent restrictions indicated.

5. Analytical Experience

	<u>March</u>	<u>April</u>
Number of Samples Received	1,684	757
Number of Determinations	15,406	5,313
Total Metallic Impurities, Buttons	1,480 ppm	1,395 ppm
Total Carbon Content, Buttons	370 ppm	398 ppm
Buttons Rejected	7.5%	8.7%
Pu 240, NRF (by neutron count)	7.88%	7.83%
Pu 240, Regular (by neutron count)	6.18%	-----

W. J. Garton
 Manager
 Finished Products

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CHEMICAL PROCESSING DEPARTMENT
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April 1962

II. ACHIEVEMENTS (Continued)

E. POWER AND GENERAL MAINTENANCE OPERATION

1. Operating Continuity

At 1:15 p.m., April 7, action was initiated to cease operation of the 200-West Area Power and Water Treatment Facilities, and evacuate the premises by authority of Security Patrol. Shortly thereafter, the order was rescinded and instructions received to restore and maintain power services. Operations were back to normal at 1:45 p.m. the same date. The interruption was the result of a nuclear excursion at a plutonium scrap recovery facility at the Finished Products Operation.

2. Inspection, Maintenance and Repair

Special emphasis was placed on the fabrication of additional PR (product receiver) cans, for which an urgent demand was created by the recent Z-Plant criticality incident. Special shifts were established in order that the work might continue on a round-the-clock basis for a portion of the month. One hundred and four cans and jackets were completed during the month, with the work continuing into May.

Assembly of the strontium filter for the HAPO-I Cask was in progress at month end. Upon completion of welding and machining, the internal shell is scheduled to be shipped to New York for installation of the filter screen.

Twenty-four pipe jumpers were fabricated during the month to meet requirements as listed below.

Palm Project CGC-821	5 jumpers
Birch Project CGC-913	2 "
NPR Processing Project CGC-929	3 "
Purex Replacements	10 "
Redox Replacements	3 "
Redox Research & Engineering	<u>1</u> "
Total	24 jumpers

The process pipe jumper fabricated for the Redox Research and Engineering Operation contained an activated charcoal filter for evaluating the removal of radioactive iodine¹³¹ by this method.

Special efforts were directed by maintenance personnel to the support of Hanford Laboratories Operation's Plutonium Carbide Development Program. Corrective alterations and modifications were in progress

at month end on the vacuum furnace in room 10, 231-Z Building. The existing vacuum chamber and furnace is being replaced with a new improved design capable of extremely high temperatures (approximately 1600°C). The arc melt furnace, used in preparing the plutonium carbide material, and the 5000-ton press, used in the sintering operation, are ready for use.

The entire efforts of the special maintenance crews were directed toward completion of field work connected with the Purex Palm Project. Project-procured materials started arriving in sufficient quantities during the month to permit the work previously delayed awaiting materials to proceed. The various segments of the work were complete at month end, as illustrated below.

Pipe and Operating Gallery	90%
Sampler Installation	90%
Aqueous Make-up Alterations	98%
Electrical Additions	75%
Instrumentation Addition	65%

The 200-East and West Area water reservoirs were chlorinated during the month, and the settling basins in 200-West Area Filter Plant drained and cleaned.

In a further attempt to increase boiler efficiency, the O₂ samplers on all 200 Area Power House boilers are being relocated to a position forward of the uptake dampers. The move is designed to eliminate the possibility of air dilution of the sample, and consequently causing inaccurate O₂ analyses.

A total of 223 drums (55-gallon capacity) of classified waste and metal turnings from off-site were buried in the 200 Area dry-waste burial gardens during the month.

In connection with the criticality incident of April 7, the Power and General Maintenance Operation installed, in the 2101-M Building, temporary walls, hoods, tanks, piping, etc., to create a reasonably exact facsimile of the room in which the incident occurred. The purpose of this counterpart of the Recuplex Facility is to assist management in determining the cause of the incident and in planning remedial measures.

III. Organization and Personnel

The Power and General Maintenance Operation assumed responsibility for recall and assignment of CPD craft personnel temporarily furloughed following the criticality incident of April 7. By the middle of the following week, virtually all craftsmen, with the exception of a few instrument technicians, had been temporarily assigned to other areas.

T. S. Lee

Manager
Power and General Maintenance

TGL:ap

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (continued)

F. FACILITIES ENGINEERING OPERATION

1. Purex

a. Process Design Engineering

241-AX Tank Farm

Process design of the Purex 241-AX Tank Farm and the essential waste routing system was completed. The 35 scope drawings and design document are being revised for approval.

Purex Concentrator Design

Detail design has been completed on the dunnage for the lower unit of the sectionalized concentrator. Detail design drawings of the remote deentrainer tower for F6-F11 Service plus cell arrangement drawings for the F6, F11, and H4 positions were issued for comment on April 27.

Purex 2EU Decanter

Studies were made on the use of an external decanter vessel to provide additional setting time for the 2EU stream for removal of entrained organic.

Hydraulic limitations have shown the decanter approach to be impractical. Efforts are now directed toward redesigning the bottom disengaging section of the 2E Column for additional phase separation capacity and early detection of flooding.

b. Project Engineering

CAC-928 - Leak Detection - High-level Waste Tanks - 241-A and 241-SX

The Boring and Tunneling Company of America (Bore Tan) demonstrated their horizontal drilling equipment by installing a lateral of satisfactory alignment under the 110-SX Tank from the existing caisson of 113-SX. With this capability demonstrated, a contract for completion of construction work, exclusive of the Plant Force portion, is under negotiation. Eighty of the 88 monitoring wells are complete.

CAC-950 - Cesium Loadout Facility - 241-C

Work Authority CAC-950(2), dated April 2, 1962, authorized an additional \$32,000 to General Electric Company, for a total of \$51,000. Procurement, jumper fabrication, and technical direction of CPFF contractor was authorized.

c. Manufacturing Engineering

Methods Study Film Program

Three films were prepared which record the operations of process sampling, step-off mat procedure, and dry waste packaging and disposal. In addition to analysis for procedural improvements, the films will be used for personnel education and training.

2. Special Separations Processing

a. Process Design Engineering

SX Tank Farm

Design and drawings were completed for the first phase of construction for rerouting tank reclaimed chemicals to the dissolvers in 202-S Building. All routings to the building have been designed and issued, including the underground line from 151 to 152 Diversion Box.

E-13 Radiation Monitoring

Design was completed of an ionization chamber for jumper installation in the E-13 Ozonator vessel to improve process control. An order is being prepared for fabrication.

F-5 Concentrator Design

The design of the F-5 Concentrator is being revised to include a seal pot to provide vessel protection from possible abnormal pressures.

b. Project Engineering

CGC-913 - Project Birch - Redox

All equipment was installed in the 233-S Greenhouse by April 27, however, circuitry troubles with the ball valves prevented beneficial use by April 30, as planned. Corrective action involving installation of relays is underway.

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3. Finished Products**a. Process Design Engineering****Recuplex Criticality Incident**

A communication system, including radio, telephone, amplification, and recording equipment, was organized, maintained, and operated for assistance to personnel making entry into 234-5 Building during investigation of the incident. Critical mass alarms were relocated, repaired, and recalibrated as necessary to furnish alarm back-up during investigation of the incident.

A mock-up of a portion of the Recuplex Area of the 234-5 Building including some of the pertinent piping to and from the K-9 vessels and other tanks, was made in the 2101-M Building. The purposes of the mock-up were as follows:

- 1) To demonstrate the clearances and feasibility of entrance of a Hughes Aircraft Company Mark II "MOBOT" and its capabilities to operate through glove ports.
- 2) To make tests of the hydraulics of the piping around the K-9 vessel.

"Z" Plant Computer Test

The final evaluation report (HW-72402) covering the "Z" Plant computer test was issued in April. Further study directed toward establishing basic alternate computer systems for "Z" Plant has been discontinued until work of a higher priority has been completed.

b. Project Engineering**CGC-912 - Waste Treatment Facility - "Z" Plant**

The directive completion date has been extended from August 15, 1962 to December 15, 1962, by Directive No. HW-522, Modification #1, dated April 13, 1962. Work was suspended from April 7 to May 1, because of the Recuplex criticality incident.

**CGC-953 - Personnel Protection, Storage Hood Shielding -
234-5 Building**

Modification #1, of the AEC Directive extending the completion date to June 1, 1962, has been received.

No site work was accomplished between April 7 and April 30, 1962, due to the Recuplex incident. Work was resumed on April 30, 1962.

4. General

a. Process Design Engineering

Waste Tank Liquid Level Measurement

The development work on the Varec System is being discontinued. Only occasional maintenance will be required to assist utilization of the equipment. The Data Gage System is still operating in the 118-TX Tank. The planned temperature testing was delayed by the Recuplex incident.

224-T Dismantling Facility

Detailed design has been completed on the modifications to the "F" and "G" Cells in the 224-T Building to provide an equipment dismantling facility. Construction of the equipment dismantling facility is now in progress.

Emergency PR Cans

As a result of the Recuplex incident, an emergency PR Can (H-2-58129) and carrier (H-2-58130) were designed to permit operation of the Purex Plant to continue until operation of 234-5 Building could be resumed. The can volume and spacing are identical to the present PR Cans, however, timing would not permit addition of the external cadmium poison. Therefore, storage limits on the PR Cans have been reduced.

Phase II Fission Product Program

The Phase II work, as now proposed for "B" Plant, will require re-activation of four or five cells. Scope work has been started and includes a functional flow diagram, a process flow routing diagram, and the arrangement for a second precipitation section (in Section 7).

b. Project Engineering

Project Cost Information - as of 4/22/62:

Total Authorized Funds - 16 active projects	\$ 11,605,000
Total Cost-to-Date	7,579,000
Commitments and Open Work Releases	1,015,000
Unencumbered Balance	3,011,000
Costs Charged to Above Projects-3/18/62 to 4/22/62	380,000

W.O. #A-51348 - Cask Conversion

An authorization for \$73,300 has been received from Oak Ridge National Laboratory for the installation of higher pressure rated filters in the HAPO I and IA Casks. Plant forces are

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modifying the HAPO I Cask and J. A. Jones Company is modifying the HAPO IA Cask. A contract has been awarded to Micro-Metallic to supply and attach the filter screens.

A handwritten signature in black ink, appearing to be "J. A. Jones", written over the printed name.

Manager
Facilities Engineering

CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

G. RESEARCH AND ENGINEERING OPERATION

1. Purex Process Technology -

a. Head End

Early in April the radioiodine emission from the Purex Plant suddenly increased from 0.1 curies/day to a peak of 23 curies/day. Based on the Sr 89-90 ratio of the dissolver solution and the integrated iodine release (~ 45 curies total), the high emission rate was traced to the charging of one dissolver with one or two tons of 20 - 30 day "cooled" irradiated uranium. All the radioiodine was discharged from the vessel vent system except about two curies which escaped from the dissolver off-gas system. To prevent further radioiodine discharges to the atmosphere, the uranium will be aged in the dissolver an additional 40 days before further dissolution.

b. Solvent Extraction

Solvent extraction performance during April was characterized by the following conditions:

- (1) Continued marginal scrubbing performance in the 2D Column and poor uranium stripping in the 2E Column;
- (2) Temporarily high plutonium contamination in the final uranium product following a special operational test in the Final Uranium Cycle;
- (3) Temporarily high uranium contamination in the plutonium product resulting from leaking let-down valves on the IBX and IBS Columns. (The valves leaked during several temporary shutdowns caused by equipment failures);
- (4) Reduced processing rate ($CF = 2.3$) near the end of the month because of subnormal performance by both No. 1 System solvent feed pumps.

Although the decontamination and recovery performance of the First and Final Plutonium Cycles continued to be excellent, uranium losses via the 2E Column organic stream were 100 - 1000 times the normal 0.002 per cent. Laboratory and cold semiworks tests have shown that the plant streams contain undesirable chemical or colloidal materials that can

markedly affect column dispersion characteristics and uranium inter-phase transfer rates. A plant test of continuously recycling uranium product to the 2D Column showed that even after 60 hours of operation no detectable improvement occurred in the process performance of the Final Uranium system. The plant test and laboratory studies of solvent treatment effects indicated that the undesirable materials were not adequately purged from the system. The special water wash of the solvent was therefore replaced with carbonate treatment and the Na_2CO_3 concentration increased to five per cent. Segregation of the wash solutions has continued.

c. Neptunium Recovery

Neptunium accumulation in the Backcycle Waste System (3WB) was below normal because of losses caused by frequent shutdown and startup operations and continued high losses via the final uranium product.

d. Waste Management

Intermittent operation of the prototype equipment for the formaldehyde denitration of high activity waste (IWW) continued to demonstrate excessively high pressure drop across the reactor tower and poor decontamination of the recovered acid. Sparging tests showed no appreciable pressure drop across the tower at a 70 cfm air flow. Equipment operation at different conditions of formaldehyde flow, reaction vessel temperature and inlet temperature of the IWW failed to reduce the pressure drop across the tower. Reevaluation of the tower and pot design are currently underway.

A probe test which exerted 22 lbs/sq in loading dropped directly through settled solids to the bottom of two coating waste storage tanks, thus indicating no hard sludge is present.

e. Fission Product Recovery

The use of Cs 137 concentrations to determine batch sizes for runs has proven successful for establishing a uniform heat load in the centrifuge bowl which is independent of the volume per ton of high activity waste used for feed. No loss of centrifuge cake has been experienced since lowering the pH during the sulfate precipitation to 0.7 - 1.5 as reported last month. Another slurry filter cask was loaded with SrCO_3 and at month end was undergoing temperature and pressure tests prior to shipment.

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2. Redox Process Technology-

a. Test Dissolution of Aluminum in Mercury-Catalyzed Nitric Acid

Irradiated plutonium-aluminum alloy fuel assemblies from the Plutonium Recycle Test Reactor are scheduled for processing in the Redox Plant during October, 1962. Dissolution of this irradiated fuel in 3-4 M nitric acid is feasible; however, since the penetration rate is approximately 3 mils per hour, dissolution time cycles will be excessively long unless a more vigorous dissolving agent can be found.

Since X-8001 aluminum dissolves at approximately the same rate as unirradiated plutonium-aluminum alloy in laboratory tests, it has been used in the mercury catalyzed-nitric acid dissolution tests in the plant. The initial Redox test dissolution of the X-8001 aluminum jackets from 175 irradiated uranium slugs in mercury-catalyzed nitric acid was completed in December, 1961. The 41.3 pounds of aluminum present in the end caps and cladding appeared to have dissolved in approximately 15 minutes. Samples of the dissolver solution taken after one hour of boiling showed that all the aluminum was dissolved. A second test dissolution of 81.9 pounds of X-8001 aluminum from 344 uranium slugs in 4.0 M HNO_3 -0.002 M $\text{Hg}(\text{NO}_3)_2$ was completed during the month. To assure activation of the aluminum, the mercuric nitrate was not added to the dissolver until the dissolver contents had been heated to 95 C. The initial dissolution reaction was rapid but easily controlled. The hydrogen content of the diluted off-gas stream during the peak of the reaction, as continuously measured and recorded by the combustible gas analyzer, was 1.2 percent and decreased to less than 0.4 percent after five minutes of boiling. Samples of the dissolver solution taken after 30 minutes of boiling showed that 70-80 percent of the aluminum had dissolved.

Since the surface area of this test charge, approximately 14,000 square inches, is equivalent to more than half that available in 8 plutonium-aluminum alloy assemblies (the planned dissolver charge), a two-cut dissolution of this fuel in mercury-catalyzed nitric acid appears feasible. However, since recent laboratory studies have shown that irradiated plutonium-aluminum alloy will activate in 1.0 M HNO_3 -0.005 M $\text{Hg}(\text{NO}_3)_2$ but not in the concentrations used for this test, additional plant testing will be required to develop a satisfactory plutonium-aluminum alloy dissolution flowsheet.

b. Redox Plant Modifications

The Redox solvent extraction columns were shut down the entire month for installation of an anion exchange contactor in the 233-S Plutonium Concentration Building and other modifications which will allow accumulation, recovery and decontamination of neptunium without interference with normal solvent extraction processing. Piping and equipment modifications include:

1. piping changes to permit use of the HS Column for recovery of neptunium from the LAW stream;

2. installation of a streamlined Higgins anion exchange contactor in the 233-S Building for improved decontamination and purification of plutonium thereby making the third plutonium decontamination cycle columns (3A-3B) available for neptunium decontamination;
3. provision of a draft tube circulator in the former plutonium rework hold-up tank (E-4) to permit its use as an ozonator for neptunium decontamination;
4. piping modifications to permit use of the L-2 plutonium stripper concentrator as a final concentrator for neptunium;
5. installation of a new neptunium loadout system in the 233-S Building.

The neptunium accumulation process is similar to that previously used except that the LAW stream is acidified, using the waste stream from the anion exchange contactor, and routed to the HS Column Feed Tank for processing through the HS Column. The neptunium extracted in the HS Column is stripped from the organic stream in the HC Column and accumulated in the LAFS Concentrator system, and the HSF tank. The modified accumulation process, which does not depend upon the HA Column for retention of the neptunium inventory, will reduce the neptunium losses from the HA Column and should permit a reduction of the HA Column acidity.

The accumulated neptunium is periodically recovered and decontaminated without interference with normal solvent extraction processing. The neptunium is removed from the accumulation system by adding a stripping stream to the scrub section of the HS Column. The neptunium-bearing aqueous phase is withdrawn from the column above the feed point and routed to the 3A-3B cycle for purification and decontamination. Facilities for recycling either the 3AW or 3BP streams to the 3AF tank permit considerable flexibility in decontamination flowsheets. Final removal of ruthenium is achieved by extended batch ozonation in the E-4 tank. The decontaminated neptunium product is concentrated batchwise in the L-2 Concentrator prior to shipment to the neptunium purification facility.

The addition of a pushed bed anion exchange contactor is the main change in the 233-S plutonium process flowsheet. Before the 2BP plutonium product solution is sent to the 233-S Building it is stripped of hexone, ozonated to remove ruthenium, acidified and buffered with ferrous sulfamate to reduce hexavalent plutonium to the three or four valence. After concentration to 7 M HNO_3 in the XAF concentrator, the plutonium solution is pumped through a heater and filter to the anion exchange contactor. The L-18 anion exchange contactor has a seven-foot extraction section, a thirteen-foot scrub section, a six-foot stripping section, a resin receiver section and a resin reservoir section. Electrically operated ball valves, positioned by a programmer, cycle the contactor through repetitive operating and push periods. The plutonium, which exists largely as a hexanitrate divalent anion, $\text{Pu}(\text{NO}_3)_6^-$, is strongly absorbed by the anion exchange resin, permitting good separation

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of plutonium from fission products, uranium and miscellaneous chemical contaminants. The product stream from the anion exchange system is concentrated in the titanium-tantalum final concentration system previously employed.

All procedures and manuals necessary for operating the modified plant have been provided and operability testing of the equipment was in progress at month-end.

c. Fission Product Heating of Redox Waste

A batch of unneutralized salt waste was held in a Redox plant tank, without agitation or water cooling for a period of seven days, to determine whether self-heating could create a temperature problem if normal operation of the Redox plant were impossible for an extended period of time. The heat generation rate calculated for this waste was 6550 BTU per hour per ton of uranium. The waste contained fission products from 4.2 tons of uranium irradiated to 77⁴ MWD per ton at a power level of 12.0 MW and had been cooled 129 days at the start of the test. The temperature held constant at 56 C during the seven-day period. When the waste batch was agitated and cooled to 25 C and again held without agitation or water cooling, the temperature rose to 49.5 C after 76 hours. This test indicated that abnormally high temperatures would not occur in unattended Redox plant tanks containing high-level waste.

d. Special Flushes

When recurrent plugging of the HA Column feed tank (F-7) weight factor dip leg was not corrected following the 57 percent nitric acid flush of this tank last month, it was suspected that siliceous solids were present. Two separate 20 percent HNO₃ - 3 percent HF flushes of the F-7 and F-8 feed tanks and a separate flush of the HA Column were completed during the month, the first HF flushes since the cessation of feed centrifugation in October, 1959. An exothermic reaction was experienced in the HAF tank which heated the solution nearly to boiling in approximately five minutes. Samples of the flush material are being evaluated in the laboratory in an attempt to identify the solids. Five pounds of uranium and five grams of plutonium were recovered in the HA Column flush. A total of 305 pounds of uranium and 274 grams of plutonium was recovered in the tank flushes. This product was apparently associated with the solids in the F-7 tank.

4. Process Chemistry

a. Purex Process Assistance

Assistance to Purex again centered primarily around the poor performance in K cell. During mid-month the recycling of uranium through K cell was followed with special samples without disclosing any significant clue to the solution. Later in the month, samples of R-2 (organic from the 2-0 organic wash column) were found to have a considerable content of solid uranyl carbonate. Further investigation disclosed that the bulk of the carbonate was being consumed as a uranium strip leaving little, if any, for organic washing. Increasing the carbonate strip in R-1 from 3% to 5% carbonate has reduced the 2EW waste losses considerably but it remains to be seen if this will also improve column stability.

b. Redox - URO Process Assistance

Two methods were suggested for the preparation of quadrivalent plutonium feed for the 233 ion exchange facility. The first, using ferrous sulfamate, is the simplest and most flexible but it does contribute iron to the final waste system. The second method utilizing sodium nitrite contributes no heavy metal ion to the waste but the process lacks flexibility and dependability.

(1) Ferrous Sulfamate Reduction

Add 2.5 moles ferrous sulfamate per mole Pu to the Pu in a 2.5 M HNO_3 solution. Feed the resulting Pu(IV)-Pu(III) mixture to a continuously boiling concentrator operating at 7 M HNO_3 . This provides an excess of one-half mole of ferrous iron to cover plant variance and the reduction is complete in a matter of seconds. The 2.5 M HNO_3 solution is not too significant.

(2) Nitrite Reduction

The acidity for nitrite reduction should be in excess of 0.3 M HNO_3 to discourage polymer formation and it should not be in excess of 1.4 M HNO_3 if reduction is to occur. The temperature should be between 50 - 70 C. At least five moles of nitrite per mole of plutonium are required. Reaction will require about 45 minutes but can be shortened by the addition of some ferric ion, if desired.

After reduction, the solution can be transferred to the concentrator as under the ferrous sulfamate recommendation.

c. Hot Semi-Works and Neptunium Recovery

(1) Neptunium Purification

Purification of the 1108 grams of virgin neptunium received from the Purex plant in March, and combined with approximately

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100 grams of recycle neptunium was completed. An ion exchange flowsheet using ascorbic acid and hydrazine as a reducing agent for the feed solution was tested. A 50 per cent reduction in the volume of the plutonium removal wash was achieved using the ascorbic acid and hydrazine flowsheet. One thousand one hundred seventy-two grams of purified neptunium nitrate was shipped to Savannah River in two shipments of 800 and 372 grams, respectively.

d. Laboratory Assistance

- (1) A total nitrate analysis for plutonium(IV) nitrate solutions, using Dowex 50X-8 resin, was evaluated and found to be of equal accuracy, but less complicated than the currently used coulometric method.
- (2) A DBP analysis was developed which would detect at the 100 ppm level with an accuracy of $\pm 10\%$. Essentially, the method consisted of four successive solvent strips with sodium sulfate (5% solution) which were subsequently titrated with caustic to determine the DBP concentration. Uranium was complexed with potassium oxalate.
- (3) In a series of solubility tests, an initially 5% solution of sodium carbonate was found capable of containing 1.68 times more sodium uranyl carbonate in solution than a 2.5% sodium carbonate system.
- (4) A measure to reduce the misunderstanding and misuse of beta and gamma activity units has been submitted to, and accepted by, customer groups serviced by the Redox and Purex laboratories. The definition of units consists of labeling all true microcurie values as "uc" and all values that cannot meet the requirements of this term as "uQ". By this means the continuity with past data is preserved, while pointing out those analyses that may not be legitimately compared with data from other sources. This measure is now in effect.
- (5) The Redox gamma analytical system is being recalibrated with new detectors and enlarged shields. The two multichannel analyzers in the system have been adjusted so that their responses are identical. A monitoring scheme has been placed in service which will point out any shift in response as well as any change in overall recovery. To date, calibration data has been taken on Np^{239} , Sc^{46} , Zn^{65} , Cs^{137} , Co^{60} , Mn^{54} , Sr^{84} , I^{131} , CePr^{144} , and RuRh^{106} . From these standards, an efficiency curve

$$\left(\frac{\text{Photopeak Area in c/s}}{\text{Photo fraction} \times \text{uc}} \text{ vs Mev} \right)$$

has been prepared to determine the relative validity of present and future isotopic calibrations. The collection of calibration

data for the remaining isotopes to be calibrated has been turned over to analytical control personnel. Verification of the data will be retained.

- (6) Plutonium dioxide (which contained no additives) from the screw calciner was chlorinated under the normal conditions. The oxide was 70.31 per cent chlorinated and contained 45.24 per cent volatile material. Because of this excessive amount of volatile material in a sample to which no additive had been added, a new sample of the same product was requested from 234-5 Development. The new sample was 69.46 per cent chlorinated and 42.55 per cent volatile material was present.
- (7) Approximately three grams of wet technetium heptasulfide were received from Hanford Laboratories Operation. The sample was dried at less than 90 C for approximately four hours, weighed, and then heated slowly (approximately 17 C/min) to approximately 1050 C under a hydrogen atmosphere and held at that temperature for one hour. The product was cooled under nitrogen and weighed. The elemental technetium was coarsely particulate and silver-gray in color. Based on the weight of the dried technetium heptasulfide, a 129 per cent yield was achieved. The metal will be examined by X-ray techniques to determine the purity and will be used as a standard for calibrating the coulometer and the beta proportional counter.
- (8) Four samples from the 234-5 building waste incinerator, off-gas scrubber were received and particle size distribution determined with the Coulter Counter. All four samples fell in the 2 to 20 micron range. The particle size distribution curves are available.

e. Standards and Quality Control

Essential Material specifications were formalized for DTPA (#705), tartaric acid (#910), D2EHPA (#384), citric acid (#285), 72% HNO₃ (#671), and magnesium oxide crucibles (#373).

An automatic titrator (potentiograph) has been procured and is under evaluation. End points of ± 10 ul on 10 ml titrations have been demonstrated.

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5. 234-5 Development

a. Anion Exchange Treatment Of Task I Filtrates

Document HW-73456, "Anion Exchange Flow Sheets And Equipment For Recovery Of Task I Filtrates", was issued. Excerpts from "Conclusions And Recommendation" follow.

Anion exchange flow sheets have been developed for the conversion of plutonium in Button Line filtrates to purified plutonium(IV) nitrate solution. The purified product is suitable for direct reprocessing in the oxalate precipitation step of the Button Line. The flow sheets are based on recent experiments in Chemical Research which demonstrated the absorption and elution characteristics of Button Line filtrates on Permutit SK resin. Flow Sheet No. 3, which uses both heated feeds and complexing, is most attractive due to high processing rates, high resin bed capacity, and higher product concentration.

An equipment arrangement is presented for processing the filtrates by anion exchange in three batch columns. The operations are simple, and provide for nearly-uninterrupted processing of Button Line filtrates. The use of the anion exchange system will free the Button Line process from dependence upon Recuplex for filtrate processing.

b. Plutonium Electrorefining

A new electrolyte purification procedure was tested.

The alkali metal chlorides are melted together and electrolyzed below their decomposition potentials for two hours. The PuCl_3 is added and electrolyzed below its decomposition potential for two hours and then above this potential for 8 - 10 amp hours or until frothing ceases. The sodium fluoride is added last so that the frothing can be observed while electrolyzing the PuCl_3 .

This melt appears to be of the same quality as that prepared with HCl treatment. The procedure takes half the time.

c. Plutonium Metal Dissolution

The explosion hazard must be defined before developing a dissolution procedure under reducing conditions.

A dissolution run using hydrazinium nitrate, nitric-hydrofluoric acids was made in an attempt to achieve 200 g/l $\text{Pu}(\text{NO}_3)_3$. The experiment was conducted by dissolving 3 g of Pu metal (added in 0.5 g increments) in 25 ml of boiling solution. After the metal was dissolved, the solution was cooled, butted with additional $\text{N}_2\text{H}_5\text{NO}_3$ and HNO_3 , and heated back to boiling. An additional 3 g batch of metal was then dissolved. The above procedure was repeated a third time. During the dissolution of the third batch

of metal, an explosion occurred in the reflux condenser as an 0.5 g piece of metal was being added through the condenser. Although the condenser was shattered, the hood was not pressurized, and no other damage occurred. The possible causes of the explosion are hydrogen gas, the presence of hydrazoic acid, or other unidentified nitrogen compound. A series of experiments will be carried out in an argon atmosphere to sample the off-gas from boiling hydrazinium nitrate - nitric acid systems. These samples will be analyzed on the mass spectrophotometer.

Manager
Research and Engineering

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (continued)

H. FINANCIAL OPERATION

1. Production Cost

Subsequent to submission of operating budgets to Contract and Accounting Operation, local AEC changes in assumptions and requests for additional data resulted in the following budget information being submitted in April:

- (a) A rework of R&D and Production summaries for FY-1963 and FY-1964 to reduce R&D in conformity with late AEC decision to submit A and B programs for both years;
- (b) Submission of manpower data in connection with the above;
- (c) Submission of item by item justifications for Weapons, Buttons and Recuplex fund requests;
- (d) Preparation of detailed input and output schedules documenting the O3 Production fund request.

Meetings were held during the month with Chemical Processing Department field representatives and Contract and Accounting Operation cost accounting personnel relative to the criticality incident to assure appropriate booking of costs.

Spare parts analyses were made in April and reports issued to section and subsection managers highlighting major items of spares where turnover rate indicated excess investment.

CPD's investment in inventories at March 31, 1962 compared with budgeted balances at that date is shown as follows:

	<u>Balance</u> <u>3-31-62</u>	<u>Control</u> <u>Allocation</u>	<u>Surplus</u> <u>(Deficit)</u>
<u>Inventories</u>			
Essential Materials	\$ 793	\$ 880	\$ 87
Spare Parts and Standby	2 004	1 778	(226)
Special Materials	<u>270</u>	<u>268</u>	<u>(2)</u>
Gross Inventories	<u>3 067</u>	<u>2 926</u>	<u>(141)</u>

	<u>Balance</u> <u>3-31-62</u>	<u>Control</u> <u>Allocation</u>	<u>Surplus</u> <u>(Deficit)</u>
<u>Reserves</u>			
Essential Materials	\$ 56	\$ 58	\$ (2)
Spare Parts and Standby	450	440	10
Special Materials	<u>150</u>	<u>153</u>	<u>(3)</u>
Total Reserves	<u>656</u>	<u>651</u>	<u>5</u>
<u>Net Investment</u>	<u>\$2 411</u>	<u>\$2 275</u>	<u>\$(136)</u>

2. General Accounting

As of March 31, 1962, fifteen active projects had incurred costs of \$7,351,281 against authorized funds of \$11,398,400. Outstanding commitments totaled \$963,434.

During April, Directive No. AEC-201, Mod. No. 2 was received from the AEC for increase in funds on Project CAC-950 - Cesium Loadout Facility - 241-C, total authorization \$51,000.

Two appropriation requests were approved in April for a total of \$4,600.

3. Auditing

A formal audit report was issued in connection with CPD administration of the General Electric Suggestion Plan. Activities audited were satisfactory with the exception of routines for submitting special payment registers.

A formal audit report was issued in connection with audit of protective clothing. Use of these services by CPD was considered to be generally satisfactory, but indicated need for additional supervisory attention. Volume of protective clothing processed for CPD during the first two months of CY-1962 shows an increase of 18.9 percent over the same period in CY-1961.

An audit was performed of CPD Cash Working Fund in connection with C&AO's audit of HAPO cash. Activities examined were satisfactory.

Audit field work was started in connection with audit of office supplies and equipment.

4. Personnel Accounting

In connection with the criticality incident, many unusual problems were encountered during April, mainly related to the areas of emergency call-in, holdover, shift change, "furlough", and vacations.

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5. Singular Cost Studies

In collaboration with Production Operation, we developed costs for departmental operations under alternate FY-1964 budget assumption conditions as requested by HOO-AEC in March, 1962. This data was integrated with other HAPO departments for consolidation; however, further refinements will be incorporated in the study during May, 1962.

Detailed studies displaying the cost impact of NPR feed material on Chemical Processing Department are in process. This study involves the combined efforts of representatives of the three HAPO production departments.

Manager - Finance

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III PERSONNEL ACTIVITIES

A. FORCE SUMMARY

<u>Operation</u>	<u>Monthly Salaried</u>		<u>Weekly Salaried</u>		<u>Total</u>	
	<u>3-31-62</u>	<u>4-29-62</u>	<u>3-31-62</u>	<u>4-29-62</u>	<u>3-31-62</u>	<u>4-29-62</u>
General Manager's Group	10	10	1	1	11	11
Financial	14	14	15	15	29	29
Research & Engineering	66	66	27	27	93	93
Facilities Engineering	63	62	20	20	83	82
Power & General Maintenance	39	39	240	244	279	283
Production	5	5	4	4	9	9
Redox	47	47	205	205	252	252
Purex	65	64	242	244	307	308
Finished Products	<u>54</u>	<u>54</u>	<u>263</u>	<u>262</u>	<u>317</u>	<u>316</u>
Total	<u>363</u>	<u>361</u>	<u>1 017</u>	<u>1 022</u>	<u>1 380</u>	<u>1 383</u>

B. PERSONNEL CHANGES

No personnel changes during the month of April

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C. TRIPS

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
V. W. Smith	Mfg. Engrg. Services Schenectady, N.Y. Syracuse, N.Y. New York, N. Y.	Training methods (4/3/62) (4/4/62) (4/5-6/62)
F. D. Fisher	Silicone Products Dept. Waterford, N.Y. Chemical & Metallurgical Products Dept. Pittsfield, Mass.	Fluidized-bed Operations (4/19/62) Phosgene handling philosophy. (4/20/62)
<u>To AEC and Other AEC Contractors</u>		
R. H. Bond	Los Alamos Scientific Laboratory Los Alamos, N.M.	Pu metal purification by casting, slow directional freezing, mold materials, mold coatings. (4/13/62)
F. D. Fisher	Argonne National Lab. Lemont, Illinois	Spray and fluid-bed operations in small diameter columns, Pu volatility studies, fused salt studies. (4/16-17/62).
O. F. Beaulieu R. J. Kofoed	The Dow Chemical Co. Rocky Flats Plant Denver, Colorado	Attend meetings on sample exchange program. (4/25-26/62).
R. E. VanderCook	American Car & Foundry Industries and Sandia Corporation Albuquerque, N. Mex.	To attend IMOG Gage Subgroup meeting and Template Fabrication discussions. Tour Primary Stds. Lab. (4/16-18/62).
<u>To General Industry</u>		
F. S. Stong	Texas Instrument Co. Houston, Texas	Witness tests on liquid level indicator. (4/19-20/62)
G. P. Kesel	Northwest Copper Co. Portland, Oregon	Hood viewing windows. (4/27/62)
P. S. Kingsley	McCullough & Sons Portland, Oregon	Stainless steel fabrication. (4/5/62).
<u>To Conventions and General Meetings</u>		
P. S. Kingsley	Portland, Oregon	ASTM Meeting. (4/6/62)

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To Conventions and General Meetings (continued)</u>		
W. E. Kaufer	Portland, Oregon	Attend AIIE Conference on scheduling and inventory control. (4/13-14/62)
W. G. Browne	Science classes at Carmichael Jr. H.S. Richland, Wash.	Spoke on the "Importance of Atomic Energy" for the Speaker's Bureau. (4/19-20/62)

D. VISITORS

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From Other G.E. Components</u>		
E. A. Link	Metallurgical Products Project methods. (4/4-5/62). Dept., Detroit, Mich.	
F. Soderer	Seattle, Wash.	Recording instruments. (4/4/62).
O. Swenson	San Francisco, Cal.	
<u>From AEC and Other AEC Contractors</u>		
K. V. Best	Dow Chemical Co.	Plutonium recovery. (4/3-4/62)
L. L. Zodtner	Rocky Flats Plant Denver, Colo.	
T. A. Butler	Oak Ridge Nat. Lab.	Fission Product Technology and Waste Management programs. (4/3-5/62).
E. Lamb	Oak Ridge, Tenn.	
B. Manowitz	Brookhaven Nat. Lab. Upton, L.I., NY.	Fission Product Technology. (4/3/62)
W. Elster	U.S.AEC Washington, D.C.	Fission Product Technology (4/3/62)
<u>From General Industry</u>		
K. B. Wilson	Hughes Aircraft Co.	Demonstrate Mark II MOBOT. (4/17-20/62)
R. A. Larson	Fullerton, Calif.	
<u>From Foreign Governments & Agencies</u>		
C. J. Jouannaud	French AEC Marcoule, France	Purex and Fission Product Technology, Chemical Processing and Waste Management Programs. Plutonium Processing. (4/3-6/62).

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<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
Jacques Duboz	French Atomic Energy Commission	Chemical Processing and Waste Management Program. (4/4-5/62).
P. J. Regnaut Jacques M. Couture	Fontenay-aux-Roses Plant, France	Chemical Processing and Waste Management Program. Purex and Fission Product Technology. Plutonium Processing. (4/4-6/62)
M. Menoux	Saclay	
A. Barbreau	Fontenay-aux-Roses Plant, France	Waste management Program. (4/6/62)

From Colleges and Universities

Geo. Watt	University of Texas Austin, Texas	Purex Process. (4/10/62).
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IV. SAFETY AND SECURITY

<u>Operation</u>	<u>Facil.</u> <u>Eng.</u>	<u>Finance</u>	<u>Fin.</u> <u>Prod.</u>	<u>P&GM</u>	<u>Purex</u>	<u>Redox</u>	<u>Prod.</u>	<u>Rel. Prac.</u>	<u>Res. & Total</u> <u>Fig.</u> <u>CPD</u>	<u>Yr. To</u> <u>Date</u>
Disabling Injuries										2
Serious Accidents										1
Medical Treatment										
Injuries	1									
Radiation Occur.			5	21	7	11			45	105
Contam. Wounds			0*		8	3			11	76
Pu Depositions			3**						3	3
Fires									1	4
Security Violations	2			1***					2	4

* Finished Products Operation had a total of ten radiation occurrences, and Research and Engineering had a total of one radiation occurrence during the month of March, bringing Year to Date total of Radiation Occurrences for CPD for the month of March to 65.

** During the month of April, three previously incurred plutonium deposition cases were confirmed. Maximum permissible body burden was less than one percent in all of the cases.

*** Previous controlled burning was flaring up due to increased wind velocity. Damage \$10.00.

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V. REPORTS

A. PREPARED AND ISSUED

- HW-72296 Secret AWD, "Fabrication Process Specifications", dated January 12, 1962, by A. E. Smith.
- HW-72297 Secret AWD, "Fabrication Process Operating Procedures", dated January 12, 1962, by A. E. Smith.
- HW-72353 Secret, "Waste Management Program, Chemical Processing Department", dated March 16, 1962, by B. F. Campbell and G. Rey.
- HW-72402 Secret, "Final Evaluation Report - GE 312 Computer Test Program - 234-5 Building", dated December 29, 1961, by J. W. Kolb.
- HW-72801 Official Use Only, "Preliminary Project Proposal - Equipment Disposal - Purex - CGC-964", dated April 18, 1962, by D. W. McKee.
- HW-73171 Secret AWD, "Progress Report - Finished Products Fabrication Technology Operation - March 1962", dated March 29, 1962, compiled by members of the Finished Products Fabrication Technology Operation, Research and Engineering.
- HW-73250 Secret, "Purex Plant Production Schedule - April 1962", dated April 6, 1962, by D. McDonald.
- HW-73251 Secret, "Redox Plant Production Schedule - April 1962", dated April 6, 1962, by D. McDonald.
- HW-73252 Secret, "UO₃ Plant Production Schedule - April 1962", dated April 6, 1962, by D. McDonald.
- HW-73253 Secret, "234-5 Plant Production Schedule - April 1962", dated April 6, 1962, by D. McDonald.
- HW-73299 Secret, AWD, "Isotopic Standard Sample Exchange Program", dated April 6, 1962, by O. F. Beaulieu.
- HW-73322 Secret, "Production Assumptions for Updating Chemical Processing Department - Plant Improvement Program - FY 1962 Revision", dated April 9, 1962, by V. R. Chapman.
- HW-73400 Confidential, "Trip Report: Los Alamos Scientific Laboratory, April 13, 1962", dated April 16, 1962, by R. H. Bond.

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- HW-73406 Unclassified, "Interim Report - Chemical and Radiochemical Analyses of TE-241-A-103 Sludge", dated April 16, 1962, by T. R. McKenzie
- HW-73420 Unclassified, "Supplement - Process Specifications for Critical Mass Control - Purex Plant", dated April 19, 1962, by B. F. Judson.
- HW-73423 Secret, "Budget Activity 03-16-04 General Weapons Development", dated April 19, 1962, by P. H. Reinker.
- HW-73433 Secret, "Comments - Minutes of Plutonium Meeting March 6, 1962", dated April 19, 1962, by P. H. Reinker.
- HW-73456 Confidential, "Anion Exchange Flow Sheets and Equipment for Recovery of Task I Filtrates", dated April 23, 1962, by H. W. Crocker.
- HW-72946 Secret, Atomic Weapon Data, "Ten-Year Improvement Program, Plutonium Conversion and Fabrication", dated April 2, 1962, by R. E. Olson and M. J. Szulinski.
- HW-72983 Confidential Undocumented, "Chip Handling", dated April 18, 1962, by L. I. Brecke.

B. PREPARED FOR SIGNATURE AND ISSUANCE

- HW-73192 Secret, "Production - March 1962", dated April 2, 1962, 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. Reinke

General Manager
Chemical Processing Department

END

DATE
FILMED
4/19/93