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**CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT**

MAY, 1962

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JUNE 21, 1962

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HANFORD ATOMIC PRODUCTS OPERATION

RICHLAND, WASHINGTON

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MONTHLY REPORT
FOR

MAY, 1962

Compiled By
OPERATION MANAGERS

June 21, 1962

HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTONWork performed under Contract No. AT(45-1)-1350 between
the Atomic Energy Commission and General Electric Company.

HANFORD

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I. SUMMARY

Production through May, as compared with the May 9, 1962 HAPO Production Forecast (HW-73531), is summarized below:

	<u>Percent of Forecast Achieved</u>	
	<u>May</u>	<u>Fiscal Year To Date</u>
Separated plutonium nitrate	130.4	95.8
Separated uranium nitrate	141.2	96.6
Uranium oxide	112.0	94.2
Plutonium metal buttons	15.3	99.0
Fabricated parts	137.9	102.5

May production exceeded forecasted quantities for all products except plutonium metal buttons. Button production was low because (1) operations remained shutdown until May 18 as a result of the criticality incident on April 7; (2) after startup, processing was performed at a low rate. By month-end, however, button line performance was steadily improving.

The Purex plant operated at an average rate of 21 tons per day during May. Processing was continuous except for one brief interruption of four hours which was caused when a 2300-volt circuit breaker opened as a result of an overload on a vacuum pump.

Improved performance was evident in all phases of the Purex solvent extraction system with one exception, that being the 2D final uranium cycle column. Despite the marginal performance of this column, uranium waste losses were reduced to normal (< 0.002 percent) after installing a new prototype cartridge in the 2E final uranium stripping column. All production met specifications during the month.

The first strontium purification operations were started in the Hot Semi-works on May 27, 1962. Both the process and the equipment performed satisfactorily.

The HAPO II-2 cask was loaded with 130,000 curies of purified strontium-90. All tests have been completed and the cask is now ready to be shipped.

The Redox plant resumed satisfactory operations on May 23, 1962, following a two-month outage. During the shutdown, the continuous neptunium recovery system was completed, and an anion exchange contactor was installed in the 233-S Plutonium Concentration Building for final purification of the plutonium nitrate stream. Prior to startup, a thorough and complete hazards analysis was made of the new equipment and operating procedures.

Plutonium metal button production was resumed on May 18, 1962, after modifying the supernatant solution load-out facilities to permit recycling of the plutonium-bearing wastes to the separations plants for recovery of the plutonium. Supernatant volumes, larger than expected at startup, had been reduced to near normal by the end of the month.

Activities in the Recuplex facility were directed toward deactivation in a proven and safe manner. Prior to May, the Recuplex facility had been made secure against the resumption of the nuclear chain reaction which occurred on April 7, 1962.

Beneficial use was obtained on May 8, 1962, of the test wells provided by Project CAC-928, "Leak Detection - High Level Waste Tanks - Redox and Purex". A contract with Bore-Tun Company was also approved by the AEC on May 28, 1962, for the construction of caissons and associated laterals..

The Physical Completion Notice, with minor exceptions, was issued May 31, 1962, for Project CGC-913, "Project Birch - Redox".

A Notice of Award was given to Nor-Pac Corporation on May 22, 1962, for Project CAC-880, "Plutonium Reclamation Facility - Z Plant". The Notice To Proceed was issued May 31, 1962, but with the mutual understanding that start of work must await settlement of the current strike.

P. H. Leinker

General Manager
Chemical Processing Department

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II. ACHIEVEMENTS

A. PRODUCTION OPERATION

1. Production Statistics

a. Percent of Forecast⁽¹⁾ Achieved

	<u>May</u>	<u>Fiscal Year to Date</u>
Separated plutonium nitrate	130.4	95.8
Separated uranium nitrate	141.2	96.6
Uranium oxide	112.0	94.2
Plutonium metal buttons	15.3	99.0
Fabricated parts	137.9	102.5

b. Purex

	<u>May</u>	<u>April</u>
Uranium nitrate produced (tons)	620.56	302.39
Average production rate during operation (T/D)	20.2	15.2
Total waste loss (%)		
Plutonium	0.37	0.64
Uranium	0.38	0.35
On-line efficiency (%)	99.4	66.0

c. Redox

Uranium nitrate produced (tons)	20.70	0.84
Average production rate during operation (T/D)	5.3	0
Total waste loss (%)		
Plutonium	0.26	0
Uranium	0.31	0
On-line efficiency (%)	17.8	0

d. Uranium Reduction (tons)

Normal UO ₃ loaded	538.79	334.45
Enriched UO ₃ loaded	19.22	99.66
Normal UO ₃ approved for shipment	499.43	299.58
Enriched UO ₃ approved for shipment	0	93.91
Normal UO ₃ shipped	549.14	250.32
Enriched UO ₃ shipped	94.07	46.40
Normal UNH backlog	315	233
Enriched UNH backlog	31	29

(1) HW-73531, HAP0 PRODUCTION FORECAST, dated 5/9/62.

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e. Plutonium Metal Processing

	<u>May</u>	<u>April</u>
Input to Task I (batches)	95	8
Reduction yield (%)	96.8	96.4
Product recovery output (Kgs)	4.32	9.72
Product recovery backlog (Kgs)	964.18	883.84
Waste disposal (grams)	124	877

f. Power

	<u>200-East</u>	<u>200-West</u>
Raw water pumped (gpm)	10,535	3,653
Filtered water pumped (gpm)	1,152	893
Maximum steam generated (lbs./hr.)	280,000	110,000
Average steam generated (lbs./hr.)	234,000	68,492
Total steam generated (M lbs.)	173,922	50,958
Coal consumed (tons)	9,127	2,679

May production exceeded forecasted quantities for all products except plutonium metal buttons. Button production was low because (1) operations remained shut-down until May 18 as a result of the criticality incident on April 7; (2) after startup, processing was performed at a low rate. By month-end, however, button line performance was steadily improving.

Manager - Production

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II. ACHIEVEMENTS (Continued)

B. PUREX OPERATION

1. Operating Continuity

The plant operated continuously at an average of 21 tons per day rate except for one period of four(4) hours during an emergency power outage.

All production met specifications. Higher than normal uranium losses via the organic wash from the second cycle uranium system continued, although reduced ten-fold from previous levels. Installation of a special cartridge in the 2-E second uranium stripping column on May 28, 1962, reduced the uranium losses to normal.

2. Processing Operation

Handling of supernatant solutions from 234-5 Building was started on May 19, 1962, and has continued at an average rate of 50 SN cans per day with no adverse effect on process performance.

Plant rates were limited by dissolver capacity. The B dissolver silver reactor became restricted and was removed from service for chemical flushing on May 10, 1962. Flushing and generation were completed and the unit returned to service on May 24, 1962.

The first strontium purification run in the Hot Semiworks began on May 27, 1962. The HA-HC purification columns and other equipment performed well during the run. Preliminary data indicated acceptable losses to the HAW waste stream and excellent cerium decontamination.

The HAFO II-2 cask was loaded with 130,000 curies of purified strontium-90 at the Hot Semiworks. All tests were completed and the cask is available for shipment. A waste solution containing strontium was successfully batch contacted at Hot Semiworks with di (2 ethyl hexyl)phosphoric acid and stripped with dilute nitric acid under strict pH control. The result was recovery of approximately 125,000 units of strontium-90.

Three strontium recovery runs were completed in 202-A E cell. A total of 312 kilocuries was recovered in the first two runs. Analyses to determine the amount recovered by the last run are not complete.

One 500-gallon cask of waste material from the 300 Area high-level cells was unloaded and the contents transferred to underground storage. A total of 353,000 gallons was transferred from the C tank farm to the BX and BY tank farms to make room for Purex coating wastes.

3. Mechanical Experience

The inboard bearing on the #3 exhaust fan at 291-A failed, resulting in a broken fan shaft and severe damage to fan belts, belt guards, sheeves, and bearing pillow blocks.

An electrical power failure at the 2300 volt level resulted in a four (4) hour process outage on May 11, 1962. The outage occurred when an air sampling pump was started up and overloaded the emergency power circuit. The circuit breakers related to the outage have been re-adjusted and the air sampling pump overhauled.

The stainless steel 2-E second uranium stripping cartridge was replaced on May 28, 1962. The new 2-E cartridge contains graded stainless steel nozzle plates interspersed with 3/4-inch thick linear polyethylene plastic plates.

Other equipment changes included replacement of stainless steel filter unit in the 201-C vessel vent system and a transfer pump in tank 102-C.

4. Radiation Experience

The short cooled metal in C-3 dissolver was dissolved, starting on May 9, 1962. The total radio-iodine I31 emission for the month was 1.05 curies. The maximum seven-day emission was 0.32 curies.

5. Analytical Experience

Equipment in the Analytical high-level work station was modified and operating techniques developed in order to provide special spectrophotometric iron and chromium analysis on bulk samples of highly radioactive waste solutions. The analytical data obtained are being used to determine a corrosion profile of the Purex process equipment.

6. Events Influencing Cost

Four operators were borrowed from 234-5 Building to help handle processing of large volumes of supernatant solutions from 234-5 through the Purex plant. Some overtime work has been incurred. The increased sampling analytical load has been successfully handled by the laboratory.

P. R. Johnson
Manager - Purex

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II. ACHIEVEMENTS (Continued)

C. REDOX OPERATION

1. Operating Continuity

The installation of the continuous neptunium recovery system and an anion exchange system in the Redox Plant was completed after a two-month outage. Prior to the startup of the plant a thorough and complete hazards analysis was made of the new equipment. All superfluous equipment in the operating hoods in the 233-S Concentration Building was removed and the one non-geometrically favorable vessel in the system was removed and replaced with a geometrically favorable vessel. An inspection of the facility and a review of the hazard analysis and operating procedures was made by the department Advisory Group prior to starting up the facility on May 23.

2. Processing Operations

The Redox Plant resumed operations on May 23 following a two-month outage (shutdown on March 21) to install continuous neptunium recovery facilities and a Higgins anion exchange contactor in the 233-S Plutonium Concentration Building for final purification of the plutonium nitrate stream. Leak checking and operability testing of the new equipment was completed by mid-month. Modifications to the new facilities, as recommended by the Hazards Review Task Force, were also completed during this period and processing of plutonium requiring rework was started through the new anion exchange system on 5-20-62. Virgin metal feed solution was started into the plant extraction system at 1520 on 5-23-62. Except for four mechanical interruptions, which varied from four to twenty-six hours in length, processing was continued as planned for the balance of the month.

Although the mechanical difficulties in the extraction system, as noted above, interfered with stable operation of the anion exchange contactor, preliminary data indicate that an arithmetic decontamination factor of 5 or more was attained, and all final plutonium product met shipping specifications.

The first seven batches of UNH, processed after the resumption of operations, were slightly high in plutonium content. This material is currently being held in storage for reworking as processing conditions permit.

Three batches of waste solution, high in product content, were generated during the initial startup period. All of this material was subsequently reworked via the 1-S precycle extraction column.

A new plutonium recycle unloading and monitoring system was installed in the 233-S Plutonium Concentration Building during the last week of the month. The new system provides facilities for returning plutonium-bearing waste from the Task I operation of the 234-5 Building to the Redox process for reworking. The waste solutions will be transferred to a geometrically favorable glass tank (I-22) containing a BF_3 neutron counter, where the plutonium content will be verified before returning to the Redox process via the recycle tank.

3. Mechanical Experience

All major equipment and piping installations associated with the continuous neptunium recovery project (CGC-913) were completed and the project was closed out with minor exceptions.

Several equipment modifications were made in the 233-S Building portion of the project as a result of the final critical hazards review. These included replacement of the L-1 acid stream feed tank and packing of the L-1-A addition tank with boron-impregnated glass Raschig rings to make both vessels critically favorable. The replacement of the L-1 tank removes the last of non-favorable geometry in the 233-S Building operating area. The addition of boron-containing glass Raschig rings in the L-1-A tank also adds assurance that a nuclear incident will not occur and provides the opportunity to evaluate chemical and structural stability of these rings.

The pump-agitator in the F-7 metal solution feed tank developed severe leakage at the throttle bushing and a new unit was installed on 5-29-62. The failed unit had operated 106 hours since it was originally installed on 3-17-62.

A short in the motor of the pump-agitator in the F-8 metal solution feed tank also developed this month and a new unit was installed on 5-7-62. Subsequent operation has been satisfactory.

The pump-agitator in the E-3 plutonium sampling tank failed and was replaced with a reclaimed unit on 5-31-62. The pump had been in operation since 10-9-61, and failed as a result of a shaft seizure.

Installation of the new concrete column carrier tunnel door was completed during the plant shutdown and is operating satisfactorily. The hoist and switchgear for the new door are now located at ground level, thus providing much easier access for maintenance work and reducing considerably the radiation field under which personnel were formerly required to work.

4. Waste Handling and Decontamination

On 5-11-62, a shipment of contaminated machine parts (approx. 1800 lbs.) from the Dow Chemical Company, Rocky Flats, Colorado,

was received and buried without incident.

Equipment valued at \$117,000 was received from the processing plants for decontamination, repair or inspection during the month. Equipment valued at approximately \$20,000 was returned to CPD customers, representing a savings of approximately \$17,000 over the cost of new replacement equipment.

A total of 290 manhours was charged to the decontamination and/or repair of railroad, automotive and heavy equipment. The following is a breakdown of the major items involved:

<u>Item</u>	<u>Operation Charged</u>
Well Cars No. 37, 39 & 42	CPD
UO ₃ Car	FPO
Flatcar No. 19028	WH&DO
Pickups No. 1C-202 & 1C-233	Purex
Motor Cranes (2)	P&GM
Motor Stator	IPD
Centrifuge Diverter	CE&UO (Spare Parts)
D-4 Caterpillar Tractor	P&GM
Hanford Jumper Heads (24)	Project CG-897
Process Tank (12-7)	Project CG-897

5. Radiation Experience

Six skin contamination cases and three radiation occurrences were recorded during the month. Most significant was the radiation occurrence in which a process operator received a contaminated finger wound (76,000 d/m) while working in the 233-S Concentration Building. A formal investigation of the incident was held, the details of which are reported in Radiation Exposure Occurrence Type B - CPD 62-2.

A minor fire occurred outside the 233-S Plutonium Concentration Building on May 27 and the plastic cover on a temporary air-lock erected at the building entrance was destroyed. Preliminary investigation suggests that rain water, which had become pocketed on the plastic, produced a lens effect and the focusing of the sunlight set fire to the plastic. There was no other damage and no contamination spread.

Nine Hanford Criticality Dosimeters, developed by the Hanford Laboratories Operation, were received and installed at strategic locations throughout the Redox Plant area. The new units replace the seven Oak Ridge Threshold Dosimeters installed during February and March of 1960, for radiation dose determinations in the event of a criticality incident. The cost of the new Hanford instrument is approximately \$50, a significant reduction from the \$800 cost of the Oak Ridge model.

The Redox Plant's "Nuclear Excursion Evacuation Procedure" and "Emergency Quick-Sort Procedure" were revised and up-dated effective May 1, 1962.

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6. Analytical Experience

The first samples, under the Atomic Energy Commission's program for the investigation of radiation damage to reactor materials, were received from the General Electric Vallecitos Atomic Laboratory this month. Isotopic analyses, performed on the 256 Multi-Channel Analyzer, were completed and results forwarded to Non-Metallic Materials Development, Hanford Laboratories Operation, for evaluation.

Neptunium and plutonium analyses were performed on waste stream samples from the Purex Plant as a service to the Development and Corrosion Chemistry Operation. The analyses were performed in support of the program to determine the feasibility of recovering neptunium from waste stream solutions by the utilization of Soltrol with tri-butyl-phosphate and an organic complexing agent.

Extensive anion and cation analyses were performed on a second series of samples taken from a Purex Plant waste tank. This work was requested by Process Chemistry, Research & Engineering Operation, in conjunction with their sludge removal studies.

7. Events Influencing Costs

The Redox Plant operated on Memorial Day, May 30, 1962 and all shift personnel worked their normal schedules. Straight day personnel observed the holiday.

Manager - Redox

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II. ACHIEVEMENTS (Continued)

D. FINISHED PRODUCTS OPERATION

1. Operating Continuity

Startup of the plutonium preparation facilities was delayed until May 18 to permit the installation of a load-out system to allow Button Line supernates to be delivered to the primary plants. The resulting shortage of plutonium feed to the fabrication facilities caused interruptions to the continuity of operation there. The Recuplex facility remained shut down following the criticality incident of the past month. Skull burning and dissolution continued normally. Uranium oxide production was slightly interrupted by feed shortages.

2. Processing Operations

a. Plutonium Fabrication

Information on plutonium fabrication is presented in Document HW-73967 entitled "Chemical Processing Department, Finished Products Operation, Z Plant Monthly Report, May, 1962," which is classified "Secret, Atomic Weapon Data, Production Rate and Stockpile Quantity Information."

b. Plutonium Processing

Operation of the plutonium preparation facilities which was resumed on May 18 has been moderately successful. Supernate volumes at startup were higher than anticipated and have been limiting in both the Button Line and in Purex. Procedure changes and mechanical corrections of the new load-out system have resulted in operational rates which are approaching the original design capacity which is approximately half of the formerly demonstrated capacity.

Recovery activity in May consisted of skull burning and dissolution, and some minor processing in the incinerator. The Recuplex facility remained shut down with the major activities being the preparation of "as built" drawings and the procurement of evidence for the investigating committee which was still meeting at month end.

c. Uranium Reduction

Uranium oxide production was normal during the month except that the shortage of feed prevented the meeting of schedule.

An unusual incident occurred in U Plant on May 4 when approximately ten tons of uranium in UNH solution was accidentally pumped to 221-U building through a line which was thought to have been blanked at the time of the TBP plant shutdown in 1957. The employees in 221-U Building, when they observed the material in the 5-6 tank, thought it to be water and transferred it to the 361 catch tank where it remained because of a plugged line to the crib. No significant loss will be incurred since it was possible to remove this material from the 361 tank to the 301 tank and hold it for reprocessing.

3. Mechanical Performance

In the Fabrication and Uranium Reduction Operations, equipment performance was satisfactory during the month.

In Plutonium Processing, following startup on May 18, it was necessary to unplug a large number of lines, pumps, and valves in Hoods 7-A and 7-C. Prior to that time, efforts were involved with piping and equipment changes to isolate Hoods 7-A and 7-C from the Recuplex facility and to provide load-out facilities for the Button Line supernates.

In recovery, the maintenance effort was directed toward assisting the operating group in regard to investigation of the April criticality incident.

4. Radiation Experience

Radiation and contamination control statistics reveal that control was satisfactory in May.

Two cases of potential plutonium deposition occurred when a glove ruptured on one of the hoods in Room 227. Some plutonium oxide was inhaled by two operators in the time it took them to don masks. Initial bio-assay results indicate 5 to 10 per cent MPL on one of the men and less than 5 per cent MPL on the other.

5. Analytical Experience

	<u>April</u>	<u>May</u>
Number of Samples Received	757	1,568
Number of Determinations	5,313	10,317
Total Metallic Impurities, Buttons	1,395 ppm	1,433 ppm
Total Carbon Content, Buttons	398 ppm	370 ppm
Buttons Rejected	8.7%	7.0%
Pu 240 NRF (by neutron count)	7.83%	----
Pu 240 NRF (by Mass Spec.)	----	7.67%
Pu 240 Regular (by neutron count)	----	----

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II. ACHIEVEMENTS (Continued)

E. POWER AND GENERAL MAINTENANCE OPERATION

1. Operating Continuity

There were no interruptions of steam, water, or emergency electrical services that affected continuity of operation of production facilities. Operating continuity was interrupted, however, at the Purex Facility when a 2300-V circuit breaker opened as the result of an overload on a vacuum pump. Since this was an outage within the 202-A Building, and not a main-line area feed, the emergency generator in the 200-East Area Power House did not come on the line. The outage occurred on May 11 and was of a three-hour duration.

2. Inspection, Maintenance and Repair

Fabrication, on an emergency basis, of 305 PR (product receiver) cans, as required by the Finished Products Operation, was completed May 18. The urgent need for additional PR cans was attributed to the criticality incident of April 7. Approximately 2400 manhours of overtime were used in order to maintain the can-fabrication schedule and prevent shutdown of the Purex Facility.

Repairs and modifications to the spare Purex concentrator were in progress at month's end. Included was the grinding out and replacement of approximately 165 inches of faulty welding, and replacement of the raschig-ring demister section with a tantalum pad. Several nozzles require alteration, and the unit is to be insulated and covered with stainless-steel sheathing. The work is considered priority, and special emphasis is being placed on completion without resorting to premium costs.

Considerable time has been expended in replacing the screws that secure the glove-port rings to the hood panels in the Z-Plant Plutonium Recovery Incinerator Facilities. The original screws were cadmium-plated and have been attacked by the corrosive atmosphere in the hood.

The buffer lid on one of the HAPO-II casks was altered to allow lifting of the cask and buffer by means of lifting lugs. The alteration was necessary to accommodate transfer of the unit from flatcar to truck at the Martin Company site at Quehanna, Pennsylvania.

A prototypal cartridge for the Final Uranium Stripping Column (K3) was assembled and delivered to the Purex Facility. The new cartridge

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contained both stainless-steel and thick linear polyethylene plates. Reduced waste losses and increased production capacity were the incentive for installing the new cartridge.

Machining of the inner shell for the new HAP0-I cask was completed, and the unit shipped to New York, May 18, for installation of the filter screen. Final completion and installation in the cask will take place at HAP0, following the unit's return from New York.

The Machine Shop and Tool & Die Shop operated on a six-day-week schedule, in a concentrated effort to expedite the tooling, gauging, fixtures, etc., required for the conversion of Z-Plant fabrication facilities to a new model.

Special emphasis was placed on pushing the Purex Palm Project to completion. Meeting the scheduled completion date is contingent upon production schedules allowing sufficient time for "tie-ins" which have to be made while the building is down. Work progress at month's end was as illustrated below.

Pipe and operating gallery piping	95%
Aqueous make-up alterations	98
Sampler installations	70
Electrical additions	85
Instrument additions	80

Assistance was rendered the Hanford Laboratories Operation by maintenance groups supporting the Plutonium Carbide Development Program at the 231-Z Facility. All equipment required for fabrication of the third requested shape had been made operable by month's end; however the need to modify or replace certain parts of this equipment may yet be in order.

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

Palm Project, CGC-821	2 jumpers
NPR Fuel Processing Project, CGC-929	1
Purex Reliability Project, CGC-895	4
Secondary Containment Project, CGC-930	7
Birch Recovery Project, CGC-912	1
Purex Replacements	10
Redox Replacements	<u>2</u>
Total	27 jumpers

A grossly contaminated 50-foot pump was removed from the 113 tank at the 241-SX Tank Farm, and disposed of by burial in the conventional manner. Evidence indicated the pump had received irreparable damage when the bottom of the tank buckled.

Modification of the power supply for the remote weather station telemetering units was completed. The reliability of the ten units throughout HAP0 and the Wahluke Slope was considerably improved with the replacement of the existing old-type, six-volt, wind-driven generators with new twelve-volt units.

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Additional instrumentation was installed in the 271-CR Building, 200-East Area, to meet the needs of the Chemical Effluent Technology Group. Included were differential pressure transmitters, converter recorders, conductivity meters, and twenty thermocouples for indicating temperatures of different phases of the process. The operation is concerned with the removal of certain isotopes from low-level Purex wastes.

William L. Lamm
Jov.
Manager
Power and General Maintenance

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (continued)

F. FACILITIES ENGINEERING OPERATION

1. Purex

a. Process Design Engineering

Formaldehyde Denitration of IWW

Early attempts to start up the formaldehyde unit were characterized by excessive pressure drop across the tower (750" H₂O) and low liquid level in the pot (25" of IWW). A study was made to determine the feasibility of relocating the tower and increasing its diameter to avoid tower flooding. However, the available data from pilot plant operation and from operations indicate that the problem is either foaming or unstable boil-off conditions within the pot. The plant unit is now operating at a much reduced rate with pressure drop across the tower somewhat higher than expected.

To define the problems in operating the formaldehyde unit, a tenth size model has been designed and is being built for installation in the 321 Building. This installation is scheduled for completion on June 8, 1962.

Essential Waste Routing System

An alternate waste routing was scoped for possible incorporation into the Purex waste complex planned under Project CAC-970. The scope includes new encased pipe lines from Purex to a diverter station which allows routing the waste streams to any one of the existing or new Purex waste tanks without going through a diversion box. The scope for this project has been integrated with the scope for the new 241-AX Tank Farm.

241-AX Waste Tank Farm

The scope document was approved by CPD and transmitted to the AEC.

Hot Semi-Work Load-Out System

Detail design drawings covering proposed modification to the fission product load-out station at 201-C have been completed. The design of the proposed modification features several improvements to afford semi-automatic operation and replacement of

process valves, shielding from D Cell environment, and better tie-ins to E Cell.

Concentrator Designs

Pressure-drop-capacity data were obtained recently on the J-8 concentrator in normal Purex service. The data indicate that the actual condenser pressure drop is less than calculated previously and that from a pressure drop standpoint alone, the present J-8 concentrator and condenser should operate satisfactorily at 4.0 capacity factor under the proposed high capacity flowsheet.

Corrosion tests performed locally indicate that tantalum, used for deentrainer pad construction, has corrosion rates less than 0.01 mil/month for boiling IWW, IWW with 10 times normal fluoride, and with various decontamination agents used at Purex.

b. Project Engineering

CAC-928 - Leak Detection - 241-A and 241-SX

The final vertical test well (total of 88) was completed May 8, 1962, and beneficial use of this phase on the project was attained on that date. All contract work, including site clean-up, was completed May 14.

A contract with Bore-Tun Company for installation of five caissons with associated laterals and the above-ground work for six caissons was approved by the Commission on May 28, at a contract price of approximately \$287,000. Notice of Intent to Award was given to Bore-Tun on the same date. This notice permits procurement of materials while awaiting settlement of the current strike.

CGC-948 - Strontium Storage & Waste Disposal - Hot Semiworks

Directive HW-531, Modification #2, dated May 25, authorized \$169,300 for design and construction, including transferred capital costs of \$10,000. This authorization increases the original funds by \$49,300.

CGC-964 - Equipment Disposal - Purex

Directive HW-537, dated May 27, 1962, authorized General Electric Co. \$30,000 for design.

c. Manufacturing Engineering

Methods Study Film Program

The film, "Loading STT Cesium Casks", has been analyzed and the results of the analysis furnished to interested personnel in

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the Purex Operation. The analysis indicates that a minimum of 20 percent of the direct labor involved in this operation can be eliminated without a major investment, and without drastically altering the operation.

2. Special Separations Processing

a. Process Design Engineering

Task I Supernatant Load-In

Detail design drawings were completed and transmitted to Redox Operation covering load-in facilities to handle Task I filtrate. A new glass tank, L-22, will be used for hold-up while obtaining a neutron count for plutonium concentration.

L-12 Pu Concentrator

Preliminary design and drawing review was completed of new L-12 Unit in 233-S Building. The new loop will be similar to the present L-3 loop.

b. Project Engineering

CGC-913 - Project Birch - Redox

The Physical Completion Notice was issued May 31, 1962, listing minor exceptions and as-built work. The estimated final cost is \$316,500 -- including \$14,900 for accruals--compared with the authorization of \$325,000.

3. Finished Products

RMA Fabrication Line

A study-type arrangement drawing was prepared and issued showing the arrangement of all new equipment in the RMA fabrication line and present shop area according to the plans made by the Fabrication Task Force. Preliminary engineering work was undertaken to remove the maintenance and ceramic shops and convert the area to a process area. Information was forwarded to obtain cost estimates for this work. Preliminary engineering studies were initiated for a rolling mill and Marform press. The basic equipment needed has been defined, and initial equipment arrangements have been made. Preliminary engineering studies were also initiated on additional casting equipment. A purchase specification was issued for a 100,000 psi pumping system to be used in 231-Z or with a future isostatic press in 234-5. Floturn machine modification has been completed as regards work to be done in 272-W. Hood fabrication is also complete. Some aluminum shapes have been floturned with a fair degree of success.

b. Project Engineering

CAC-880 - Plutonium Reclamation Facility - Z Plant

A Notice of Award was given to the Nor-Pac Corporation on May 22, 1962. A Notice to Proceed followed it on May 31, 1962. No work can be started on site until the current strike is ended.

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

This project is being closed out as of June 1, 1962, with exceptions. The estimated final cost is \$40,000, the amount of the Directive

c. Manufacturing Engineering

1251 Maching and Inspection Methods Study

The machining and inspection operations associated with manufacture of the 1251 model were filmed for subsequent radiation and methods analyses.

4. General

a. Process Design Engineering

Cask Design Verification Test Program

Two model casks were shipped on May 10, 1962, to the University of Texas under the design verification test program. The shipment of the first model casks containers has been delayed until about June 8, 1962 to allow modification to the rubber spool pieces.

b. Project Engineering

Project Cost Information as of 5-20-62:

Total Authorized Funds - 16 active Projects	\$11,605,000
Total Cost-to-date	7,857,000
Commitments and Open Work Releases	1,056,000
Unencumbered Balance	2,692,000
Costs Charged to Above Projects	
4-22-62 to 5-20-62	278,000

Manager - Facilities Engineering

HP Shaw:olc

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

G. RESEARCH AND ENGINEERING OPERATION

1. Purex Process Technology

a. Solvent Extraction

During the month solvent extraction performance continued to show improvement in all portions of the plant except the 2D Column of the Final Uranium Cycle. Decontamination and recovery performance of the First Cycle was excellent. Superior performance in the Final Plutonium Cycle produced plutonium with only 20 - 25 per cent of the gamma activity permitted by the product specifications. Large volumes of supernatant solutions from plutonium precipitation operations in the 234-5 Building were successfully processed through the Purex Plant.

Uranium losses in the 2EW stream from the 2E Column were reduced from a peak of 1.5 to approximately 0.03 per cent by using 5 vice 2.5 per cent sodium carbonate solution for solvent washing and adding a batch contact step in the No. 2 Solvent System. The 2EW losses were further reduced to 0.002 per cent with normal flow ratios and solution temperatures after installation of a new 2E Cartridge containing graded nozzle plates interspersed with 3/4-in. thick plastic plates. The operable pulse frequency of the new cartridge is 63 cycles per minute compared to 38 for the previous nozzle-plate cartridge.

b. Neptunium Recovery

Neptunium accumulation in the Backcycle Waste System was below normal because 30 - 50 per cent of the neptunium in the virgin feed escaped via the final uranium product. (This material is recovered during subsequent uranium processing at Paducah.)

c. Plutonium Concentration

Resin movement in the plutonium ion exchange unit intermittently became very difficult near mid month after the resin had been in the unit approximately 45 days. During the periods of poor pushing, plutonium recycle increased sufficiently to raise the plutonium concentration appreciably throughout the plant. Using a special procedure for changing resin, including appropriate critical mass controls, the resin in the unit was replaced without a shutdown. Operation of the unit was smooth subsequent to the resin change.

d. Solvent Treatment

Solvent losses from the No. 2 System increased a factor of four to 400 gallons per day, after inauguration of a five per cent sodium carbonate wash in the feed tank to the 20 Column (TK-R1). However, the "lost" solvent was segregated from the washes and stored for future recovery. The batch washing in TK-R1 was discontinued when the 2E Column uranium losses returned to normal after installation of the new 2E Column cartridge. In addition, the concentration of sodium carbonate was reduced from 5 to 2-1/2 per cent in the organic wash solutions throughout the plant.

e. Waste Management

After the installation of new flow controls, the prototype for denitration of high activity waste (IWW) operated smoothly at a formaldehyde flow of fifty per cent flowsheet. Decontamination performance of the recovered acid system appeared to remain low, possibly due to sampler and receiver cross contamination.

f. Fission Product Recovery

Batch size for strontium recovery from high activity waste (IWW) has been increased to 60 kilocuries of Sr 90 per sulfate precipitation. Overall recovery continues to be 50 - 60 per cent with the major loss occurring in the sulfate step.

Aged rework material was successfully purified at the Strontium Semiworks using a batch contact with di(2-ethyl hexyl) phosphoric acid. The strip contact was made with nitric acid under careful pH control to avoid the use of citric acid and its attendant decomposition problems.

Campaign operation of the HA-HC purification columns in the Strontium Semiworks was underway at month's end with preliminary data indicating low HAW losses and excellent cerium decontamination.

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2. Redox Process Technology

a. Plutonium Anion Exchange

Leak checking and operability testing of the anion exchange system installed in the 233-S Building was completed at mid-month. Modifications to the facility recommended by the Hazards Review Task Force, which included replacement of the XAS Feed Tank (L-1) with one of favorable geometry and poisoning of the XCX Addition Tank (L-1-A) with Pyrex Raschig rings, were also completed and processing of plutonium requiring rework was started on May 20, 1962. Mechanical difficulties in the extraction system caused frequent shutdowns and changes in the processing rate, so that stable operation of the anion exchange facility was not attained. Preliminary data indicated that an arithmetic decontamination factor of 5 or more was readily attained, and all final plutonium product met shipping specifications.

A new plutonium recycle unloading and monitoring system was installed and put into service by month-end. Plutonium-bearing wastes from the Task I operation of the 234-5 Building are transferred into a new geometrically favorable glass tank (L-22) containing a BF₃ neutron counter. There the plutonium concentration and quantity are determined from calibration data and checked against shipper statements before the solution is added to the recycle tank (L-16) for transfer to the metal solution oxidizer (H-4). The neutron counter gave excellent correlations with laboratory analyses at high plutonium concentrations and is adequate for recycle monitoring to one gram of plutonium per liter. Some additional evaluation of background effects at low concentrations will be required.

b. Solvent Extraction

The modified neptunium accumulation process, which employs the HS Column for retention of the neptunium inventory, appears to be operating efficiently. Neptunium has accumulated in the LAFS Concentrator System and the HSF tank to give a feed to the HS Column of 0.3 - 0.5 gram per gallon. The neptunium concentration in the HS Column waste samples is at or near the lower detection limit of $< 2.0 \times 10^{-4}$ grams per gallon.

At the time of the adoption of ferrous sulfamate as the reductant for the 1BX and 3DS streams in July 1961, the use of sulfamic acid as a nitrite suppressant was continued. Elimination of the sulfamic acid from the 1BX and 3DS salt streams was initiated, on a test basis, in February, 1962. Since no adverse effects were noted, sulfamic acid-free 1BX and 3DS streams are now standard and a chemical savings of \$2 per ton has been realized.

c. Waste Storage

The initial attempt to obtain a sludge core sample from the 108-SX tank, using equipment similar to that used by the Purex Operation in January, 1962, was unsuccessful. Plugging of the flushing holes in the cutter head allowed penetration of only 14 inches of the 38-inch sludge layer. Inspection of the core sample, one week later, found that the solids, presumably mainly sodium nitrate, had been dissolved by the 24 inches of seal water trapped in the sample tube above the solids. A second attempt to obtain a sludge core sample from this tank will be made in June following transfer of the non-boiling supernatant solution and dissolution of the top 15-20 inches of sludge.

During June, 1961, an attempt was made to insert a chisel-pointed probe, equipped with seven thermocouples, into the 108-SX tank sludge to measure the temperature of the sludge at various depths. Repeated attempts to penetrate the sludge layer finally bent the 30-inch-long lower section of the probe. A satisfactory probe for inserting thermocouples into the sludge layer, without disturbing the sludge, has not yet been designed. Thermocouple-carrying probes were installed in the 110-SX and 115-SX tanks during the month. These tanks have 0 inches and 3.5 inches of measurable sludge at present. These thermocouples, located at 4-inch intervals on the bottom 2 feet of the probe, will permit temperature measurements as the sludge builds up in these tanks.

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3. Finished Products Chemical Technology

a. Metal Finishing Operation

1. Button Line

The button line started up on May 18, 1962, following a six-week shut-down. During the shut-down, equipment modifications were made to permit treating and loading out the supernates for recycling to the separations plants (Redox and Purex) for recovery, as the normal recovery facilities in Recuplex are not available. KMnO_4 is now added to the filtrate solution to decompose any oxalate, and the resulting solution treated with NaNO_2 to eliminate any excess KMnO_4 prior to filtering, sampling, and loading out. Button line operations have been satisfactory; however, rates, dependent on the volume of aqueous recycle generated, are about half those normally obtained when recycle was coupled to the Recuplex process. Aqueous waste generation during the first week of operation exceeded the expected rate due to erratic feed flows. Improved control of chemical additions and elimination of the drum filter cake wash has reduced the waste volume to an acceptable level ($\sim$ 110 - 125 percent of calculated volume).

2. Recuplex

On April 7, 1962, a nuclear excursion occurred in the Recuplex facility in the organic wash receiver (K-9 tank) during a system flush. By April 27, 1962, steps had been completed for making the facility secure against a resumption of the chain reaction. All operations in the Recuplex facility have been suspended for an indefinite period of time. All work in the Recuplex facility has been directed toward "deactivating" the facility in a proven, safe manner. To date procedures have been written and completed for sampling most of the vessels and sumps in the solvent extraction (SE) and reception and blending (R & B) hoods, for checking the status of all valves, and for obtaining special samples from parts of the system.

An AEC-HAPO committee is conducting an investigation of the incident and will issue a report on completion of the investigation.

b. Uranium Reduction Operation

An accidental transfer of UNH solution from the storage tank (X-1) to the 221-U Building, through a transfer line formerly used in the shut down TBP process, resulted in UNH solution ultimately being routed to the waste system. Approximately seven tons of uranium (as UNH) were recovered from the 361-U catch tank, and transferred to a storage tank (301) in the 211-U area on May 11 and May 12, 1962. The material recovered has been sampled to determine purity and subsequent method for reprocessing.

Process Test 62-1-T, designed to determine methods for improving the reactivity of UO_3 at the Paducah Plant of Union Carbide Nuclear Company, has been temporarily suspended. The test had been conducted with E-metal to minimize the inventory of UO_3 in test batches, however, this material has recently been routed to the Fernald Plant of the National Lead Company of Ohio for isotopic blending and direct conversion to metal as part of the program for increasing neptunium production. The test will be reevaluated and resumed using the depleted uranium system.

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4. Process Chemistry

a. Purex Process Assistance

Laboratory investigations on the second sludge sample from Purex Tank A-103 is underway with the results closely paralleling those on the first sludge sample.

	<u>1st sample</u>	<u>2nd sample</u>
H ₂ O Soluble	67%	64%
HCl Soluble	18%	14%
Residue	1%	3%
Pu g/g sludge	2.1×10^{-5}	3.2×10^{-5}
Np "	2.8×10^{-5}	5.6×10^{-6}
U "	0.006	0.018
Na "	0.281	0.346

Investigation into the process problems around the Purex K-cell is continuing. The effort centers more around the 2D column since performance of 2E was substantially improved with the new column cartridge. Filters from the water system have been obtained and organic extractions on the filter disclosed the presence of resin or other organic material. Water leaching of the filter as well as 1CU leaches of the filter disclosed the presence of surfactants and also a reduction of 1CU extraction rates by a factor of two or more in the presence of the leached material. Subsequent transfer rates of the 2DU during stripping with 0.01 M HNO₃ also appeared to be slower.

Thirty-five liters of water were concentrated to 100 ml and laboratory tests indicated that the concentrate foamed on agitation, had little effect when used in a 2E type contact, and increased the disengaging times when incorporated in synthetic 2DF. Additional work will be performed before conclusions are reached. This will include gas chromatographic and infrared analysis of Purex solvent samples from which TBP has been stripped plus diluent extractions of cold stream used in K cell.

b. Redox Plant Assistance

The Redox effort since the May start-up has been concerned with development of procedures and training which would permit control laboratory application of the DK-2 spectrophotometer to Redox process samples on a routine basis.

c. Hot Semiworks Plant Assistance

The recovery of approximately 150 curies of strontium from Tank 54 waste solutions by batch extraction was successfully piloted in the laboratory.

Laboratory studies have shown that hydrogen peroxide will oxidize the citric acid used as a buffer in HCX at a ratio of 10 moles of peroxide for each mole of citric acid in a boiling solution of 2 M HNO_3 . Scouting runs to determine the feasibility of substituting tartaric acid or maleic acid for the citric acid in HCX have indicated the following: 1) Better than 99 per cent of the strontium can be precipitated as the carbonate from solutions 1.6 M tartaric acid, 0.7 M maleic acid, or 1.41 M maleic acid. Only 97 per cent of the strontium will precipitate from a solution 2 M citric acid. 2) Titration curves indicate that 0.75 M tartaric acid or 0.5 M maleic acid will have about the same buffering capacity as 1 M citric acid. 3) Undesirable precipitates of sodium and strontium hydrogen maleate are readily formed.

d. Laboratory Assistance

1. The DBP analysis described last month was further modified to provide application to all Purex sample types. By adding an initial 5 g/l uranium contact and a 20% sodium oxalate strip, spike recoveries of $99\% \pm 6\%$ were found down to 40 ppm DBP.
2. The following tests are being performed to find and eliminate the difficulties currently being experienced with the Pu/U ratio method.
 - a. The plutonium found by a precision extraction method confirmed that found by the corrected AT technique using the Purex D-5 composite for April.
 - b. No bias was found between a 5×10^4 c/m mount (L-6 count rate) and a 2.5×10^3 c/m mount (H-7 count rate) on the ASP counters.
 - c. Initial tests indicate a D-5 composite could have a lower Pu/U ratio when stored in a glass container than if it were stored in a plastic container. There appears to be some selective plutonium absorption on glass.

Distribution ratios were run on scrubber samples from the Z plant incinerator and gave a particle range of 2 to 22 microns. Samples of UO_2 powder from ceramic fuels (HLO) were also analyzed on the counter and were found to have a range of particle size of from 6 to 55 microns. The Coulter counter has been transferred to the Redox Control Laboratory where it will be available for customer work in the future.

The 400 channel RIDL analyzer has been received and placed in service using the gamma detector system belonging to the Redox Analytical

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Control Laboratory. An acceptable compliance to the response efficiency of the Control Lab's RCL analyzers has made it possible to operate all of these instruments interchangeably. Specifically, calibration of the Control Lab's gamma analyzing system is being carried out with the RIDL analyzer.

Calibration data has been taken on Sb^{124} , In^{116m} , Cr^{51} , Ce^{141} , Na^{22} , $ZrNb^{95}$, Ru^{103} , and Fe^{59} making a total of 18 isotopes for which the Redox gamma analyzing system has been calibrated. The activity level of the calibration sources of In^{116m} and Fe^{59} were drawn from the efficiency plot of total photopeak area per microcurie versus Mev. The activity levels of the remaining standards have been independently determined and have verified the efficiency curve.

An investigation was made of the process sampling and analytical system used for the 234-5 incinerator off-gas scrubber system. As a result of this investigation, the process sampling was shown to be good and an improved analytical method gave very good checks between samples. Smaller samples may now be analyzed with better precision and accuracy.

A chromium target tube has been installed in the X-ray fluorescence spectrometer. This new tube will facilitate the analysis of low atomic weight elements. Current efforts are directed towards developing a chloride method for $PuCl_3$ product.

5. 234-5 Development - H. H. Hopkins, Jr.

a. Plutonium Recovery From Fabrication Oil

Experiments show that a contact with 5 M HNO_3 for 10 minutes is an effective method of removing plutonium from fabrication oil.

A stock solution of process fab oil (mixture of lard oil and carbon tetrachloride) was black and had a large volume of solids. Separate analyses showed 0.4 - 0.7 g/l Pu, 0.2 - 0.6 percent solids (by volume), 0.01 M Cl^- , SpG of 1.01, and pH of 1.5 - 12.1. After centrifuging for 10 minutes in a clinical centrifuge, the solution contained 0.2 - 0.4 g/l Pu. The stock solution described above was butted to a SpG of 1.2 with CCl_4 (resulting in 44 percent CCl_4).

Samples of this solution were then contacted with the following reagents: H_2O , 0.1 M HNO_3 , 5 M HNO_3 , 10 M HNO_3 , 5 M HNO_3 -0.1 M HF, 5 M HNO_3 -1 M HF, 10 M HNO_3 -1.0 M HF, 0.1 M FS (0.1 M ferrous ammonium sulfate-0.1 M sulfamic acid), 0.1 M FS-0.05 M HF, 1.0 M FS-0.05 M HF, 1.0 M FS, and 10 percent TBP (in the fab oil) with 10 M HNO_3 -1.0 M HF. An L/V of one and a contact time of five minutes were used. Three reagents were able to strip the plutonium to 0.05 g/l or less (throw-away value). These reagents are 5 M HNO_3 , 10 M HNO_3 , and 5 M HNO_3 -1 M HF.

A second test series was made using the five best stripping agents from above. The organic used in this run was from the same stock solution as described above, except that it was filtered through an 0.25 micron filter. This material contained 0.17-0.18 g/l Pu. Results of this series showed that use of fluoride did not result in improvement.

A third run series was made to determine the effect of contact time on stripping efficiency. The oil used for this run was samples of the filtered oil described above. Stripping agents used in this were 5 M HNO_3 and 5 M HNO_3 -1.0 M HF. Contact times used with each of the two stripping agents were 3, 10, and 30 minutes. The run using HF was ineffective, stripping 43 percent of the Pu in 30 minutes. It appeared in both runs that equilibrium is attained slowly. A 10-minute contact time appears to be effective with 5 M HNO_3 .

Samples of fab oil were also tested to determine how much plutonium was present as solids in the oil. Daily samples of oil were received. Half of each sample was filtered through an 0.25 micron filter. The other half was let stand for five days. Five samples showed little (< 5 percent) change in plutonium concentration on filtering or on standing. A sixth sample showed a 50 percent decrease in plutonium on both filtering and on standing for four days.

b. Electrorefining Of Plutonium Metal

Current-efficiency relationships are under study.

The ratio of cathode current density (amp/cm²) to the concentration of plutonium (%) in the electrolyte was plotted against the cathode for six batch runs. The correlation shows that high current density is favorable as long as the plutonium concentration is high enough. This is to be expected from the work of others who have found that high current density improves efficiency. From this plot, it should be possible to predict optimum conditions for high efficiency.

A run was designed to fill in a point in the 90 percent efficiency region. However, the results did not fit. One explanation of this may be the lower amperage (40 amps). Previous runs had indicated that 50 amps gave better results. This indicates that there is a minimum desirable current density.

One electrowinning run and one electrorefining run in an LiF-NaF-PuF₄ system were attempted to obtain a comparison with the chloride system. Electrowinning was difficult because the anode effect prevented drawing more than seven amps. Apparently the fluorine is held on the anode surface tighter than chlorine.

The electrorefining run performed smoothly except that the decomposition potential of NaF and PuF₃ are so similar that considerable amounts of sodium metal were released. Very little consolidated plutonium was found. There were some "black solids" that appeared to be the same as those found in the chloride system. There was no ceramic corrosion noticed in either case.

c. Critical Mass Control

The critical mass control program of the 234-5 Development Operation has been reviewed. All hood limits have been updated. Emphasis is being directed toward minimizing chances of water flooding, and improved plutonium storage facilities in the glove boxes.

RF Judson

for Manager
Research and Engineering

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II. ACHIEVEMENTS (continued)

H. FINANCIAL OPERATION

1. Production Cost

The 03 Program production budget submission for FY 1963 and FY 1964 was reworked to reflect changes in production assumptions received from the AEC this month.

Funds were added to the FY 1964 02 Program production budget by the local AEC and similar additions are being considered for the FY 1963 budget on the basis that sufficient amounts for possible contingencies were not included.

Assistance is being provided plant managers in a review of Spare Parts and at month end approximately \$100,000 of spares have been listed for excessing.

In collaboration with Finished Products Operation and at AEC request, a standard pricing schedule for billing of unclassified Pu to AEC licensees was developed which will be included in the Federal Register.

The following Special Requests were handled during the month:

A0020	1.26 Kg	Unclassified Pu metal	for Monsanto
A0021	3 Kg	"	" " " NUMEC
A0022	3.5 Kg	"	" " " "
A0023	4 Kg	"	" " " Argonne National Lab.
A0024	1 Kg	"	" " " Brookhaven Research Lab.
A0027		Special assistance to unload storage tank from carrier truck requested by Linde Co.	
A0404		Burial of one Box Contaminated Material from Dow Chemical Company.	

All new estimates (and subsequent billing) will be based on the Standard Pricing Schedule submitted for inclusion in the Federal Register.

CPD's investment in inventories at April 30, 1962 compared with budgeted balances is shown as follows:

	<u>Balance</u> <u>4-30-62</u>	<u>Control</u> <u>Allocation</u>	<u>Surplus</u> <u>(Deficit)</u>
<u>Inventories</u>			
Essential Materials	\$ 804	\$ 880	\$ 76
Spare Parts and Standby	1 958	1 778	(180)
Special Materials	<u>120-1)</u>	<u>268</u>	<u>148</u>
Gross Inventories	<u>2 882</u>	<u>2 926</u>	<u>44</u>
<u>Reserves</u>			
Essential Materials	56	58	(2)
Spare Parts and Standby	450	440	10
Special Materials	<u>-0-</u>	<u>153</u>	<u>(153)</u>
Total Reserves	<u>506</u>	<u>651</u>	<u>(145)</u>
<u>Net Investment</u>	<u>\$2 376</u>	<u>\$2 275</u>	<u>\$(101)</u>

-1) Yttrium oxide valued at \$150,000 and the equivalent reserve transferred to General Supplies Inventory in April at AEC request.

2. General Accounting*

As of April 30, 1962 sixteen active projects had incurred costs of \$7,675,983 against authorized funds of \$11,605,400. Outstanding commitments totaled \$840,608.

During May two Modifications and one Directive were received from the AEC: Modification No. 3, Directive No. AEC-195, Project CAC-928 - Leak Detection--High Level Waste Tanks--241-A and 241-SX, decrease in funds of \$12,500, total authorization \$88,900; Modification No. 2, Directive No. HW-531, increase in funds of \$44,300, total authorized funds \$159,300; Directive No. HW-537, Project CGC-964 - Equipment Disposal--Purex, authorized funds \$30,000.

Project CGC-830 - Plant Modifications for Reprocessing Non-Production Reactor Fuels, was abandoned. Total cost \$556,956.

During May there were seven Appropriation Requests approved for a total authorization of \$42,850. These were as follows:

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HW-73884

26052	Replacement 14" Lathe	P&GM	\$16 000
26059	Recording Spectrophotometer	R&E	9 850
26056	Portable Scanner	Purex	5 070
26054	Portable Hydraulic Lift	P&GM	3 500
26057	Acid Feed Tank L-1	Redox	3 500
61-CPD-42	(Supplement #1)		
	TV Camera (New Total \$21,000)	Redox	2 500
26055	Constant Air Monitor	Purex	2 430

Total Authorization \$42 850

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

3. Auditing

The audit of office supplies and equipment, nearing completion, disclosed 12 items of equipment in excess of requirements. They are being returned to the Office Equipment Unit for reassignment. Generally, usage of office equipment is considered to be satisfactory.

4. Personnel Accounting

Acknowledgments that no conflict of interest exists between work assignment and outside business activities have now been received from all CPD exempt employees except two, as required by OPG 6.6, "Conflict of Interest." These are expected to be received.

Manager - Finance

CHEMICAL PROCESSING DEPARTMENT
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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>4-29-62</u>	<u>5-31-62</u>	<u>4-29-62</u>	<u>5-31-62</u>	<u>4-29-62</u>	<u>5-31-62</u>
General Manager's Group	10	11	1	1	11	12
Financial	14	14	15	15	29	29
Research & Engineering	66	65	27	26	93	91
Facilities Engineering	62	62	20	20	82	82
Power & General Maintenance	39	39	244	243	283	282
Production	5	5	4	4	9	9
Redox	47	47	205	203	252	250
Purex	64	64	244	247	308	311
Finished Products	<u>54</u>	<u>53</u>	<u>262</u>	<u>259</u>	<u>316</u>	<u>312</u>
Total	<u>361</u>	<u>360</u>	<u>1 022</u>	<u>1 018</u>	<u>1 383</u>	<u>1 378</u>

B. PERSONNEL CHANGES

Merle K. Harmon has been appointed Manager - Redox Operation, effective May 1. Mr. Harmon, formerly Manager - Redox Technology, will replace C. T. Grosz with who will assume the position of Consultant, Business Effectiveness Program on the same date.

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C. TRIPS

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To Other G.E. Components</u>		
L. R. Michels	GEL Schenectady, N.Y.	Process Design. (5/1-2/62)
R. W. Harvey	San Jose, Calif.	Methods and Work Measurement.
R. D. Pope		(5/14-18/62)
C. M. Thomas		
<u>To AEC and Other AEC Contractors</u>		
L. L. Zahn	ORNL, Oak Ridge, Tenn.	Witness Cask Drop Tests.
		(5/7/62)
P. B. Fisk	IASL, Los Alamos, N.M.	Non-destructive testing.
		(5/8-11/62)
H. J. Bellarts	Dow Chemical Co.	Fabrication Equipment &
I. N. Taylor	Rocky Flats, Colo.	Process. (5/17-18/62)
<u>To General Industry</u>		
C. W. Smith	Pacific Steel Product Co., Seattle, Wn.	Assembly of Model Cask Containers. (5/21/62)
<u>To Conventions & General Meetings</u>		
R. Sorenson	Seattle, Wash.	Attend symposium on Infrared Spectrophotometry. (5/1/62)
H. W. Stivers	U.S. Corps of Engrs. Walla Walla, Wn.	AISC Design Specifications for structural steel members. (5/16/62)
D. R. Gustavson	Baltimore, Md.	Attend Annual Meeting of AIChE. (5/21-24/62)
<u>To Colleges & Universities</u>		
L. L. Zahn	Johns Hopkins Univ. Baltimore, Md.	Shipment of Radioactive Materials. (5/2-3/62)

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D. VISITORS

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From Other G.E. Components</u>		
C. P. Ruiz G. D. Collins	APED, San Jose, Calif.	Handling of Plutonium. (5/7/62)
A. D. McGovern	X-ray Dept. St. Petersburg, Fla.	IMOG Committee Meeting. (5/8-9/62)
F. J. Martin	General Engineering Research Lab.	GERL Programs. (5/22/62)
<u>From AEC and Other AEC Contractors</u>		
F. E. Minton	DMA Headquarters Washington, D.C.	Plutonium Fabrication. (4/27/62)
W. Stratman M. DeSesa	National Lead of Ohio Cincinnati, Ohio	Confer on procedure for UO ₃ shipments. (5/1/62)
C. A. Luke	USAEC - Div. of Licens- ing and Regulations Washington, D.C.	Neutron interaction calcula- tions and critical mass con- trol. (5/7-8/62)
C. R. Barncord	Sandia Laboratories Livermore, Calif.	IMOG Committee meeting. (5/8/62)
D. M. Bassler	Dow Chemical Co. Rocky Flats Plant Denver, Colo.	Sanford tour. (5/9/62)
R. H. Creighton C. A. Slater	Bendix Corporation Kansas City, Missouri	" " "
W. A. Gardner C. F. Hurley R. S. Wilson	Sandia Laboratories Albuquerque, N.M.	" " "
C. R. Poole	Mason & Hanger--Silas Mason Co., Iowa Ord. Plt. Burlington, Iowa	" " "
W. D. Martin	Mason & Hanger--Silas Mason Co., Pantex Ord. Plt. Amarillo, Texas	" " "
J. W. Strohecker G. A. Fowler	Union Carbide Nuclear Co. Y-12 Plt., Oak Ridge, Tenn.	" " "
R. J. Spies	Lawrence Rad. Lab. Livermore, Calif.	" " "

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From AEC and Other AEC Contractors (con'd)</u>		
D. A. Orth	E.I. duPont de Nemours Savannah River Plant Aiken, S.C.	Purex and fission product processes, also process procedures. (5/9-10/62)
A. J. Smith	Lawrence Rad. Lab. Livermore, Calif.	Purex process. (5/11/62)
W. G. Morrison	Phillips Petroleum Co. Idaho Falls, Idaho	Purex process. (5/11/62)
G. H. Bidinger	The Dow Chemical Co. Denver, Colo.	Plutonium fabrication. (5/11/62)
J. Moody C. Biggs	Sandia Corp. Albuquerque, N.M.	Visual inspection of secondary standards program. (5/15/62)
L. E. Killion	USAEC-ALOO Albuquerque, N.M.	Quality assurance programs. (5/16/62)
E. J. Bloch	DOP Headquarters Washington, D.C.	200 Area Shops. (5/16/62)
B. Schwartz	USAEC-Div. of Prod. Washington, D.C.	Waste management. (5/17/62)
R. A. Gardner	USAEC - Wash., D.C.	Purex process. (5/18/62)
W. H. Christie A. S. Trundle	Union Carbide Nuclear Oak Ridge Nat. Lab. Oak Ridge, Tenn.	Purex process. (5/18/62)
R. Brown J. Murray	AEC, Wash., D.C.	Purex plant tour. (5/24/62)
A. R. Aikens W. J. Rusnack	AEC-Washington, D.C. Div. of Licensing & Regulations	Redox plant technology. (5/28/62)
A. R. Aikens W. J. Rusnack	USAEC - Div. of Licensing & Regulations Washington, D.C.	Waste management and Purex processing. (5/29/62)
D. C. Nichols	duPont Savannah River	Purex Plant Tour. Review of Monitoring Techniques. (5/31/62)

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<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From General Industry</u>		
J. Birch	Daystrom, Inc. Weston Instruments Div. Monterey Park, Calif.	Discuss applicable X-ray gates. (5/9/62)
A. K. Doolittle	Doolittle Engrg. Co. Philadelphia, Pa.	Protective coatings. (5/14/62)
Sheldon Dunning	Sheldon Dunning, Inc. Seattle, Wash.	Protective coatings. (5/14/62)
W. H. Rodgers C. W. Taylor	Grace-Davidson San Francisco, Calif.	Waste Storage. (5/14/62)
F. M. Slusher	Northwest Mfg. Co. Seattle, Wash.	Metal coatings. (5/16/62)
J. W. Payne H. Mandel	Atomics International Los Angeles, Calif.	In-Line Monitors. (5/22-23/62)
Dave Tuel Mr. Burkard	Wyandotte Chemical Co. Wyandotte, Mich.	Decontamination chemicals. (5/28/62)

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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.</u> <u>Prac.</u>	<u>Res.&</u> <u>Eng.</u>	<u>Total</u> <u>CPD</u>	<u>Yr. To</u> <u>Date</u>
Disabling Injuries											2
Serious Accidents											1
Medical Treatment											
Injuries											
Radiation Occur.				7	27	13		1		61	167
Contam. Wounds			6			6				16	92
Pu Depositions						1*				1	1
Fires											3
Security Violations				1	1	1			3**	7	7
								1		1	5

* Contaminated wound occurred in Redox to Processing employee when right index finger was punctured through gloves by either a weld burr or a sliver of glass, while he was cleaning bottom of L-18 contactor.

** Purex-Processing - Failure of bearing on fan shaft caused overload on V-belts resulting in their slipping on pulleys, overheating and finally igniting and in turn igniting oil and grease on equipment. Damage - \$250.00.

P&GM-Shops - Hot piece of metal from cutting operation lodged in sawdust under bandsaw which was located approximately 6' from where torch was being operated. Cutting was done near end of shaft and sawdust ignited when saw was unattended. Damage - \$10.00.

Redox-Maintenance - Presumed that fire started from lens effect created by water bubble, which had formed on flat roof of temporary plastic enclosure, focusing sun rays on a cardboard waste box in enclosure. Portion of plastic enclosure, waste box, and cloth laundry bag containing several pairs of coveralls were burned and paint was peeled on metal portion of 233-S Building. Damage - \$40.00.

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HW-73834

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V. REPORTS

A. PREPARED AND ISSUED

- HW-61312 ADD 1, Unclassified, "Addendum 1, Specifications for Critical Mass Control, Redox Plant - E-Metal", dated May 1, 1962, by R. G. Barnes.
- HW-71601, Rev.1, Unclassified, "Utilization of Time - Maintenance Crafts and Associated Personnel", dated May 20, 1962, by A. C. Morgenthau.
- HW-71639 6, Secret AWD, "Plutonium Monthly Report, March-April, 1962", dated May 24, 1962, by A. E. Smith.
- HW-71918, Secret, "Hazards Evaluation Study, Chemical Processing Department", dated May 1, 1962, by E. G. Pierick.
- HW-71924, Secret AWD, "Project Proposal, Additional Plutonium Storage Facilities - 234-5 Building, Project CGC-968", dated April 27, 1962, by L. W. Finch.
- HW-72780, Unclassified, "Process Design Engineering Purex Essential Waste Routing System and 241-SX Tank Farm", dated April 30, 1962, by E. Doud, et al.
- HW-73374, Official Use Only, "Project Proposal, Rev.1, Strontium Storage and Waste Disposal - Hot Semiworks, Project CGC-948", dated April 27, 1962, by D. W. McKee.
- HW-73489, Secret, "Budget for FY 64 and Revised Budget for FY 63, Supplemental Separations Research and Development Programs - 02-53-04 and 02-53-05", dated April 25, 1962, by W. S. Frank.
- HW-73490, Confidential, "Plutonium Electrowinning Development Test Run Series Summary", dated May 30, 1962, by M. H. Curtis.
- HW-73522, Secret AWD, "Comments - COMW-2156", dated April 30, 1962, by A. E. Smith.
- HW-73529, Secret, "Report on Mark V Dissolver", dated May 1, 1962, by H. P. Simonds.
- HW-73554, Secret, "Plutonium Chloride for Off-Site Delivery", dated May 1, 1962, by J. H. Warren.

- HW-73574, Unclassified, "Invention Report: Pyrochemical Reaction Cell", dated May 7, 1962, by T. S. Soine and J. V. Gilchrist.
- HW-73590, Secret AWD, "Progress Report - Finished Products Fabrication Technology Operation - April, 1962", dated May 8, 1962, by A. E. Smith.
- HW-73591, Confidential, "Trip Report - Argonne National Laboratory and G. E. Components: General Engineering Laboratory, Schenectady, New York; Silicone Products Department, Waterford, New York; Chemical and Metallurgical Products, Pittsfield, Massachusetts - April 16-20, 1962", dated May 8, 1962, by F. D. Fisher.
- HW-73602 RD, Secret, "Purex Plant Production Schedule, May, 1962", dated May 10, 1962, by D. McDonald.
- HW-73603 RD, Secret, "Redox Plant Production Schedule, May, 1962", dated May 10, 1962, by D. McDonald.
- HW-73604 RD, Secret, "UO₃ Plant Production Schedule, May, 1962", dated May 10, 1962, by D. McDonald.
- HW-73605 RD, Secret, "234-5 Plant Production Schedule, May, 1962", dated May 10, 1962, by D. McDonald.
- HW-73606, Secret AWD, "Supplementary Data to O3 Program Production Budget Submission - Budget for FY 1964 and Revised Budget for FY 1963", dated May 9, 1962, by B. M. Dobbs.
- HW-73656, Secret AWD, "Statistical Statements and Associated Data for 234-5 Building Final Product Shipped During the First Quarter of Calendar Year 1962", dated May 11, 1962, by A. E. Smith.
- HW-73669, Secret, "Analysis of Six Groups of Fringe 105-H Material", dated May 11, 1962, by R. P. Ringer and J. C. Steinhauser.
- HW-73679, Confidential, "Critical Mass Control Specification - Hood 7-A", dated May 16, 1962, by L. M. Meeker.
- HW-73688, Confidential, "Critical Mass Control Specification - SN Filtrate Cans - Loading Out from Hood 7-A", dated May 17, 1962, by L. M. Meeker.
- HW-73721, Secret, "Processing of LRL Scrap", dated May 21, 1962, by P. H. Reinker.
- HW-73741, Secret AWD, "Justification of O3 Program - Process Development Support Pu Requirements for Fourth Quarter FY 1962 and FY 1963", dated May 23, 1962, by J. H. Warren.
- HW-73754, Secret, "CPD Plant Improvement Program", dated May 23, 1962, by J. H. Warren.
- HW-73760, Unclassified, "Recuplex Mock-Up Facility", dated May 8, 1962, by W. P. Ingalls, et al.

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HW-73761, Unclassified, "Process Specifications for Operational Control - Strontium Semiworks", dated May 25, 1962, by B. F. Judson and J. B. Kendall.

HW-73776, Unclassified, "Supplement No. 2 - Process Specifications for Critical Mass Control - Purex Plant", dated May 28, 1962, by G. C. Oberg.

B. PREPARED FOR SIGNATURE AND ISSUANCE

HW-73524, Secret, "Production - April, 1962", dated May 1, 1962, by W. E. Johnson.

HW-73531, Secret, "HAPO Production Forecast, April 1, 1962 Through December 31, 1963", dated May 9, 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.

<u>INVENTOR</u>	<u>TITLE</u>
T. S. Soine, Research & Engineering	Pyrochemical Reaction Cell
J. V. Gilchrist, "	"

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P. H. Reinker

General Manager
Chemical Processing Department

END

**DATE
FILMED**

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