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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

MAY, 1957

GENERAL SUMMARY

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PRODUCTION

Operation of the separations plants was normal during the month and plutonium production exceeded the monthly commitment for May. At month end the Purex Plant was shut down for routine flushing and maintenance of equipment while the Redox Plant remained in operation. The processing of the first shipment of spent fuel elements from Chalk River was completed in the Redox Plant during the month.

The production of fabricated shapes met the monthly commitment in the fabrication facility, and the commitment for unfabricated plutonium metal was exceeded by 4%. The Product Recovery Operation established a new high in the material processed through the solvent extraction columns and in the amount of material processed through the slag and crucible dissolvers.

Mechanical problems and operating difficulties continued with the continuous calciners; however, the monthly commitment for UO_3 was met. The basis for calculating UO_3 production was revised to include only that material which has been analyzed and found to meet the established specifications.

ENGINEERING

A feasibility study of the capability of CPD to reprocess certain power fuels is being prepared for transmission to the AEC. This survey differs from previous studies in that the most attractive locations for production activities are now believed to be in 221-U and 202-S Buildings. Fuels containing less than 3% U-235 would be received, stored, disassembled, and dissolved in modified U area facilities, the solution would be decontaminated in Redox, and the products calcined or reduced to buttons in the 224-U (or UA) or 234-5 facilities. A project cost of \$6,300,000 is estimated, with the U plant modifications and additions (including an inter-area pipeline) being estimated at \$6,000,000; \$100,000 being allocated to Redox revisions; and \$200,000 to new calcination equipment designed for nuclear safety. If the PRDC core (27% U-235) were to be reprocessed at Hanford, an additional \$500,000 would be required for special dissolving facilities, and loss of product value equivalent to about \$500 per kilogram of core material processed would be incurred through the dilution of the material to about 2 to 3% U-235 to maintain nuclear safety. A project time of 30 months is estimated to be required from start of project scope to beneficial use, primarily because of anticipated delays in procuring titanium equipment. The converted facilities are believed capable of meeting the needs for reprocessing slightly enriched fuels at minimum cost through 1965.

A progress report was presented to the AEC describing the capability of the Department to recover neptunium-237, which is present in irradiated fuels to the extent of about 0.3% of the mass of plutonium present. While the technology is still uncertain, it appears probable that Purex flowsheet modifications

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can be made permitting the routine recovery of decontaminated neptunium nitrate without interfering with current plans to improve Purex capacity and costs. Similar flowsheet revisions are possible in the Redox Plant. Capital investments of about \$250,000 would be required to activate neptunium recovery in each plant, and incremental additional operating costs of about \$20 and \$3 per gram neptunium recovered would be incurred in the Purex and Redox Plants, respectively.

A plant test (Redox) indicated that the dissolution time of dingot metal is about 50 to 75% longer than that of normal production metal. If this material were adopted as production material without compensating changes of fabrication or dissolution technology, the production capacity of the Redox and Purex Plants could be expected to be decreased up to 40%. Dingot metal is in pilot plant production, and is being developed to decrease production costs and increase uranium purity (lower hydrogen and carbon content). Hanford is scheduled to receive about ten tons of dingot metal per month for the balance of the year, followed by increasing quantities if and when this material is adopted as a standard product. Arrangements are being made to segregate this material in an attempt to develop techniques to improve the dissolution rates.

An engineering study has been completed on the feasibility and cost of conversion of the Purex Plant for two-cycle operation in accordance with the new two-cycle flowsheet. The total project cost of the two-cycle conversion is estimated at \$540,000. A beneficial use date of April 1, 1958 could be realized if the necessary connectors and instruments can be obtained from spare parts or be procured on an expedited basis. On a normal procurement basis, beneficial use would be July 1958.

On May 2, 1957, a performance test run of the vacuum fractionator at design rates was conducted by the Purex Plant. The test run satisfactorily demonstrated the capability of the fractionator to perform at design rates. This demonstration completes all work on Project CG-598, Purex Acid Fractionator.

Preliminary engineering studies were completed defining the feasibility and cost of conversion of one of the Redox dissolver cells to the Darex process for dissolution of stainless steel clad fuel elements from power reactors. The estimated project cost for the installation is \$1,500,000.

The feasibility and costs associated with processing spent fuels from various private power reactors utilizing initial U-235 enrichments of less than 3 per cent have been given preliminary study. It was determined that the Redox Plant could process these spent fuels in a segregated condition, from the dissolution and feed adjustment steps on, by concentration control for nuclear safety. Based upon optimistic development, design, and construction schedules, the project could be completed within three years of authorization.

Engineering evaluation studies have been initiated on a critical mass laboratory facility in cooperation with the Hanford Laboratory Operation. This laboratory is to be designed to perform critical mass experiments on plutonium-bearing solutions and slurries. The interests of the Department in this facility center around two basic points:

- a. A large percentage of the experimental work performed in the facility will be in support of Chemical Processing Department activities.
- b. There is a possibility that safety and economic factors may dictate location of the facility within or adjacent to the 200 Areas. The safety and hazards control of the facility in such a case would be of utmost importance to the Department.

GENERAL

Preliminary work has begun on the complete revision, necessitated by budget reductions, of the FY 1958 budget. Work sheets have been set up in preparation for budget revisions in connection with the recent AEC review of the HAPO budget. It is anticipated that these revisions will be so widely diversified as to necessitate a complete rework of the operating, inventory and equipment budgets for FY 1958.

Conversion of weekly payroll to the Electronic Data Processing Machine has been completed. It is anticipated that the payroll for week ending June 2 will be processed on the EDPM. The preliminary conversion work which has been done with reference to processing the weekly payroll indicates the transition should be smooth with a minimum of difficulties encountered.

The AEC has agreed to accept all charges of abandoned studies and to permit capitalization of studies which have resulted in approved projects. The costs for abandoned studies have been transmitted to R & U Operation for consolidation prior to transmittal to the AEC.

During the month an analysis of C.P.D. grievances received since September, 1956 was completed. The analysis showed that approximately half of the grievances filed were filed in connection with jurisdictional problems between the crafts.

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STAFF

Vice President and General Manager, Atomic Products Division . F. K. McCune
General Manager, Hanford Atomic Products Operation W. E. Johnson
General Manager, Chemical Processing Department W. K. MacCready
Manager, Production Operation J. H. Warren
Manager, Purex Operation O. C. Schroeder
Manager, Redox Operation C. T. Groswith
Manager, Finished Products Operation W. N. Mobley
Manager, Power & General Maintenance Operation T. G. LaFollette
Manager, Financial Operation K. G. Grimm
Manager, Facilities Engineering Operation H. P. Shaw
Manager, Research and Engineering Operation R. B. Richards
Manager, Employee Relations Operation D. S. Roberts

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CHEMICAL PROCESSING DEPARTMENT
NUMBER OF EMPLOYEES
MAY 31, 1957

OPERATION	EXEMPT		OTHER		TOTAL	
	4-30-57	5-31-57	4-30-57	5-31-57	4-30-57	5-31-57
GENERAL MANAGER'S GROUP	10	10	1	1	11	11
PRODUCTION	7	7	4	4	11	11
PUREX	43	42	266	265	309	307
REDOX	52	53	291	292	343	345
FINISHED PRODUCTS	58	59	362	346	420	405
POWER AND GENERAL MAINTENANCE	45	45	283	280	328	325
FINANCIAL	21	22	52	48	73	70
FACILITIES ENGINEERING	78	80	29	28	107	108
RESEARCH AND ENGINEERING	71	71	26	26	97	97
EMPLOYEE RELATIONS	32	32	58	59	90	91
	417	421	1372	1349	1789	1770

CHEMICAL PROCESSING DEPARTMENT

PATENT SUMMARY
FOR
MONTH OF MAY, 1957

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>
C. R. Anderson	Variable Lattice Nuclear Fuel Bed Suspensions Maintained by Degree of Agitation
C. R. Anderson	Variable Lattice Nuclear Reactor Controlled by an Extendable Fuel Support Frame
S. I. Allen	Transistor Type Dose Rate Integrator

J. H. Warren
 ACTING GENERAL MANAGER
 CHEMICAL PROCESSING DEPARTMENT

JH Warren:vb

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CHEMICAL PROCESSING DEPARTMENT
PRODUCTION OPERATION

May, 1957

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I. RESPONSIBILITY

There were no changes in the responsibility assigned to the Production Operation during the month.

II. ACHIEVEMENT

A. Production Statistics

Plutonium production in the separations plants exceeded the monthly commitment for May, 1957. Both Purex and Redox Plants operated satisfactorily according to schedule. Some difficulty was experienced in Redox plant during the latter part of the month when the extraction columns showed symptoms of flooding. The columns were flushed with no significant effect on the processing rate, and at month end the operation was normal. On May 27, 1957 the Purex plant was shut down for routine equipment flushing and maintenance.

The production of UO_2 was 100% of the monthly commitment. Effective May 1, 1957 the basis for calculating UO_2 production was revised to include only that material which has been sampled and found to meet the established specifications. This basis is now consistent with the basis for calculating the production of other finished products in the Department.

1. Purex Operation

	<u>May</u>	<u>April</u>
Tons Uranium delivered to storage	355.9	405.85
Average production rate per operating day (tons)	15.0	14.6
Average yield, %		
Uranium	100.14	98.0
Plutonium	98.3	97.5
Total Waste Loss, %		
Uranium	0.27	0.17
Plutonium	1.27	0.89
Average cooling time (days)	122	121
Minimum cooling time (days)	108	107
Percent operating time	75.8	92.83

2. Redox Operations

	<u>May</u>	<u>April</u>
Tons Uranium delivered to storage	148.0	155.0
Average production rate per operating day (tons)	7.8	8.8
Average yield, %		
Uranium	100.4	99.0
Plutonium	87.9	109.9
Total Waste Loss, %		
Uranium	0.10	0.40
Plutonium	0.39	0.83
Average cooling time (days)	121	119
Minimum cooling time (days)	97	105
Percent operating time	60.8	58.6

3. 234-5 Operation

	<u>May</u>	<u>April</u>
Batches completed through Task I	427	452
Batches completed through Task II	419	457
Runs completed through Task III	199	239
Reduction yield, %	98.73	98.04
Waste disposal (units)	403.09	585.87

4. UO₃ Operations

	<u>May</u>	<u>April</u>	<u>To Date</u>
Uranium drummed (tons)		493.26)	
Uranium accepted (tons)	400.4	)	20,557.02
Uranium shipped (tons)	492.98	444.15	20,450.50
Average cooling time (days)	127	126	
Minimum cooling time (days)	103	111	

5. Power

	<u>200 East</u>	<u>200 West</u>
Raw water pumped, gpm	6,962	3,736
Filtered water pumped, gpm	939	1,207
Maximum steam generated, lbs/hr.	189,000	132,000
Average steam generated, lbs/hr.	126,516	85,661
Total steam generated, M lbs.	94,128	63,732
Coal consumed, est. (tons)	5,751	3,980

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6. Waste Storage

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	<u>Equivalent Tons U</u>	
	<u>May</u>	<u>April</u>
Salt Waste reserve storage capacity-Redox	8,751	8,800
Salt Waste reserve storage capacity-Purex	6,695	6,749
Coating Waste reserve storage capacity-Redox	12,342	12,490
Coating Waste reserve storage capacity-Purex	3,628	6,984

B. Production Planning and Scheduling Operation

Work was continued on the project covering the utilization of recovered acid from the UO_3 Plant.

It has been noted that Purex Plant is continuing to use recovered acid faster than the UO_3 Plant is producing it. This is expected to reduce the inventory of UO_3 recovered acid to a low point by the time Purex Plant starts recovering nitric acid from their dissolver off-gases.

A study has been initiated covering alternate methods of recovering the uranium and plutonium from a small batch of enriched uranium.

An analysis was made of the current plutonium processing problem which arises out of the capacity bottleneck existing in Task I and II of the fabrication facility. Indications are that during June and July, 1957, the facility can process sufficient plutonium on the 5 day work week basis to permit the primary plant monthly cumulative production to exceed the latest official forecast by as much as the equivalent of 50 tons of uranium. It should be noted however, that at the end of May the primary plant cumulative output since April, 1957 will very likely be on the order of 90 tons in excess of the official forecast. This means that to prevent further overtime at the fabrication facility, it will be necessary

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to reduce the June output from the primary plants in order to adjust the accumulated excess production to 50 tons or less. The alternative, if significantly greater than 50 tons excess production is maintained, will be to operate the facility on one or two overtime days prior to the first of August. In the analysis it was also mentioned that activity toward installing the continuous Task I and II units has been accelerated.

An investigation was initiated into the problems and the economic considerations that would be involved in the UO_2 Plant if we were to segregate 10 tons of uranium enriched in excess of 0.94% U-235. The investigation is in response to a request from Hanford Operations Office - Atomic Energy Commission.

The value of the static waste tank monitoring program, established in April, was substantiated this month when it was instrumental in the early detection of a water leak into tank 103-B. Immediate action after discovery of the condition averted development of a potentially serious situation. Investigation of the incident revealed that raw water was escaping from a Plug Valve (turned to the bleed position) on the main line and located near B-Farm, draining into the encasement and subsequently into 101-B Pump Pit. From there the liquid cascaded to tank 103-B. The valve will be replaced.

Because of a hazardous condition in C Farm caused by the overground transfer line into 110-C, use of this tank as the organic wash water receiver from Purex was discontinued in preference to 102-C. Routing to the latter will be accomplished via underground line.

A Purex Waste Storage meeting was held on May 9, at which time recent development and problems in self-concentration were discussed. While no definite conclusions were reached, it appears that additions to tank 103-A will be discontinued, at least temporarily, after filling to the hydrostatic head with 10M sodium ion. Subsequent technological development and/or additional experience gained with self-concentrating wastes could conceivably alter the status, thereby making it economically desirable to resume additions at a future date. Assuming a terminal concentration of 10M sodium ion at the hydrostatic head and continuation on the present flowsheet, it was estimated that additional salt waste space would be needed 10-1-61. Assuming the same conditions but installation of the two-cycle flowsheet 7-1-58, the estimated need date would be delayed until 2-1-67.

Laboratory efforts thus far have been unsuccessful in demonstrating a method for effectively removing Co^{60} from the material in 101-BY, 102-BY, and 103-BY to permit cribbing of the resultant supernatant. Presumably the long storage interval after the cesium scavenging resulted in the formation of a cobalt complex which is not readily susceptible to present methods and techniques. Should the material require trenching, approximately two trenches will be needed, leaving three unused trenches of which one will be filled with other wastes currently in storage at BY-Farm. In light of this

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unexpected need for trenches plus the modest success of initial scavenging efforts, future ground disposal appears to be in jeopardy unless: (1) Additional trenches are provided; (2) More efficient scavenging methods and/or techniques are devised, or; (3) cribbing restrictions are relaxed.

C. Essential Materials

A recommendation was received from CPD Fire and Safety personnel to empty the UO_3 propane tanks and place the storage tanks in lay-away status. During May, 8,965 gallons were transferred to the Redox propane storage tanks. There are approximately 6,600 additional gallons to transfer.

During April the inventory of essential materials decreased \$27,952 to a value of \$1,054,233. Reductions since September 30, 1956 total \$406,121.

It appears that savings might result from obtaining various chemicals in solution rather than in the present dry form. These chemicals are sodium dichromate and sodium nitrate. Inquiries have been made as to how costs would compare with the cost of dry material. Redox personnel are very interested in the possibilities since their dry dichromate and nitrate must be handled twice, from box cars to 275-EA warehouse and from 275-EA to the 202-S Building.

D. Reports and Documents

1. Prepared and Issued

HW-50073	Essential Material Consumption - April 1957, Purex Plant, M. A. Thress
HW-50074	Essential Material Area Report to Cost and Purchasing, April 1957, M. A. Thress
HW-50075	Essential Materials Ordered, D. E. Peterson
HW-50076 RD	UO_3 Building Production Schedule for May, 1957, B. F. Campbell
HW-50077 RD	234-5 Building Production Schedule for May, 1957, B. F. Campbell
HW-50078	Redox Plant Production Schedule, May 3, 1957, D. McDonald
HW-50079	Purex Plant Production Schedule, May 3, 1957, D. McDonald
HW-50127	Chemical Processing Department - Waste Status Summary for April, 1957, R. E. Roberts

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HW-50356 Purex Plant Shutdown, May 24, 1957, J. H. Warren

HW-50062 UO₃ Plant Shutdown, May 1, 1957, J. H. Warren

2. Prepared for Signature and Issuance

XX-1926 Production Forecast, May 1, 1957 Through
September 1958, W. E. Johnson/V. R. Chapman

III. ORGANIZATION AND PERSONNEL

A. Force Summary

	<u>Beginning of Month</u>	<u>End of Month</u>
Exempt	8	8
Non-Exempt	<u>4</u>	<u>4</u>
Total	12	12

B. Safety

There were no plant injuries incurred by Production Operation personnel during May, 1957.

C. Security

There was one security violation in the Production Operation during the month involving a lost document.

J. H. Warren

Manager
PRODUCTION OPERATION

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CHEMICAL PROCESSING DEPARTMENT
PUREX OPERATION

May, 1957

I. RESPONSIBILITY

There was no change in the scope of the Purex Operation responsibility.

II. ACHIEVEMENT

A. Processing Experience

1. Normal Processing

Plant operations were resumed on May 3, 1957 at a 1.92 CF and continued at this rate until May 14 when the rate was reduced to 1.44 CF to balance Purex-Redox rates with Z Plant's capacity. A scheduled building shutdown was begun on May 26. On-line efficiency for the period was 75.8 percent. The production commitment for the month was met.

Waste losses for the month were 1.27 percent and .27 percent, respectively, for plutonium and uranium. The high plutonium loss was due mainly to excessive losses in the precycle HC column and the final plutonium 2B column. Significant improvement in plutonium losses from the 2B column was made during the last week of the operating period following addition of sulfate ion to the column via the 2BX stream. Coating waste losses continued to be somewhat erratic.

Except for two batches of plutonium produced during startup, all plutonium produced during the month met building specifications. All uranium produced was within specifications. Segregation of several uranium batches was necessary while plutonium content was rechecked, however, in each case additional samples proved the material to be acceptable.

A gradual increase in differential pressure across the silver reactors in both A and B cells was experienced; however, the restriction within the reactors has not progressed to the point where the dissolver pot vacuum is reduced below normal. Several attempts to remove the restriction in the B reactor by hot water flushes have been only moderately successful. This work will continue in an effort to extend the life of the reactors.

One batch of rework totaling 750 gallons was accumulated as a result of an overflow of the metal solution tank D3. Continuation of the air blow cycle following the metal solution transfer from A dissolver to D3 resulted in the transfer of the subsequent rinse solution into the D3 tank. The malfunctioning jet transfer switch was inspected but no flaw was found in the mechanism.

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Radio-iodine stack emissions averaged approximately 0.5 curies/day for the month with no cumulative discharge in excess of the 6 curies/week limit. Iodine release from the vessel vent system was controlled by intermittent addition of mercuric nitrate to the head end centrifugation feed tank.

The boil-off rate from the underground waste storage tank 241-103-A continued at seven gallons per minute. The liquid level in the tank was increased from 132" to 142" when the aqueous waste from the special flushes of the plant solvent system was added early in the month. The temperature of the sludge layer in the tank bottom decreased from 150° C to 116° C as a result of improved circulation made possible by the larger volume of liquid. Operation of the contact condenser was changed from recovered process cooling water to raw water. The lower temperature of the raw water permitted a reduction in volume requirements with a resultant reduction in the A-8 crib liquid level from 52" to 43" (overflow 90").

Seventy-one loads of UNH were delivered to 224-U and forty-five loads of recovered acid were received from the UO₂ Plant. Storage space for UO₂ acid was increased from 14,000 to 50,000 gallons by temporary use of the P4 UNH storage tank. This will permit more economical scheduling of acid shipments.

2. Special Processing

Two startup batches of plutonium, 750 gallons of metal solution accumulated when the D3 tank overflowed, and fifteen and one-half tons of out-of-specification uranium were reworked within the building. The latter material was largely a mixture of UNH and HNO₃ acid from the UO₂ Plant, and UNH returned from the 300 Area. During the scheduled outages at the beginning and end of the month, special washes of the extraction solvent were conducted to reduce fission product activity and improve solvent quality; in the latter outage the precycle HC and final plutonium 2B columns were also flushed.

B. Radiation Experience

1. Radiation Occurrences

Two radiation occurrences were incurred during the month. A laboratory assistant contaminated her finger tips to greater than 40,000 d/m plutonium in removing her grossly contaminated surgeons gloves. The skin contamination was readily removed. A welder contaminated his personal underclothing to 6,000 c/m fission products when he sat in a wet spot during the course of his work. No skin contamination was incurred in the incident.

2. Personnel Exposure

Five cases of skin contamination were incurred during the month. The maximum amounts of contaminant encountered were greater than

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40,000 d/m plutonium and 5,000 c/m fission product.

Replacement of the drain valve on one of the two boiling waste tank condensers was completed. Final inspection for leaks and the removal of tools was completed at maximum dose rates of 2 rads/hour at four feet and 300 mr/hour at eight feet.

The maximum dose rate encountered in obtaining process samples during the month was 3.5 rads/hour, including 500 mr/hour at one foot from an E-5 sample.

A radiation survey was made in the canyon "greenhouse" (canyon observation room) to determine the radiation level during the charging of a dissolver. The maximum dose rate observed was 60 mr/hour at approximately 370 feet from a bucket of irradiated metal.

Several process cell jumpers were repaired on the canyon deck during the month. Typical dose rates were encountered in repairing the BT-15 jumper. The maximum radiation level at the end of the jumper was 17.5 rads/hour, including 1 r/hour at one foot. Shielding reduced the radiation level to 450 mrads/hour, including 50 mr/hour at six inches. The average dose rate for the work on the jumper was 250 mrads/hour.

3. Contamination Experience

A suck- or blow-back of process material into the F-7 process sampler water flush line contaminated the line internally to 3 r/hour at two inches. Repeated flushing of the line with water reduced the radiation level to 2 r/hour and "Bowlene" flushes reduced the level to 300 mr/hour. Additional internal decontamination will be attempted to further reduce the radiation level.

Grossly contaminated waste (greater than 40,000 d/m plutonium) was removed from L Cell with only a minor spread of contamination to paper laid on the canyon deck for contamination control. The contamination was promptly fixed with tape, and the paper removed.

The canyon deck decontamination program continued throughout the month. Work at the E cell section was typical of the decontamination accomplished. Thirteen contaminated areas ranging from 500 mrads/hour to 10 rads/hour were reduced to a maximum of 25 mrads/hour.

C. Mechanical Experience

The centrifuge repaired during April was installed in the E-4 position on May 29, after undergoing a series of test runs earlier in the month. This machine, installed in the E-4 position early in the year, was removed for repair in February as the result of a drivehead bearing failure. Final in-cell testing is now in progress.

The rectifiers (stack of three) that provide DC electrical power to brake E-2, E-4, and G-3 centrifuges failed on May 5 because of flash

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damage of the rectifier plates. Similar failures were experienced in April 1957, December 1956, and May 1956. As a result of the high frequency of failures, two sets of rectifiers were installed on an experimental basis to provide additional DC capacity for braking the centrifuges, thereby increasing the life expectancy of the rectifiers.

Loss of electrical power to motor control center #3 for five minutes on May 14 interrupted the operation of two J Cell process pumps, two air sample vacuum pumps, and two auxiliary ventilation fans. The outage was not of sufficient duration to adversely affect building activities. Subsequent investigation disclosed the outage occurred as the sample gallery vacuum pumps were changed from automatic to manual operation, with the current surge resulting from simultaneous starting of both motors tripping the breaker to MCC #3. Electrical wiring changes were made to preclude the possibility of a similar incident from this cause in the future.

A leak was found in the piping-through-concrete on the F11 concentrator steam supply to the right hand tube bundle. This line - one of four steam lines serving the tube bundle - was removed from service and isolated for future evaluation of the cause of failure. An engineering study of large concentrator steam demands has shown that present production requirements will permit operation of the tube bundles on two of the four steam supply lines. Accordingly, a number of in-concrete steam lines are being removed from service pending resolution of the failure problem.

Installation of the 2WW backcycle jumpers was completed at the end of the month. The jumpers will permit evaluation of the backcycle scheme to recover the plutonium from the waste streams of 1A, 2D, and 2E columns during the next operating period.

One of two agitators was removed from solvent storage tank G7 in preparation for conversion of the agitator to a turbomixer. The turbomixer will be used in prototype demonstration of improved solvent treatment techniques in the #1 organic treatment system.

D. Analytical Control Experience

During the latter part of the month another procedure for determining plutonium in the final uranium product sample was tested. This procedure allows for the removal of the neptunium bias that existed in previous methods and also makes possible a reasonable estimation of the neptunium content of the sample. With the June startup, the new procedure (coded PuA-20f) will be the official procedure for determining plutonium in the final uranium samples.

E. Improvement Experience

1. Process Tests and Revisions

(For more detailed information on these and other items, see the Research and Engineering portion of the CPD report.)

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The most significant achievement during the month was the ten-fold reduction in plutonium losses from the 2B column (from approximately 0.3 percent to 0.03 percent) resulting from the addition of 0.005 M sulfuric acid to the 2BX stream. A sharp drop in losses also occurred in the 2BW stream immediately following the addition and the losses remained low during the remainder of the run period. No adverse effects were noted.

During the early May outage a production test of the acid fractionator was completed for Facilities Engineering to determine if a surface condenser rather than the installed contact condenser would be of value in reducing the load on the Purex cribs. The fractionator unit operated at 55 gallons per minute flow rate (3.75 CF) for twelve hours under stable conditions, producing 60 percent acid from 30 percent feed. Although final results of fission product distribution in the overheads have not been received, it is expected they will reflect no higher values than are obtained at current processing rates. These values are low enough to permit open ditch disposal of the effluent, reserving the fractionator crib (A-9) for potential future use.

2. Inventions and Discoveries

S. I. Allen, Product and Material Handling Operation supervisor, submitted an invention report on a Transistor Type Dose Rate Integrator.

F. Events Influencing Costs

The storage space for UO_3 recovered acid was increased from 14,000 to 50,000 gallons through temporary use of the P4 UNH storage tank. The increased reserve in storage will reduce transportation overtime cost associated with the recovered acid transfers.

A savings of about \$6200 was realized during the month by the use of UO_3 recovered acid in preference to fresh acid from offsite.

G. Plant Development and Expansion

No significant items to report.

III. ORGANIZATION AND PERSONNEL

A. Safety

There were no disabling injuries. Eight medical treatment cases were reported. One serious accident occurred on May 2 when a maintenance employee sustained a severe shoulder strain as a result of a fall in the locker room. CPD Serious Accident Report #57-2 was issued covering the formal investigation of this injury.

B. Security

There were no security violations during the month.

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C. R. Miller was assigned to the Analytical Control Operation as a Process Chemist upon his return from military service on May 27.

J. E. Mee, Process Chemist, terminated on May 31, to return to school and study for a doctor's degree.

O. F. Beaulieu, G. J. Behling, J. J. Jech, and J. H. Mathis completed the first session of PEM.

MANAGER
PUREX OPERATION

OC Schroeder: JCG:gt

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CHEMICAL PROCESSING DEPARTMENT
REDOX OPERATION

MAY, 1957

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I. RESPONSIBILITY

There were no changes in the scope of responsibility of the Redox Operation this month.

II. ACHIEVEMENT

A. Processing Operation

1. Production Rates and Operating Continuity

The Redox Facility was scheduled for a low production commitment during May and for this reason the first 12 days of the month were devoted to acid flushing and an extensive crane and canyon decontamination program. Processing was resumed at 2200 on 5-12-57 and operations were continuous for the remainder of the month, except for a six hour period on 5-21-57 when the process was shut down for the replacement of the agitator in the H-1 feed preparation tank. The facility exceeded the production commitment by 13.8% and achieved a mechanical efficiency of 99% during the period of scheduled operation. The actual on-line efficiency for the month was 61% and is attributable to the low production commitment which did not require full time processing.

Some difficulty was experienced at the start of the operating period with the acid balance throughout the process. Poor decontamination factors resulted in the reworking of fifteen E-3 batches of plutonium. Seven E-12 batches of UNH were out of shipping specifications and had to be ozonated, run through the silica gel and/or blended. All UNH produced met shipping specifications after this treatment.

Waste losses for the month showed a significant improvement over the past several months. The plutonium and uranium losses in the waste streams represented 0.39% and 0.10% respectively of the month's production.

A total of 4.1 curies of I131 were emitted during the month, of which 3.6 curies were emitted during the period 5-1-57 through 5-8-57. There was no dissolver activity during this period and to date the reason for this relatively high emission has not definitely been established.

During the latter part of April and the early part of May, a thorough 60% nitric acid flush of the columns and attendant vessels

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was made. Analytical results on the flush material indicate that the process changes made during April have been effective in reducing the plutonium hold-up in the system. Only 5% as much material was recovered in this flush as in a similar flush performed in February, and only 14% of that recovered during an April flush. Material balances for the month of May indicate no deposition problem. However, some crystallization in the F-4 tank (3DF Feed Tank) continued to exist as 65 units of uranium were recovered from this tank during a flush. Changes in the caustic addition to this system have been made in an attempt to correct this condition; however, the results have not yet been evaluated.

Dissolution tests were completed this month on the nine bucket charge of single cast uranium ingot material (Dingot material) which was charged to the B-2 dissolver on April 28. Results indicate that the dissolution time for this material will be 66 to 100% longer than that required for normal material.

As a preventive measure against flooding in the 1-S and 1-A pre-cycle columns, a 10% nitric acid flush of the columns was made on 5-27 and 5-29 respectively. The flushes were completed with no loss in operating time.

---SECTION.

2. Equipment Experience

a. Steam Shutdown

On 5-1-57 a total building steam shutdown was taken to replace all of the sectionalizing valves directly off of the main steam loop. Although this was largely a preventive maintenance program, greater than 75% of the valves were found to be leaking through.

b. Vent Jet Fail Safes

It had been determined that the fail safe mechanisms on the building vent jets were not operating satisfactorily, as the steam valve controlled by the fail safe was not of sufficient size to allow an immediate build-up of steam on the vent jet,

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should the air supply fail. On 5-9-57, all of the undersized steam valves were replaced with valves and piping of adequate size. The fail safe system is now operating properly.

c. Water Segregation (Project CG-653)

Following the completion of the waste water segregation project in January, a back pressure on the dissolver pot coils was noted. This was attributed to an undersize pipe tunnel header. Since the pressure was sufficiently high to effect the dissolver time cycle, plans were immediately made to relieve the pressure by utilizing a spare trench header and splitting each dissolver coil discharge between the two headers. To accomplish this objective, three cell jumpers were subsequently fabricated. Installation of the jumpers in A and C dissolver cells was completed this month and the installation in B Cell is tentatively scheduled for the June-July shutdown. Although the project is not complete, it now appears that this installation will alleviate the back pressure on the dissolver coils.

d. Equipment Burial

On 5-13-57, a waste box containing \$71,374 worth of failed and unrepairable cell equipment was buried without incident. This was burial CP-57-62.

e. C-3 Silver Reactor

The C-3 silver reactor was replaced this month when it was observed that the efficiency of the unit was rapidly decreasing in spite of repeated regenerations. The replacement unit was one which had been removed on 3-18-57 due to a plugged heater unit. The new installation, following regeneration has operated in a satisfactory manner.

f. H-1 Agitator

On 5-20-57, the agitator in the H-1 Feed Preparation Tank failed due to a seized shaft. The unit was replaced on 5-21-57 and subsequent operation has been satisfactory.

g. D-14 Backcycle Pump

On 5-24-57, the D-14 pump failed due to a frozen shaft. Processing was continued without the benefit of full backcycle for a period of 14 hours while the pump was replaced. The new unit is currently operating satisfactorily.

h. C-2 Dissolver. Coil Outlet Jumper

On 5-25-57, the Crosby valve in the coil outlet jumper on the C-2 dissolver froze in the closed position. All efforts to free the valve were unsuccessful and on 5-27-57 the jumper

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was removed to the Remote Maintenance Shop for the installation of a new valve. Repair and reinstallation were accomplished without incident.

i. Crane Optics

During the change out of the H-1 Feed Preparation Tank agitator on 5-21-57, the left hand optic on the 60-T Canyon Crane failed to change magnification. A new optic-head was installed and satisfactory operation subsequently restored.

j. Railroad Tunnel Door

On 5-20-57, the vertical canyon tunnel door was damaged to the point that replacement was necessary. The incident occurred when the door was inadvertently closed while the train crew was moving a car out of the tunnel. Appropriate action has been taken to eliminate future incidents of this type.

k. Canyon Crane Wrench

On 5-24-57, the left hand wrench on the canyon crane failed due to an internally shorted drive motor. Replacement was made on 5-27-57 and the new unit is now operating satisfactorily.

B. Maintenance Operation

1. Operating Continuity and Equipment Maintenance

The facility operated at a mechanical efficiency of 99% during the period of scheduled operation. Two pieces of rotating equipment failed and were replaced during this period namely; the D-14 Backcycle Pump and the H-1 Feed Preparation Tank Agitator. During the scheduled shutdown in the early part of the month, one silver reactor, a dissolver lid gasket, and four jumpers were installed.

2. Inspection and Maintenance

A total of 241 inspection cards were issued during the month, of which 158 were returned by the respective foreman, together with 96 cards from previous months. A balance of 131 inspections are currently outstanding, 95 of which are in the instrument group. The loss of two experienced instrument men during April has not allowed any significant reduction in the inspection performance of this group.

The glass bearing P-130 pump installed in the F-1 position on April 13, 1957 continues to operate satisfactorily. Actually, during this period the pump has operated only 30 days so that it is too early to establish the success of the glass bearings in this service. Difficulties with the bowl and head castings on the specially designed pumps, ordered from the Peerless Company

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for this position, has delayed delivery. Because of repeated failures to meet former delivery dates, no realistic delivery date can be expected. However, the latest information from the Company indicates a possibility that at least one unit may be delivered during June. In order to provide adequate spares for this position, four TBP pumps were picked up before excessing and transferred to the Redox inventory. These pumps will require extensive modification before they can be used; however, in view of the indefinite delivery date of the Peerless order, this appears to be the logical course of action.

A permanent nitric acid line was installed from the 2DX proportioneer pump on the 7th level to the F-G-16 wall connector in the South Pipe Gallery to meter nitric acid to the process in F-Cell. This installation was made to replace a temporary saran line which was installed during April.

A blow down manifold was installed in the 233-S Building to service the L-8, L-12, L-13 and L-15 condenser lines. This will enable the operators to blow down the strainers in these lines whenever they become plugged, without the necessity of a pipefitter going behind the board and hooking up a hose from the plug strainer to the floor drain.

A large section of duct work was fabricated and installed this month for the No. 3 air exhaust fan located on the east end of the 202-S Building. The old black iron duct work was corroded to the point that replacement with stainless steel was considered advisable.

An inspection of the caustic lines in the 211-S Tank Farm Area revealed six weld leaks. The welded sections were cut out and replaced using the oxo-acetylene torch rather than the metallic arc. Experience has proved that the gas welding technique gives longer life in caustic service.

On 5-25-57, the blocks on the 219-S Waste Tank Vault (Laboratory waste) were removed and an extensive maintenance and housekeeping program initiated. This included the replacement of two defective thermohms, repair of all steam leaks, and the replacement of two bakelite H. M. Chambers, used for leak detection, with five inch G. E. tubes. All electric motors in the pit were cleaned and given a protective coat of paint. The job was completed on 5-29-57 without incident.

Experimental work on the problem of leaks in the in-concrete piping in the 202-S Building has failed to positively identify the source of corrosion. However, there is substantial evidence that it may be due to chlorides released by the thermal decomposition of the plastic tape used in wrapping the pipes prior to casting them in concrete. Samples of the wrappings have been analyzed and decomposition products of the tape have been investigated. The tape showed a chloride content of 19%. Another factor which

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bears consideration is that cracks in the pipe sample obtained from Redox are typical stress corrosion cracks. It is quite definite that this condition was caused by stresses induced in the pipes by cold bending during fabrication without subsequent heat treating. This condition, when combined with the chloride from the waterproof tape, could very likely have started the corrosion. Further evidence to substantiate this theory is that similar pipes in the Bismuth Phosphate Building were heat treated after fabrication and were not covered with any kind of wrapping such as was done in Redox and Purex. Samples of waterproof wrapping tape were removed from seven lines in the Purex Facility and analyzed for chloride content. Although the analyses indicated a lower percent of chloride than the Redox tape, it was still very much above the allowable limit of 5ppm. Work has started on the removal of a short section of an in-concrete steam line from the 221-T Building and work is continuing on the fabrication and calibration of equipment for the eddy current surveys to be made in both the Purex and Redox Plants.

C. Waste Handling and Decontamination Operation

1. Waste Handling

a. 200 East Area

	<u>Gallons</u>
Waste Scavenged	540,000
Waste to Ditches (Scavenged)	1, 818,000
Waste Received (TBP)	197,000
Purex Coating Waste Received at C Farm	52,000
Waste to Cribs	none

b. 200 West Area

	<u>Gallons</u>
Redox Coating Waste Received at U Farm	25,050
Salt Waste Received at SX Farm	152,654
Total Gallons Boil-Off Salt Waste	121,690

2. Equipment Decontamination

a. Automotive Equipment

A total of 14 vehicles were decontaminated for other facilities during the month.

b. Railroad Maintenance

A total of 151 manhours were charged to railroad decontamination work and time keeping at Riverland.

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3. Equipment Decontamination 221-U Building

Plans are now being formalized for the operation of a portion of the 221-U Canyon Building as an equipment decontamination facility rather than the 221-T Canyon Building as originally planned. The availability of equipment in the 221-U Building which can be readily adapted to equipment decontamination will effect a savings in excess of \$50,000 in equipment and will allow that portion of the building not utilized for the decontamination operation to be used for much needed office space for other CPD operations. Actual work will start at the completion of the Bismuth Phosphate lay-away program now expected during the early part of June.

4. T and B Plant Lay-Away

At this writing, lay-away work in the 224-T, 224-B and 221-B Buildings has been completed. Because of the decision to use the 221-U Canyon Building as an equipment decontamination facility rather than the 221-T Building, some additional lay-away work in the 221-T Building will be necessary. However, this work is now expected to be complete early in June. At this time all responsibility for property and equipment is to be transferred from the Redox Operation to the Power and General Maintenance Operation.

5. Purex Work at C Tank Farm

A plugged line to the 104-C tank (Purex coating waste) and several jumper changes accounted for approximately 190 manhours charged to the Purex Operation.

D. Analytical Control Operation

1. Control Statistics

<u>Month</u>	<u>Samples</u>	<u>Determinations</u>
April	3038	7374
May	3087	7157

2. Building Maintenance

Principal 222-S Building maintenance included completion of the pipe lagging in the 219-S Building, repair of four plugged vacuum lines, and replacement of three C.W.S. hood filters.

3. Equipment Experience

One day of down time was experienced with the mass spectrometer due to the failure of the source filament.

Installation of an Intrafax system between the 222-S Analytical Laboratory and the 202-S Building was completed this month. Transmitting of analytical results to the 202-S Building Dispatcher

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via the Intrafax was initiated upon completion of the installation and operation to date has been satisfactory.

A defective orifice controlling the flow of hydrogen and hydrogen fluoride gases was replaced in the UO_3 reactivity apparatus restoring the efficiency of this equipment.

An unstable condition in the X-ray photometer was corrected by realignment of the X-ray head and cell holder. A detailed procedure for replacing and aligning the X-ray head has been prepared to forestall future difficulty.

4. Assistance to Process

A series of curves relating specific gravity and per cent calcium nitrate at different temperatures was prepared as a service to the Redox Waste Handling and Decontamination Operation.

Methods were developed this month for the routine analysis of TBP organic solvent samples for radio-caesium. Development of the methods was made possible by a revision in the cesium analytical method which now employs a cobalticyanide precipitation step instead of perchloric acid. The hazard of using the cesium analysis on organic material has thus been greatly reduced.

5. Analytical Procedures

A bias in the X-ray uranium assay was eliminated by the replacement of a glass absorption cell which was found to have a small leak.

E. Radiation Monitoring Operation

1. Radiation Occurrence Experience

Redox Operation experienced one of its best months in radiation control with only four Radiation Occurrences reported for the month. This is particularly encouraging in light of the extensive crane decontamination work which was conducted during the month and the extensive decontamination work carried on in other parts of the Redox Operation. One of the Radiation Occurrences involved a localized technical overexposure to a process operator. A maximum of 4.3 rads exposure was received over an area of one square centimeter on the employee's wrist. The cause of this Radiation Occurrence was the failure of a radiation monitor to survey a process sampler at completion of a process sampling operation. Appropriate action has been taken to eliminate future incidents of this type.

2. Personnel Exposure Experience

The crane decontamination program conducted in the first two weeks

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of the month required an estimated 10.3 rads exposure to achieve the highly successful results of this program. Definite savings in personnel were realized with the closed circuit television and the Dose Rate Integrators in that exposure timekeeping was conducted from the TV room. It is estimated that with the old method of timekeeping, where the timekeeper was at the work site, 2.5 rads additional exposure would have been necessary to complete this large scale program. It is also felt that the use of the dose rate integrators provided maximum utilization of the workers in the radiation zones due to the ease in the use of and the accuracy of the dose rate integrators.

3. Other Contamination Experience

The crane decontamination was completed during the month, and the success of this program can best be shown by the increase in time limits on the crane. Catwalk time limits which originally ranged from less than 30 seconds to 10 minutes were increased to 10 to 20 minutes and in the area above the crane cab the average time limit was increased from 6 minutes to 12 minutes. Dose rates to 1 rad/hr at 5 feet encountered on crane tools were reduced to a maximum radiation level of 2.5 rads/hr at 3 inches. Some crane areas will need further decontamination. For example, the top of the main trolley still shows dose rates to personnel of 1.5 to 3.5 rads/hr. Individual motor generator sets will also require some further decontamination. The program did succeed in achieving a primary objective which was to increase time limits to a point which would allow the preventive maintenance program and future decontamination work to continue.

F. Improvement Experience

1. Process Tests and Revisions

Information relating to this item is covered in the Research and Engineering portion of the Department report.

2. Miscellaneous Improvement Items

Significant improvements were made in the condition of the 202-S Canyon and the canyon crane following the utilization of the canyon spray down system the latter part of April and the extensive decontamination program on the crane instituted 5-1-57 through 5-10-57. The time limit for 50 mr exposure on the crane catwalks prior to this effort ranged from less than 30 seconds to ten minutes. Following the decontamination program, the time limits were increased to 10 to 20 minutes. This allowed a thorough lubrication of the crane on 5-10-57 for the first time since 1953.

The program was more effective on this assault due largely to the planning and scheduling that was done by the men directly

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responsible for carrying out this program. New techniques were also developed which should prove invaluable in future decontamination programs. Among these was the development of a solvent jet which combines the solvent with an air stream. Results indicate that this method of decontamination has been more effective than the previously used high pressure spray.

Another technique which saved an estimated 2.5 rad of exposure time was the utilization of closed circuit TV and the Dosage Rate Integrators to time keep the exposure of the men decontaminating the crane. The entire crane decontamination program was carried out without incident. A separate report on the canyon crane decontamination program will be issued.

Following the crane cleanup, air sampling of the canyon air was again resumed. This had been discontinued several years ago, as the air samplers were so "hot" they were difficult to handle, therefore the RMU men handling the samples had to be constantly monitored during the removal of the samples. The first sample following the wash down and crane decontamination program read only 2500 c/m after 5 CFM exposure for 24 hours. Since then, even lower samples have been taken. On 5-28-57, the canyon air was below assault mask limits.

Following the canyon wash down and decontamination of the canyon crane, the canyon was entirely relamped. This is the first time in the past four years, that the canyon has been entirely relamped.

3. Inventions or Discoveries

There were no inventions or discoveries of a patentable nature reported in the Redox Operation during the month of May, 1957.

G. Events Influencing Costs

Unit cost figures for the month of May will be high due to the limited amount of feed material available for processing.

Failure of the D-14 backcycle pump on 5-24-57 necessitated processing for approximately 14 hours without the benefit of full back-cycle.

A charge of \$34,000 was assessed against Bismuth Phosphate Plant lay-away budget due to the excessing of essential materials which are no longer needed.

Spare connector assemblies valued at approximately \$22,000 were returned to Spare Parts this month for credit. Approximately \$4,400 worth of merchandise has yet to be returned in order to erase the charges which were incurred against the Redox Maintenance Operation in salvaging these connector assemblies.

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In checking into the IBM runs and cost reports since the reorganization of September 1, 1956, a discrepancy in the interpretation of procedure in establishing the charges between internal and external maintenance was found. The April 30th cost report, which covers the first ten months of FY 1957, indicates a credit of \$133,000 for external maintenance and a deficit of \$50,000 for internal maintenance. A review of the IBM runs back to December 1, 1956, has revealed that approximately \$76,000 should be removed from internal maintenance charges. Approximately \$50,000 of this should rightfully be charged to external maintenance for jumpers and other canyon equipment fabricated by the Shop but purchased through Spare Parts. Because these purchases were made by Redox Maintenance from Spare Parts Operation the charges were erroneously made against the internal maintenance budget. Corrective action has been taken to apply the charges to the proper accounts. An additional \$26,000 will be removed from internal maintenance with the return of the completed connector assemblies in the connector salvage program.

Stock adjustment requests (S.A.R.'s) have been prepared and sent to Spare Parts covering the excessing of Bismuth Phosphate spare parts and spare equipment. Other S.A.R.'s have been prepared transferring those items needed for the Tank Farms to the inventories of that operation. A few of the 75 Ton crane parts as well as the 271-T and B air conditioning parts, are being retained. The disposition of six centrifuges valued at approximately \$94,000 is yet to be determined. At least one of the six will be transferred to the Redox spare parts inventory.

Additional lay-away work in the Metal Removal Operation has delayed the completion of a complete equipment inventory. Consequently, the transfer of Tank Farm property and equipment from the Finished Products Operation to the Redox Operation has been extended from May 1 to June 1, 1957.

At the request of SS Accountability the weighing and tabulating of UO_3 sample residues before returning to the process was assumed by the 222-S Analytical Laboratory. An increase in work-load of five manhours per month has resulted.

H. Plant Development and Expansion

1. Design Liaison, Construction Checking

CG-621, Redox Contamination Control

Minor repairs of deficiencies noted during the acceptance tests remain to be accomplished.

CG-643, Redox Capacity Increase Phase III

The project proposal, revision No. 2, is now being circulated within the Chemical Processing Department for approvals. The

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revision asks for funds for the completion of the original proposal.

CG-686, In-Line Monitoring Instrument

Installation of piping for the instruments has commenced in the north and south sample galleries and at "K" panel operating board.

CG-692, Modification to Redox 233-S Concentration Building

A project proposal revision, requesting \$120,000 rather than \$98,000, is now being circulated for approvals. The increase in cost estimate is due to the change in work force determination to permit all work to be done by the Construction and Engineering Operation, and a revision in the scope of the work which provides a spare exhaust unit which will allow filter changing with a minimum danger of plutonium contamination spread.

CG-720, Redox SWP Service Area

A directive has been received from the AEC authorizing construction of this project. Funds authorized were \$10,000 less than indicated on the project estimate. Discussions between representatives of G.E. and AEC resulted in agreement that the reduction would be acceptable.

CG-722, Recovery Acid Receiving Station - Redox

This project is at a standstill until scope revision is complete. Cost estimates of \$59,000 for the pipeline to the 224-U Building and \$16,000 for the tank trailer facility have been released. A breakdown of these estimates has been requested.

CG-648, Auxiliary Iodine Removal and Nitric Acid Recovery

The fixed price contractor's work was held up approximately one week due to a pipefitter's strike. Work should now be completed by June 15. Construction Engineering force's work should be completed ten days after the June scheduled shutdown. Beneficial use date is now approximately June 24, 1957.

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Capillary Tube Samplers

The capillary tube samplers, which are to replace the bayonet type samplers in the 202-S Building sample gallery, are now being installed as they are received from the 200-W Maintenance Shop. This item will be deleted from future reports.

Improved Redox Dissolver

Construction of the larger capacity Redox dissolver at White Bluffs by the Construction and Engineering Operation is now estimated at 75 per cent complete with no delays anticipated.

I. Reports Issued

No secret reports were issued by Redox Operation personnel during the month of May, 1957.

III. ORGANIZATION AND PERSONNEL

A. Safety

There was one disabling injury and two serious accidents in the Redox Operation during May, 1957. Seven medical treatment injuries were reported during the month.

On March 8, 1957 a chemical utility operator tripped on a temporary foot bridge and fell to his right knee. Progression of the injury resulted in surgery on May 23, 1957 to correct a dislocation of the semi-lubar cartilage of the right knee. Details of this injury are described in the Investigation Report, "Disabling Injury CPD No. 57-1".

On May 7, 1957 a serious accident was experienced when a plumber steamfitter journeyman, engaged in the installation of a new nitric acid line on the Redox 7th level, slipped on a wet spot on the vinyl tiled floor and fell. The injured was taken to the Area First Aid by ambulance, examined by an industrial doctor, then sent to Kadlec Methodist Hospital where the injury was diagnosed as a fracture of the distal end of the left fibula, contusion left shoulder and laceration of scalp. A walking cast was applied and the patient was released the following morning. He returned to his work area and was placed on guided work. De-

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tails of this injury are described in the Investigation Report, "Serious Accident CPD No. 57-3".

On May 7, 1957 a serious accident occurred in the 601-C Building. A process operator and a utility operator were in the process of making up a chemical solution on the second level of the building when an electrical powered one-half ton hoist failed and fell with the load approximately 12 feet to the first floor level. There were no injuries sustained and damage was limited to \$100. Details of the accident are described in the Investigation Report, "Serious Accident CPD No. 57-4".

On 5-23-57, a small fire occurred in a waste box on the crane maintenance platform while the Construction and Engineering Operation was welding on the crane canopy. The fire was readily extinguished with a CO₂ extinguisher and damage was negligible.

A two hour outage on the 222-S Building ventilation system was taken to remove an accumulation of lubricating oil from the floor of the low pressure plenum chamber. This action was taken as a fire prevention measure.

As a safety measure in the 202-S Building freight elevator, angle iron lifting bars were installed on the cage doors to prevent passengers from lifting them by grasping the screen mesh.

D. B. Dabbling, W-3622, was chosen as the outstanding participant for the month of April in the Chemical Processing Department's program of "Who's Who in Safety".

B. Security

There were no security violations in the Redox Operation during the month of May.

C. Personnel Activities

A rotational training program involving the supervisors of the Analytical Control Operation has been scheduled for the coming months. Each supervisor will ultimately be placed on loan to the Redox Processing Operation for a two - three month period, and will work in conjunction with the members of this operation and Redox Technology personnel in learning the details of the operational work. This program will also allow management the opportunity for further evaluation of possible candidates for promotion.

During the period of scheduled downtime for May, a series of tours involving 30 operational personnel, was conducted by the Analytical Control Operation in an effort to present a composite picture of the Analytical services, procedures and instrumentation utilized. Since a better understanding of both analytical and process conditions by all concerned seemed to be realized, it is planned to conduct similar tours during any future periods of schedule downtime.

A work sampling program was started on May 20 in the Redox Maintenance Operation and is to continue through June 7. To date, employees appear to be accepting the program very well.

C. W. Pollock, Process Chemist, Analytical Control Operation attended the Engineering Sessions of the "Data Processing Survey Course" at W-10 on May 13, 14 and 15.

W. S. Lee, Foreman Maintenance, and R. E. Dahl, Control Chemist, Analytical Control Operation, attended the Management Orientation Course scheduled on May 17.

All secretaries, stenographers, and typists (total of 7) in the Redox Operation attended the training session "Classified Document Preparation and Handling" on May 10, as presented by representatives of Classified Files and Security.

W. S. Lee and C. E. McMahon, Foreman Maintenance, A. H. Case, Analytical Chemist, and S. G. Wells, Chief Operator, attended the first session of the "Labor Relations Course" as presented by the CPD Training Group on May 27.

A total of 53 Redox Operation personnel participated in guided tours of KE and KW Reactor Operation Facilities during the month of May.

Six exempt and one non-exempt Redox personnel attended a projectionist training course offered during the month by the CPD Training Group.

Two non-exempt personnel attended the "Rescue Refresher Course" as presented by the Specialist, Plant Disaster and Civil Defense.

O. E. Warren, Redox Power Operator, attended training sessions on "Ventilation Principles" on May 3 and 31.

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C. T. Grosvenor by
Manager *CBH*
Redox Operation

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CHEMICAL PROCESSING DEPARTMENT
FINISHED PRODUCTS OPERATION

MAY 1957

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I RESPONSIBILITY

There were no changes during the month in the responsibilities assigned to the Finished Products Operation.

II ACHIEVEMENTS

A. Metal Finishing Operation

All incoming feed from the Redox and Purex Plants was converted to plutonium metal and shipped offsite unfabricated. The schedule which was established for the month of May was satisfied.

It was necessary to maintain high processing rates during the entire month in order to carry the heavy feed load. Material started coming from Purex on May 6 and continued through May 28 at which time the plant was scheduled for flushing operations. Redox feed was received starting on May 16 and continued through the rest of the month. Enough material was available from lag storage in order to permit operation during the first few days of the month when feed was not being delivered from the primary plants.

Equipment performance was, for the most part, satisfactory except for two significant outages which were experienced. About the middle of the month one of the glass reactor vessels in Task I was broken during normal processing. This failure, resulted in a 25% reduction in processing capacity. The outage for repair was longer than anticipated because the replacement vessel was broken in the process of installation. This equipment was out of service four days as the direct result of this failure. Later in the month, water was forced into the hydrogen fluoride gas distribution system by improper manipulation of valves in the cylinder purge manifold. Production was interrupted two days while this system was dismantled for cleaning. These two combinations of circumstances made it necessary to work one additional day of overtime in order to meet established schedules.

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A. Metal Finishing Operation (Continued)

Some significant lowering in radiation level was achieved in the Zone 3 work area of the wet and dry chemistry operations by installation of transparent shielding over the plexiglass panels. It is not clear at this time whether additional action will be necessary in order to satisfy radiation exposure goals which have been established for the department. Other operations are now being scrutinized whether reduction of exposure can be effected by reasonable means elsewhere in the fabrication plant.

B. Product Recovery Operation

A record was achieved in the Recuplex dissolvers, the 77 runs processed by current day flow sheets representing an equivalent of 114 runs under operating conditions of four months ago. The previous high was 80 virgin runs in December 1956, and 54 runs in April 1957, the latter being equivalent to 99 under old flow sheets.

The recovery of metal scrap and casting skulls, temporarily held back in order to allow the processing of virgin feed from the parent plants, was resumed. A ca. 23.3 Kg was dissolved, some of this originating from low density buttons and impure castings from the Metal Finishing Operation. Because of the type of plutonium being fabricated, all of the dissolved metal had to be returned via Recuplex extraction to provide the necessary degree of purity. This will continue.

Recuplex extraction column performance hit an all time high. A total of 72.6 Kg plutonium was charged in, 63.7 Kg (95 batches) being delivered to Metal Finishing Operation by month end. Column operating efficiency was 90.6%, with an instantaneous rate of 1905 liters per day. In achieving these records, waste losses were kept at an all time low of 0.16% which is attributed in part to improved organic washing chemistry, described in previous reports. Difficulties encountered included the necessity for processing 30 batches of off-standard Purex feed in addition to the dissolved metal scrap noted above, which required careful scheduling so as not to overload the system. Further, the pumps and agitators on the organic tanks (K-1 and K-2) had to be repaired several times and eventually necessitated replacement of the K-2 pump. Action was taken to reduce analytical costs by eliminating the aqueous waste stream sample taken on each shift, as well as reducing the frequency of the organic stream samples from three to one per day. The radioassay of the final product solution (J-2 and J-3 tanks) was eliminated, it having served its purpose of defining isotope correction factors on the old waste being recovered at MWD levels different from current production.

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B. Product Recovery Operation (Continued)

The recovery of polish residues (sandpaper, filters, etc., contained in 35 - 40 boxes) was resumed when it was found that satisfactory control of burning rates could be achieved by slowly charring the paper in a wire basket on a hotplate. While this method is slower than burning with a torch, it is much safer. The ashes are being set aside pending the completion of the charring operation.

Power and ventilation work proceeded very smoothly. Two 250 cfm capacity instrument air dryers were installed in 291-Z as a replacement for the two 100 cfm dryers in order to better handle the present demand and prevent rusting of the pipes. The exhaust filters at Task II were replaced again; due to the heavy production load, change-out is now scheduled at three-week intervals. Other service activities included installation of asbestos siding and roofing on the 2704-Z Building and replacement of broken down barricades around the tile field. The ladies locker rooms were redecorated and large mirrors installed. The 2704-BXR and 271-BXR Buildings were excessed and will be put up for public sale.

C. Uranium Reduction Operation

Uranium production through the Uranium Reduction Operation was slightly over the basic "approved for shipment" commitment. This was somewhat below scheduled production. Actual material produced was 96% of scheduled, or goal. At month end a backlog of 174.00 tons of uranium as UNH was on hand at various locations throughout the plant awaiting processing at 224-U. One hundred twenty-two thousand, two hundred ninety-one (122,291) gallons of recovered nitric acid was shipped to Purex during May.

Numerous mechanical and operating difficulties were encountered during May, which resulted in only 48.2% total on line efficiency for the calciners. Achievement of this limited efficiency was possible only by the broad use of overtime for maintenance forces. The major problems encountered this month are centered around the fume vent system, with its related filters and valves, and the apparently changed expansion characteristics of the calciner shell and agitator, which resulted in extensive damage to two units during the month.

A three-day shutdown was scheduled at the first of the month when the fume vent header was found to be essentially plugged. This line was ultimately cleared by pumping it full of hot nitric acid. At month end the header is again plugged and a repeat cleanout will be needed during the first few days in June. The first plugging of the header occurred after approximately 1500 tons of uranium had been processed (intermittent operations since startup) at various operating rates. The latest plugging has occurred after processing less than one-third the tonnage; however, operating rates were higher.

C. Uranium Reduction Operation (Continued)

Changes in expansion characteristics apparently stemming from modification to calciners J, K, G, and H may be the cause of major damage to two of these units during May. J calciner was shut down on May 8 on a crash basis when a feed point was caught by an agitator paddle. This action apparently broke the paddle off, which set off a chain reaction ending with all agitator paddles being broken or bent as well as the trough badly scored. A similar occurrence happened in K on May 15, however, a quick shutdown was made, limiting damage to two sets of agitators paddles. Similar damage was possibly averted on G cell by early shutdown when the agitator started striking a feed point. This problem is being studied by Facilities Engineering who have recommended certain clearance modifications. J Cell was repaired and restarted late in the month but shut down again when the agitator started hitting the No. 4 thermowell. Calciners G and M were shutdown when the weir tie rod became badly bent, possibly from striking an agitator.

The following data on each calciner is herein included:

<u>Calciner</u>	<u>Days</u>	<u>Days</u>	<u>Rate per *</u>	<u>Rate per *</u>
	<u>Scheduled</u>	<u>Operated</u>	<u>Oper. Day</u>	<u>Scheduled Day</u>
G	28	12	4.67 T/D	2.01 T/D
H	28	15	5.84	3.15
J	28	7	4.32	1.08
K	28	7	4.67	1.16
L	28	22	6.42	5.05
M	28	18	6.18	4.00

(* Rates based on output tonnage.)

Actual mechanical online efficiency was 48.2%.

All units were down until May 3, due to the cleanout of the fume vent header.

G Cell: Started 5-8-57. Startup delayed due to leaky seal and plugged filters. Crashed down 5-10-57 when UNH feed pump failed - restarted 5-12-57. Startup again delayed due to plugged feed points, etc. Shut down 5-18-57 when agitator started hitting feed points, restarted 5-23-57. Down on 5-28-57 due to excessive fuming brought on by plugged vent header.

H Cell: Operated very well during its period of operation. Down until 5-16-57 to repipe hot box and replace drive motor. Was still running at month end.

J Cell: Started 5-3-57. Down 5-8-57 when agitator paddles broke off. Repaired and restarted 5-27, shutdown 5-31 when agitator started hitting thermowell.

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DECLASSIFIED**C. Uranium Reduction Operation (Continued)**

K Cell: Started 5-3-57, shutdown 5-6, when oil leaks on the bearing became excessive. Restarted 5-8, crashed down 5-10, when feed pump failed, restarted 5-11-57. Shut down 5-15-57 when agitator paddles were damaged - repairs not completed at month end.

L Cell: This unit operated satisfactorily most of the month. Started 5-3-57 - down 5-10, when feed pump failed - restarted 5-11. On 5-27-57 this cell was shut down when the overflow weir became plugged. Repairs not completed at month end.

M Cell: Started 5-11-57 when final assembly of all components were made. (This unit had never been previously run.) Shut down 5-30 when agitator started hitting weir. Repairs not complete at month end.

The operating problems appear to be stemming from design deficiencies; these deficiencies are in three primary categories, fume vent system (includes filters and isolation valves), mechanical troubles (expansion characteristics and bearing oil seals), and in the feed system. A major problem in solids handling may be in evidence as the powder fails to meet specifications (particle size) when output exceeding 25 T/D is processed. This point has not yet been fully proven; however, over 200 tons of material required remilling during the past two months, all of which had been processed at high operating rates.

Recent evidence from spectographic analyses indicates that waste material from the cell drainage system can be processed through this building with no adverse effect on product specifications. This is being done on a carefully controlled basis at this time and is working satisfactorily.

Significant improvement has been made in area housekeeping during the month with still some work to be done to put the place in tip-top condition.

Pot room lay-away work is continuing at a satisfactory rate.

D. Maintenance Operation

The major maintenance work performed in the 234-5 Building during the month consisted of the replacement of a broken glass reactor vessel in Task I and the reconditioning of hydrofluoric acid lines to Task II. Both of these jobs resulted in loss of processing time. Also in Task I considerable work was done in relation to leaking valves and plugged process lines. In Task II it was necessary to replace a door at Station #4 due to severe corrosion. In Task III it was necessary to install a new work coil support. In Task IV the recorder controller on Unit #3 was overhauled. In Task V it was necessary to replace the broken glass jar on the 5-A density balance.

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D. Maintenance Operation (Continued)

In Recuplex the K-2 pump failed during the month and was replaced with a rebuilt unit. Also in Recuplex sample headers on J-2, J-3, and J-25 were revised to accommodate the use of plastic instead of glass bottles.

In 291-Z Building the outboard bearings on exhaust fan EM-5 were found to be defective during a preventive maintenance inspection. In making repairs it was necessary to undercut the shaft and build it up by welding and then turn it to proper size while in place using a special tool for this purpose. Also in 291-Z Building the 100 CFM instrument air driers were replaced with 250 CFM driers in order to handle present demand and reduce possibility of scale in the instrument air lines.

In the Uranium Reduction Plant major maintenance problems centered around the broken agitators in J and K calciners and the plugged fume vent system. In J calciner it was necessary to replace agitator paddles all of which were either broken off or badly bent. This unit was returned to service on 5-27-57 after having been down for 19 days. The similar difficulty which occurred in K calciner was less severe since this unit was shut down before extensive damage occurred. This unit is still down after 15 days and repairs are currently in progress. The cause of these failures has not yet been definitely determined. The fume vent system was inspected at the first of the month and found to be essentially plugged with product. To remove this material it was necessary to install blanks and to make provision for flushing the lines with acid, and also install lines for the removal of the acid after the cleaning process was finished. At month end a similar condition is apparent and a repeat cleanout is scheduled. This problem of plugged vent lines is under study at month end.

The lay-away work on the pot rooms is approximately 90% complete at month end. Some delay was encountered on the lay-away work as the men normally employed on this were used when the severe troubles mentioned above were encountered on the calciners and fume vent systems.

E. Analytical Control Operation

A total of 7888 determinations were made on 1943 samples received in the Analytical Laboratory during the month. This is an increase in number of determinations by one-third over last month on twenty-four percent less samples. Part of this was the result of requests for complete analysis of all button samples.

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E. Analytical Control Operation (Continued)

Routine procedures have been written for the IBM Program for plutonium metal determination results. Procedures are now being developed for controlling counting instruments in Product Inspection, and for referee and standards programs in the Analytical Laboratory.

F. Layaway Operation

In the Tank Farms contamination on all vault and tank cover blocks has been reduced to non-smearable condition. "Radiation yellow" paint is being applied to areas of concrete where radiation levels are above 100 MR Beta. All in-farm diversion boxes and vault cover blocks are sealed with paper and tar. All pump pits and vaults have been inventoried and recorded in the tank farm card file. All sanitary water and steam to the 271-UR and TXR buildings, has been shut off. Contaminated ground areas have been covered with dirt. Minor cleanup will be continued until June 14, at which time non-exempt personnel will be released.

In the 221-U Building inventory and decontamination of all canyon cells has been completed. Scrubbing and decontamination of the canyon deck is essentially complete. This work and minor cleanup of the building will continue until the middle of June.

Twenty-one thousand (21,000) gallons of organic solution (RAX) which was originally scheduled for transfer to the Purex Plant, was buried because it was not compatible with the Purex process and had no other use. This material was buried, with minor ground contamination occurring when the line which was used to transport the material from the 276-U Area leaked. One 8" culvert was replaced and ground areas were dug out and buried.

All failed pumps (6) were removed from the 241-WR vault and buried. Considerable time was consumed on this work due to extremely high radiation levels and also high winds which occasionally cancelled scheduled work.

All field spare equipment used in the maintenance of the tank farms and the Metal Recovery Plant have been segregated and paper work necessary for transferring to excess or for disposal are essentially completed.

An inventory of the equipment used and its disposition during the Metal Removal program has been prepared. An inventory of all equipment and its disposition during the Metal Recovery program is presently being prepared.

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DECLASSIFIED**F. Layaway Operation (Continued)**

All maintenance craftsmen with the exception of two millwrights and three Ironworker riggers will be transferred out of the building as of June 3rd. These remaining craftsmen have been loaned out until R.O.F.'s can be issued to those low on seniority and placement can be made. All maintenance foremen have been transferred to 234-5 Building for project work.

All chemical worker personnel have been transferred or given R.O.F.'s effective on June 14. One process crane operator remains to be R.O.F.'d.

Two Operations Supervisors will be transferred as of June 3rd. The three remaining supervisors and one Chief Operator will remain in the building until approximately June 14, when final cleanup is completed.

G. Radiation Monitoring Operation

Fifteen radiation occurrences were documented in May as compared to twenty in April. (This was erroneously reported as twenty-one in the April report.) The breakdown for the various Operations is as follows: Metal Finishing four, Product Recovery four, Maintenance two, Uranium Reduction five, Analytical Control, Radiation Monitoring, and Layaway none.

Twenty-six cases of skin contamination were reported in May as compared to twenty-two in April. The breakdown for the Operations is as follows: Metal Finishing four, Product Recovery four, Analytical Control one, Maintenance nine, Uranium Reduction eight, Radiation Monitoring and Layaway none.

Decontamination of the Tank Farms and 221-U Building will be completed shortly after the first of June. The Tank Farms and 221-U Building are in excellent condition from a radiation viewpoint.

The high production levels continue to keep dose rates undesirably high along the RMA Line. Dose rates along Task I and Task II average from 3 to 8 mr/hr. While this appears to be quite low, it is necessary for operators to work in these areas several hours each day and rate of exposure accumulation is high enough to make the 3 r/year limit very difficult to meet.

A process operator working in the SE Hood in Recuplex, had a contaminated injury when a piece of broken glass cut through the hood glove and two other gloves. The contamination was removed and the first results obtained from urine specimens indicate that negligible internal deposition resulted.

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H. Improvement Experience

1. Process Tests and Revisions

Information relating to this item will be covered in the Research and Engineering portion of the Department report. Other information concerning Weapon Data will be covered in a separate report to be written at a later date.

2. Inventions or Discoveries

No inventions or discoveries of a patentable nature were reported during the month.

I. Events Influencing Cost

In Recuplex the dissolver cycles have been reduced from 18 to 10 hours. One contributor to this record was the elimination of the six-hour coagulation period. Other significant changes included first, the elimination of the Filter-Aid (diatomaceous earth) starting with run number 22. This reduced sharply the volume of difficultly soluble slurry from each run which normally had to be recycled and, hence in turn, took dissolver capacity. When experience demonstrated that no plugging of the filters blocks would be caused by this step, a successful test was made whereby the undissolved solids from five successive runs were combined on the filter block prior to back-flushing and assay. Thus, in addition to cutting the assay requirements at this point by a factor of five, volumes of filter flushing acids could be reduced equivalent to about 40 liters (ca. 10% of a run) and allow still more material to be charged into a run. Perhaps the most significant economic advantage is the sharp reduction in plutonium losses from the dissolver operation since most of this slurry waste can be recycled without delays to the operation. Further, since Filter-Aid will no longer be used, the facilities scheduled on the Recuplex Project 723 for elutriating this material have been cancelled. It should also be noted that by virtue of combining certain types of waste and employing the free fluoride ion normally contained, the consumption of the essential material, sodium fluoride, has been cut from 200 pounds to 40 pounds per month.

In the Uranium Reduction Operation very high maintenance costs were experienced in May which will probably bring unit costs back to previous levels. High costs are caused by troubles as discussed in Section II-C of this report.

J. Plant Development and Expansion

1. Project CG-745 - RMC Fabrication Line

Revision 1 of the project proposal requesting authorization of construction funds in the amount of \$925,000 has been submitted to the Atomic Energy Commission for approval. Previous authorizations in the amount of \$75,000 had been received to initiate design.

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J. Plant Development and Expansion (Continued)

1. Project CG-745 - RMC Fabrication Line (Continued)

The design and procurement preparation status for Project CG-745 is approximately 11% ahead of the official schedule, with an approximate percentage completion of 31%.

Preliminary bids have been received on the basis of the approved purchase specifications for those items with abnormally long delivery schedules. To date there is no indication that procurement will delay the February 1958 start-up schedule.

The present schedule, based on Commission approval of construction funds by June 1, 1957, for project work, is as follows:

- a. Fabrication and installation prints complete, including approval by August 9, 1957.
- b. Equipment dismantling, site preparation
 - start - June 17, 1957
 - end - July 15, 1957 (RG Area)
 - Oct. 1, 1957 (RMB Area)
- c. Equipment installation
 - start - October 1, 1957
 - Beneficial use (official) February 1, 1958

2. Project CG-691 - Improved Task I and II

All critical equipment for the first unit has arrived on site except for the metering pumps which are ready for testing at the vendor's plant. The calciner and fluorinator assemblies were set in place in the hood. Installation work, in general has progressed slightly slower than anticipated due to the lack of craftsmen. This situation will improve on June 1, when additional craftsmen have been scheduled for this work.

3. Project CG-734 - RMC Button Line

The scope of the RMC Button Line has been defined and a document will be issued by Facilities Engineering early in June. The project proposal requesting the balance of the funds for procurement and construction has been prepared.

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J. Plant Development and Expansion (Continued)

4. Alpha and Neutron Monitors for Task I

The installation of piping to accommodate the continuous alpha and neutron monitors in the supernate streams has been completed. The associated electronic equipment was installed late in the month and currently data is being collected for comparison with laboratory samples. The equipment appears to respond well with supernatant passing through the call. However, the correlation with laboratory results has not been very good.

5. Z Plant Filter Replacement

The project proposal for the replacement of the exhaust air filters with a flame proof type was submitted to the A.E.C. for approval. Originally, the filters were to be a special MSA type because tests indicated that this filter was superior to any others which were available for testing. Other vendors have recently indicated a desire to supply fire resistant filters. Therefore, tests will be made to determine the suitability to our needs. Requests for sample filters have been made and testing will be initiated on arrival.

6. Project CG-613 - UO₃ Expansion

Repairs to the continuous calciner ACA motors are continuing, with five having been completed. On 5-8-57, J Call was shut down due to broken agitator blades. Alignment problems at elevated temperatures was evidently the cause of the broken blades. The slotting of calciners L and M bearing mount base ways will not proceed until the cause of the misalignment has been determined.

Bin level indicator capacitance probes have been received and installation of the probes will start June 3. The installation of new calrod units for the calciner feed boxes is scheduled for the week of June 10, and roof repairs to 224-UA are scheduled for the week of June 17. Material required for distortion instrumentation is expected on site June 20, 1957.

Major project deficiencies include calciner agitator and bearing alignment problems, off-gas filters and DOV's, plugging calciner off-gas systems, erratic and plugging calciner feed system, and rotary valve problems.

Finished Products Technology will install a wet separator in the calciner off-gas line from one of the calciner units in an effort to solve the plugging fume vent header problem. Facilities Engineering is conducting studies on the calciner feed and the calciner agitator alignment problems.

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J. Plant Development and Expansion (Continued)

7. Project CG-712 - Reduction of Air Borne Noxious Fumes

Construction work authorization has been released to Construction Operations for the installation of 80' stack and blower. The stack is scheduled for tie-in to absorber off-gas system by July 15, 1957, and blower by August 15, 1957.

8. Project CG-722-Utilization of 224-U Acid at Purex and Redox

Detailed design work is nearing completion for the modification necessary to the 241-SR and at 224-U Building. A rescoping of the remainder of the project is in progress.

9. Project 725 - Disposal of Liquid Waste, 224-U

The preparation of the Project Proposal is being delayed for a period of seven weeks pending the outcome of studies by Finished Products Technology on the feasibility of recycling the wastes through the 224-U plant process.

10. Project Proposal - UO₃ Plant Improvements

A Request For Preliminary Project Proposal for UO₃ Plant Miscellaneous Improvements requesting funds for preliminary scoping and design and determining the total project requirements is being prepared by Facilities Planning, Facilities Engineering Operation.

11. Budget Studies

A construction project data sheet titled, "Improvements and Additions to Plutonium Fabrication Facilities - 234-5 Building", as requested by HCO-AEC, has been submitted. This shows an expenditure estimate of \$2,740,000 and includes supplementation of the RMC fabrication line facilities and modifications and additions to the existing RMA fabrication line. This would be scheduled for design to start in April 1958, procurement in August 1958, and construction in December 1958.

12. Engineering Studies

K. Reports Issued

HW-50334 Chemical Processing Department, Finished Products Operation, Z Plant Monthly Report, May 1957, by W. N. Mobley

III ORGANIZATION AND PERSONNEL**DECLASSIFIED**A. Organization Changes

There were no organization changes during the month in the Finished Products Operation.

B. Safety Experience

No disabling injuries were experienced during the month. There were sixteen medical treatment injuries experienced this month as compared to seventeen in April. Frequency rate dropped to 2.44 from 2.54 in April. Three of the medical treatment injuries involved nitric fumes and are being investigated separately as Near-Serious Accidents.

C. Radiation Experience

All significant information relative to radiation experience in the Finished Products Operation is carried in this report under Radiation Monitoring activity (Item II - G)

D. Security Experience

No security violations were experienced during the month.

E. Personnel Activities

Four supervisors completed the Professional Business Management course during the month.

Six supervisors attended Labor Relations Conferences during the month.

Several clerical personnel attended a Lecture on Classified Document Preparation and Handling.

Numerous non-exempt personnel attended Employee Development Program information meetings.

W. N. Mobley
W. N. Mobley, Manager
Finished Products Operation

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E-14

CHEMICAL PROCESSING DEPARTMENT
POWER AND GENERAL MAINTENANCE OPERATION

JUNE 1957

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I. RESPONSIBILITY

The responsibilities assigned this operation remained unchanged during May.

II. ACHIEVEMENT

A. Operating Continuity

Steam, water, and emergency electrical services were supplied the prime operating facilities in a manner sufficient to maintain continuity of operations without interruption for the entire month.

B. Inspection, Maintenance, and Replacement

Two steam generating units (No. 3 boilers in 200 East and 200 West Areas) were inspected by a third party (Travelers Insurance Company) and found to be in good state of repair.

Renovation of equipment at the Hot Semi-Works continued. The remaining work consists primarily of pressure testing of piping assemblies and test running of pumps, agitators, and pulse generators. The work is estimated to be 95% complete with completion scheduled for June 28.

Process equipment requirements for the scheduled May shutdown of the Redox and Purex Facilities were met on schedule.

Special emphasis was placed on the fabrication of the L-cell package for Purex. Some difficulties were encountered in vessel fabrication. A redesign of the sample pots was necessary in that fabrication specifications were not compatible with fabrication techniques. The failure of a portion of the stainless steel piping to meet corrosion standards has also imposed certain limitations on work progress. Satisfactory remedial measures have been taken to overcome these obstacles, and an estimated completion date of August 11, 1957 has been established for this work.

Tentative agreements have been reached with the Finished Products Operation regarding priority work on Projects CG-745 (RMC Fabrication Line), Project CG-691 (Improved Task I and Task II Facilities) and Project CG-734 (RMC Button Line).

Principal among the services rendered the prime production facilities were the supplying of one A-106 agitator, a P-130 pump, and 10 pipe jumpers to the Redox Plant, one F-1 and one D-1 agitator, and 10 pipe jumpers to Purex, and six jumpers for the tank farms.

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Satisfactory progress was made on the fabrication of assemblies for Project CG-691 (Improved Task I and Task II Facilities, 234-5). The temporary conveyor for hood H9B and one fluorinator assembly were completed and delivered to the job site. The slat conveyor and the second fluorinator are scheduled for completion June 15.

The machining of chucks, special tools, templets, etc., required in connection with Whitney Project occupied the greater portion of the time and effort of the Tool & Die Shop during the month. Overall progress was considered favorable.

Shops forces completed the installation of $\frac{1}{4}$ " safety glass over the lucite panels on four reactor hoods and two machining hoods in the 234-5 Building. The additional shielding increased the operators' time on these hoods from three to eight hours.

The Ventilation and Air Balance Group completed a survey of the re-wash room in the plant laundry to determine the possibility of exhausting air from this room to the Roto-clone. Results of the survey indicated the Roto-clone was operating at design capacity and that a separate exhaust system, complete with filter, would be required before the existing condition could be corrected. Recommendations were passed on to building supervision.

Approximately 17,000 lineal feet of deteriorated wooden barricades in the 200 Areas were replaced with steel stakes and chains in a continuing effort to reduce maintenance costs and improve the general appearance of the area.

The weed control program was vigorously continued. The initial application of 2-4-D has been completed on approximately 80% of the total acreage in the 200 Areas.

The rearrangement of work locations of several components within the Shops Operation was completed. The sheet metal, motor repair, and boiler shops were relocated to enhance the efficiency and operability of the shops organization. Other shop improvements included the installation of mercury vapor lighting fixtures in 272-W which increased work area lighting by some 32 foot candles.

Assistance rendered the 241-CR scavenger waste program included the removal of five deepwell pumps from their existing locations to new locations. The work was performed under very rigid SWP conditions due to the contaminated nature of the equipment.

C. Improvement Experience

Analysis of the P&GM spare parts inventory, currently in progress, indicates a 12.63% reduction of the stock inventoried to date. This represents a stock reduction in the amount of \$7,055.27.

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A 10" Harding Tool Makers precision lathe was released to the Finished Products Operation for use in the RMA line. The P&GM Operation will, at a later date, take delivery on a similar lathe ordered by Finished Products Operation but on which delivery dates were unsatisfactory.

A net savings of approximately \$2,000.00 was realized on the purchase of a new Brown and Sharpe Milling Machine. When it became apparent that a milling machine purchased for \$278.00 from Excess could not be economically repaired, the idea originated in P&GM to trade in the unit. Subsequent negotiations resulted in a trade-in allowance of \$2,825.00 on a new unit. This represents a new approach in the procurement and discarding of equipment at HAPO.

III. ORGANIZATION AND PERSONNEL

A. Safety and Security

The injury frequency rate for this operation was 4.21 for the month, based on twenty-two medical treatment cases. No disabling injuries were reported.

No security violations were in evidence.

B. Personnel Activities

Louie Saunders attended a Cost Control Clinic on Industrial Sanitations in Seattle on June 3.

J.H. Palmer attended a demonstration of ventilation equipment by the American Air Filter Company in Seattle on May 20.

R.J. Browning visited various operations in Manufacturing Services in Schenectady during the week of May 20 to observe modern machine shop and maintenance methods.

J.R. Goggin consulted management personnel of the Small Aircraft Engine and Medium Steam Turbine Department and the Gear and Generator Department at Lynn, Massachusetts on building and equipment methods and procedures during the week of May 20. He also reviewed recent developments on plastic tooling, steel rule dies, automation of job shop machine tools, and preventive maintenance methods with Manufacturing Services in Schenectady.

Ten employee suggestions were submitted by personnel of this operation during the period covered by this report.

The number of CPD employees attending P&GM craft training sessions during May totaled 248.

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R. W. Harvey, Acting Manager
Power and General Maintenance Operation

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HW-50584 DEL

CHEMICAL PROCESSING DEPARTMENT
FINANCIAL OPERATION

MAY, 1957

I. RESPONSIBILITY

There were no significant changes in the responsibilities assigned to the Financial Operation during the month.

II. ACHIEVEMENT

A. Product Cost

Operating reports for the month of April were issued on the eighth working day of the month, representing the best performance to date.

A "dry run", using April costs, was made in order to test the new operating report forms to be used starting July 1. All indications are that the new form will function satisfactorily and provide the expected 70% reduction in clerical effort entailed in preparing the present form, yet continuing to present all major cost categories in a concise form. In order to obtain the maximum effectiveness from the new report, a series of meetings has been scheduled with Level 3 managers in order to explain the use and advantages of the new report form.

Preliminary work has begun on the complete revision, necessitated by budget reductions, of the FY 1958 budget. Work sheets have been set up in preparation for budget revisions in connection with the recent AEC review of the HAPO budget. It is anticipated that these revisions will be so widely diversified as to necessitate a complete rework of the operating, inventory and equipment budgets for FY 1958. Preparations were also made for recasting the budget into the new operating report formats.

Assistance was given to various operations in preparing their budget revisions for the departmental revised submission. Personnel from both of the Cost Reports and Analysis groups participated in these consultations.

At the request of Employee Relations, a feasibility study was completed concerning the costs of alternative methods of conducting the Industrial Medical Operation. The purpose of the study was to determine whether it would be more economical to operate the Industrial Medical Service under local supervision or by means of portable trailer service, rather than by the present method of sending employees to town for physical examinations.

Progress in excessing of spare parts from standby inventories was followed closely during the month and this effort appears to be progressing satisfactorily.

The inventory representative and the Manager-Product Cost attended a meeting in the 703 Building in which AEC Finance gave permission to

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accrue standby excess losses in a special investment loss account on the AEC books.

Action was initiated to place the detailed inventory reports on automatic masters in order to realize further economies in typing and checking time.

Two men were provided for one day to assist Relations and Utilities in conducting a physical inventory of general supplies in the 200 Areas.

B. Personnel Accounting

Conversion of weekly payroll to the Electronic Data Processing Machine has been completed. It is anticipated that the payroll for week ending June 2 will be processed on the EDPM. The preliminary conversion work which has been done with reference to processing the weekly payroll indicates the transition should be smooth with a minimum of difficulties encountered.

As further evidence of General Electric's continuing effort to improve employee benefits, HAPC components were recently advised by Employee Benefits Information Letters and Personnel Accounting Bulletins of revised and improved benefits for employees entering and returning from the armed forces. The important changes are:

1. Pay differential for annual encampment or training duty will apply to the working days in a 17-day period instead of the former 14-day period.
2. Employees entering active training duty for a six-month period under the Reserve Forces Act of 1955 will also receive pay differential for the number of working days in the first 17 days of duty.
3. Re-employment rights will be granted to all employees in the National Guard on the same basis as required under Federal statutes.
4. Employees taking Armed Forces Refresher Courses during normal working hours will be allowed differential pay for up to two weeks less any previous period in the calendar year for which military pay differential was granted.

Local inauguration of these new benefits will be delayed until the method to be used in calculating military pay has been firmed up.

Statistics:

1. <u>Number of CPD Employees</u>	<u>Monthly</u>	<u>Weekly</u>	<u>Total</u>
Employees at Beginning of Month	417	1 372	1 789
Additions and Transfers In	3	4	7
Removals and Transfers Out	(1)	(25)	(26)
Transfers from Weekly to Monthly	2	2	0
Transfers from Monthly to Weekly	0	0	0
Employees at End of Month	<u>421</u>	<u>1 349</u>	<u>1 770</u>

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HW-50584 DEL2. Overtime Payments During Month

	<u>May</u>	<u>April</u>
Nonexempt Employees	\$17 885*	\$14 569**
Exempt Employees	<u>3 215</u>	<u>4 223</u>
Total	<u>\$21 100</u>	<u>\$18 792</u>

*Payments to nonexempt employees cover a five-week period.

**Payments to nonexempt employees cover a four-week period.

3. Gross Payroll

	<u>May</u>	<u>April</u>
Nonexempt Employees	\$ 833 569*	\$662 093**
Exempt Employees	<u>315 453</u>	<u>313 108</u>
Total	<u>\$1 149 022</u>	<u>\$975 201</u>

*Payments to nonexempt employees cover a five-week period.

**Payments to nonexempt employees cover a four-week period.

4. Pension Plan

	<u>May</u>	<u>CY to Date</u>
Number retired	0	3
Number who became eligible for participation	2	15
Number who elected to participate	2	15

5. Insurance Claims Paid

	<u>May</u>	<u>CY to Date</u>
Employee Life Insurance	0	3
Amount	0	\$43 961
Employee Weekly Benefit Claims Paid	27	122
Amount	\$2 251	\$13 729
Employee and Dependent Accident and Health Claims Paid	219	1 404
Amount	\$4 564	\$89 739

6. Suggestion Awards

	<u>May</u>	<u>CY to Date</u>
Number of Awards	89	269
Total Amount of Awards	\$2 450	\$8 918

7. Preferential Rates

	<u>May</u>	<u>CY to Date</u>
Number added	0	0
Number eliminated	0	1
Number currently in effect	57	57

8. Number of Military Allowance Payments

	<u>May</u>	<u>CY to Date</u>
	1	1
Amount	\$448	\$448

C. General Accounting

During May, the second month the new voucher check procedure has been in effect, 75 checks totaling \$246,485 were drawn by the General Books Operation.

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Due to increased travel activity and other activities requiring cash advances, the CPD working fund has been increased from \$3,000 to \$4,000.

Total funds authorized on 38 active CPD projects amounted to \$18.3 million as of May 31, 1957. Total expenditures of \$12.7 million and commitments of \$1.7 million have been incurred against these funds.

Additional authorizations of \$172,800 were received during May consisting of \$50,000 for preliminary design of a Fission Product Isolation facility, and \$122,800 for construction funds for the following projects: (1) Relocation of Purex Cooling Water Swamp, \$33,000; (2) Modification to Redox SWP Facilities, \$97,000; (3) Reduction of Air-Borne Noxious Fumes, 224-U (decrease \$2,500).

Preliminary Closing Costs on the following projects were transferred to the Unclassified Property account for Unitization and Classification to Plant and Equipment in Service:

IR-211	Shelters for Regulated Docks-Purex	\$12 663
CG-624	Redox Railroad Tunnel Ventilation Barrier	60 187
		<u>\$72 850</u>

Plant and Equipment balances at May 31, 1957, were as follows:

<u>Plant and Equipment</u>	<u>Asset</u>	<u>Reserve</u>	<u>Net</u>
In Service	\$261 447 016	\$114 955 890	\$146 491 125
Held for Future Use	46 476 438	31 598 673	14 877 765
Not Used Nor Currently Useful	<u>1 978 936</u>	<u>1 978 936</u>	<u>-0-</u>
	<u>\$309 902 390</u>	<u>\$148 533 499</u>	<u>\$161 368 890</u>

May depreciation charged to product cost amounted to \$1,013,149, including R & U general use and IPD export water assessments of \$91,417 and \$9,588 respectively. Depreciation, charged to standby, amounted to \$218,549.

The Commission has agreed to accept all charges of abandoned studies and to permit capitalization of studies which have resulted in approved projects. The costs for abandoned studies have been transmitted to R & U Operation for consolidation prior to transmittal to the AEC.

All prior years' Advanced Engineering Accounts have been closed with the exception of project CG-655, "Crib Method Selection Tests". The Advanced Engineering costs incurred during FY 1957 will be transferred to CPD cost for distribution subsequent to the compilation of the data sheet regarding the replacement of the 234-5 RMA fabrication line with more versatile equipment.

Processing activities in the calciner pots were discontinued on April 1, 1957, and production diverted to the continuous calciners. The batch-type pots are being laid away under standby condition I (ready for start-up with 30 days' notice). Verification of the property involved is being done in order to effect the transfer from the In Service to the Held for Future Use property account.

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It is planned to place the T, B, and TBP facilities in the Plant and Equipment Not Used Nor Currently Useful property account under Condition Status IV. Condition Status IV provides for facilities when plans for their future use are indefinite.

D. Auditing

Effective May 23, "Between Shift Registers" for the 200 Areas will be forwarded daily to the Auditing Operation by Security and Patrol. Auditing will compare the data recorded on the registers with time cards and other related data and investigate any discrepancy to the extent deemed necessary to assure that timekeeping practices are not being abused. Any items requiring corrective action or additional information required will be referred to Level 3 managers for disposition weekly.

Field work was completed on the audit of CPD's activity relating to S.S. Accountability. Summaries of findings and recommendations were prepared and reviewed with process managers of the Redox and Purex plants.

Field work was completed on the audit of CPD's administration of the General Electric Suggestion Plan. Findings will be issued early in June.

An audit program was prepared for an audit of Management of Capital Assets which will be conducted during June, 1957.

During the month, 259 purchase requisitions were reviewed to ascertain whether or not expenditures were reimbursable.

Mr. L. B. McNeill, Auditor, AEC Audit Branch, visited CPD May 29, 1957. The purpose of his visit was to review audit work performed by General Electric Traveling and Internal Auditors during the audit year ending August 31, 1957. AEC audit of CPD activities will be limited to areas of operations not covered by Company auditors and to specific areas of which they are required to audit. It is expected that their examinations will be conducted during the months of June and July, 1957.

E. Procedures

A special meeting was held with Relations and Utilities Operation and Hanford Laboratories Operation Procedures Specialists in order to examine the progress that has been made on the study of converting cost to Electronic Data Processing.

Considerable effort was spent in designing report formats for:

- a. Product and Material Handling Operation - Purex
- b. Product Recovery Operation - Finished Products Operation
- c. Suggestion Plan

Advice 5.1.7, which sets forth the general philosophy of forms control, provides definitions, and establishes procedures for the generation, revision, and procurement of forms, was drafted and submitted for approval.

F. Measurements

Statements of the following costs anticipated for FY 1958 were prepared and submitted to the Contract Study Group:

1. Government Cost Transfers to AEC
2. CPD Operating Expense Liquidated to Cost Capitalized
3. Cost of Maintaining Facilities in Standby
4. Estimate of Government Cost Transfers to AEC

The major effort during the month was devoted to preliminary work on the preparation of cost and production estimates for the remainder of CY 1957, and development of a suitable productivity index for CPD.

III. ORGANIZATION AND PERSONNEL

A. General

The second in a series of lectures covering organization, purpose and services of the Financial Operation was presented to a group of approximately 60 CPD employees on May 24.

B. Safety and Security

A safety and security meeting for all Financial Operation personnel was held on May 31, 1957.

No major or minor injuries were experienced during the month.

There were no security violations during the month.

C. Reports Issued

- HW-50116 - Secret - CPD Essential Materials Inventory and Consumption Report by S. R. Myers
- HW-50166 - Secret - CPD April Unit Cost Information by K. G. Grimm
- HW-50160 - Secret - April Unit Cost Information - Finished Products Operation by B. M. Dobbs
- HW-50161 - Secret - April Unit Cost Information - Purex Operation by B. M. Dobbs
- HW-50162 - Secret - April Unit Cost Information - Redox Operation by B. M. Dobbs

D. Personnel Relations

On May 24, 1957, an information meeting was held with all Financial Operation personnel. Approximately ten days prior to the meeting, all Financial personnel were asked to submit anonymous questions covering any problems they wished discussed. During the meeting answers to these questions were presented to the group, along with other items of possible interest.

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E. Personnel Activities

W. T. McKeown, Manager - Personnel Accounting, visited Schenectady and New York City to discuss the various aspects of personnel accounting.

Manager - Finance

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June 7, 1957

CHEMICAL PROCESSING DEPARTMENT
FACILITIES ENGINEERING OPERATION

May, 1957

I. RESPONSIBILITY

There were no significant changes in responsibilities assigned to the Facilities Engineering Operation during the month.

II. ACHIEVEMENTS

PUREX OPERATION

A. Process Technology

1. Two-Cycle Conversion Study

An engineering study has been completed on the feasibility and cost of conversion of the Purex Plant for two-cycle operation in accordance with the new two-cycle flowsheet.

The major aspects of the two-cycle conversion are as follows:

1. Installation in the H3 canyon position of an HS column obtained by modification of the spare T-H3 column.
2. Purchase of new spare HS and HA columns.
3. Removal of the present 1A column from the J-2 canyon position and installation of a standard 5,000 gallon tank in its place. Tank TK-F4, the nitric acid receiver, can be released from its present function to serve in the J-2 position, thus eliminating the need for purchase of a new tank.
4. Installation of about 50 new jumpers.
5. Decontamination and boxing of the present 1A and HC columns and jumpers not required for two-cycle operation.
6. Miscellaneous cold side and instrumentation modifications.

The total project cost of the two-cycle conversion is estimated at \$540,000. A beneficial use date of April 1, 1958 might be realized if the necessary connectors and instruments can be obtained from

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spare parts or be procured on an expedited basis. On a normal procurement basis, beneficial use would be July 1958. On completion of the two-cycle conversion, the instantaneous capacity of the Purex Plant would be about 23 tons per day (capacity factor of 2.75).

Surveys were made of the possible limitations imposed to the Purex Plant capacity by potential failure of permanent steam piping to the large concentrators on both the present three-cycle and new two-cycle flowsheets. The erosive characteristics of steam velocities in excess of 250 feet per second appear to be the limiting criterion of steam piping capacity; pressure drop is not a serious limitation. At a capacity factor of 2.75 on the three-cycle flowsheet, four of the five large concentrators would require a minimum of four steam lines to transfer the steam through the gallery wall without exceeding the 250 feet per second velocity. On the new two-cycle flowsheet, at a capacity factor of 4.0, five steam lines would be required on two of the large concentrators if the velocity criterion is to be satisfied.

2. Dissolver Chute

Development has been started on a Purex dissolver chute that will allow continuous charging and yet use batch dissolving by stacking the slugs up into the throat of the dissolver and dissolving out the lower layers in the vessel. Further study of the rate of aluminum jacket dissolution (or corrosion) by the acid fumes in the upper part of the slug stack must be made to determine the effect on the process and the waste streams. This study has been started by the Research and Engineering Operation.

3. LA Column Monitor

The LA column interface float type monitor was installed during the month and hooked up with a recorder. It has been found to be more sensitive than the pressure type interface monitor by a factor of five. After the monitor had been recording the interface for a week, it was connected to the controller and has been found to control the interface and keep it within smaller limits than was possible with the pressure type monitor. No difficulty has been reported with the float type monitor and no improvements have been made. To date, the operation of the float has either met or surpassed the expectations of its operation.

B. Plant Engineering

1. E-4 Centrifuge

The E-4 centrifuge has been repaired and run-in in the Purex shops.

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It will be installed in place during the next scheduled Purex Plant shutdown. The Bird Machine Company indicates that the two new spare units will be shipped July 15, 1957. A contract (DDR-18) for development of a design, and fabrication and testing of a prototype of a new oiling system for the centrifuges has been negotiated with the Bird Machine Company for \$9,965. They are proceeding very aggressively on this work, having already completed the drawings of their proposed test arrangement and prototype. The drawings have been reviewed and returned with our comments and concurrence.

2. Purex Agitators

The drawings and specifications for the purchase of Purex agitators have been completely redrawn and rewritten to incorporate the latest HAPO specifications, the latest developments, and to allow procurement by competitive bidding on a specific design. Original procurement was on a design-and-fabricate basis.

3. Continuous Organic Contactor

Definitive process design work was completed on a continuous organic contactor installation in TK-G7 to permit washing the No. 1 system organic with carbonate prior to treatment in the 10 column, T-G2. The estimated total project cost for this work is \$165,000 including \$27,000 for contingencies and \$24,000 for design.

4. Essential Material Standard

The Purex Essential Material Standard was revised to comply with Purex Plant flowsheet #3. In addition to the standard consumption of chemicals during normal flowsheet operation, the standard amounts of chemicals to be used during typical shutdowns, flushes, and startups were also listed.

5. Instrument Air Compressor Study

This study was completed and the report issued early in the month. Since foreseeable instrument air requirements were only slightly in excess of the capacity of the existing compressors, it was recommended that the output of the present compressors be increased by driving them at a higher speed by means of a gear box inserted between the compressor and the motor. Additional power required is available since the present motor is 200 HP with a maximum load of 155 HP. By increasing the compressor speed from 1750 RPM to 2050 RPM the output is increased 12 $\frac{1}{2}$ % and the pressure can also be increased. It is estimated that gear boxes can be installed on both compressors for approximately \$9,000, whereas installation of a third compressor is estimated at \$18,500.

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6. Electrical Circuit Bus-Tie

The circuit design for automatically closing the bus-tie breaker between the two normal bus sections on the 2300 volt level when power failure to one section is experienced, has been completed. A material list has been provided and a Work Order has been issued by the Purex Operation to install the necessary relays and wiring.

C. Project Activities(1)

1. CG-644, Purex Silica Gel Facility

The revised design package for the Purex silica gel facility submitted by the architect-engineer for approval was transmitted to File without a detailed review. The drawings, specifications and Acceptance Test Procedure were noted with "Preliminary - Unchecked By G.E." to insure against any future construction activity using or referring to the design package without a comprehensive review and revisions as required. This course of action was chosen since construction activity on this project is not planned or foreseen, and since the AEC as contract administrators have chosen to close out the contract with the architect-engineer without renegotiation or litigation that might be involved if the package were resubmitted for further corrections or improvement. A superficial review of the design package indicated it to be much more satisfactory than as originally submitted.

2. CG-657 - Purex Acid Recovery and Iodine Removal Facility

Design modifications apparent from field liaison work on project CG-647 for improved safety of the facility were transmitted to Project Engineering in order that they might be incorporated prior to initiation of the Acceptance Test Procedures. These modifications involve protection of the process equipment against high vacuum collapse by limiting the steam pressure possible on the exhausting jets. It was recommended that a safety valve be installed on the steam manifold to the jets. Water fill lines for the floor drain seals from cell XC and XD were also recommended. Precautionary procedures on the operation of the jets and gas diaphragm-operated valves were presented for Purex Operation information.

(1) For complete information on projects, refer to the following reports:

General Managers Project Report
Semimonthly Status Report
AEC-HOO Monthly Progress Report of Construction Jobs

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3. CG-598 - Acid Fractionator

On May 2, 1957, a performance test run of the vacuum fractionator at design rates was conducted by Purex Operation. This test run satisfactorily demonstrated the capability of the fractionator to perform at design rates. This demonstration completes all work on this project.

4. Ion Exchange Plutonium Concentrator Cost Estimate

A cost estimate breakdown for inclusion in the FY 1959 construction budget data sheets was verbally given to HOO-AEC. This cost estimate was \$500,000 for converting the Purex prototype ion-exchange plutonium concentrator to a manufacturing facility.

REDOX OPERATION

A. Research and Development

The modified Aveco manual valves for operation with the prototype in-line pH monitor have been accepted at Redox and a complete new manifold for installation in the main sample box has been fabricated and delivered to Operations at Redox. It is anticipated that the new manifold will have considerably less pressure drop than the one currently in use.

A sample of beryllium copper rod has arrived for trial use in a co-axial electrical connector that is under development, and a work order has been written to have three sets of contacts fabricated in the Technical Shops. Testing of the completed connector will be resumed when the new contacts are received.

1. Darex Process Studies

Preliminary engineering studies were completed defining the feasibility and cost of conversion of one of the Redox dissolver cells to the Darex process for dissolution of stainless steel clad fuel elements from power reactors. The Darex process utilizes aqua regia as the dissolving medium. The studies were based upon dissolution of low enrichment fuels (less than 3% U²³⁵ equivalent). Installation of the Darex process equipment into the Redox dissolver cell was shown to be feasible. This equipment would be constructed of titanium and would be capable of dissolving at an instantaneous rate of 1 ton per day of uranium. The estimated project cost for this installation is \$1,500,000.

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B. Process Technology

1. Failure of Steam Pipes - Redox and Purex

From information developed to this time, it has been established that the failure of stainless steel pipes in Redox is the result of stress corrosion caused by an environment of chlorides present in the wrapping and sealing material on the outer surface of the pipe. Stresses in the pipes are those induced by cold-bending and residual stresses from mill fabrication. These conditions have been accelerated in the steam supply pipes because of the higher temperatures involved. An overall examination to determine the extent of the corrosive conditions in the steam pipes and other intra-cell piping will be started as soon as calibration work is completed on eddy current monitoring equipment.

The Construction Engineering Operation has been requested to aid in the development of methods for repair or replacement of the damaged pipe in Redox.

Samples of tape taken from the Purex through-wall piping have been analyzed and found to contain smaller amounts of chloride bearing material, which indicates that there is a probable similar problem to arise in the Purex Plant. The one failure found to date in the Purex facility has not positively been identified as being caused by stress corrosion. Eddy current examination of the Purex piping will also be made to determine the extent of present and possible future damage.

FINISHED PRODUCTS OPERATION - "Z" PLANT

A. Research and Development

1. Inspection Gauges

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2. Skull Dissolving Facility

Design and development studies were started during the month to determine the best long-range solution to the skull dissolving facility in the 234-5 Building and to determine methods for correlating this long-range solution to the more immediate plans of providing a replacement to the existing skull dissolving hood. Preliminary results of this investigation indicate that it would be desirable if provisions could be made for expanding the capacity of the skull dissolving facilities by a factor of four. The future requirements for the skull dissolving facility cannot be accurately predicted but some of the variables that must be considered are:

1. The possibility of having to dissolve all alpha turnings.
2. The possibility of having to dissolve entire plutonium weapon cores under a rework program.
3. The possibility of having a large amount of burned turnings from alpha machining.

In addition, it appears that several advantages can be gained if the skull dissolving facility, which is primarily a portion of the recovery process, were located in the Recuplex area. Some of the principal advantages of locating this hood in the Recuplex area are:

1. It would be operated by the same operator now used for the slag and crucible dissolver.
2. Chemical addition could be made easier and safer by the installation of lines from the chemical addition room.
3. The use of PR cans to carry the dissolved solutions could be eliminated.
4. The routing of solutions to the Recuplex facility could be simplified.

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B. Process Technology

The detail design of a combination well for a neutron probe and lines for specific gravity measurement on Recuplex process tanks was supplied Research and Engineering for use in obtaining experimental data on Recuplex solutions. Background work is being carried on for the Recuplex prototype neutron monitors and for the six permanent installations on Recuplex.

C. Plant Engineering

1. Manpower Utilization - 234-5 Analytical Laboratory

A study of manpower utilization in the 234-5 analytical laboratory was completed and a report written outlining areas in which productivity could be improved by personnel development, re-assignment of work, and reduction of shift crews. The study also resulted in a determination of time requirements for the major direct and indirect type jobs performed in the laboratory. The information derived from the study will form the basis for a new analytical laboratory manpower standard.

D. Project Activities

1. CG-691 - Continuous Task I and Task II

The installation of the temporary continuous Task I and Task II hood in the RG Line is proceeding at a rapid rate. Since design on this project has been completed all activities have been limited to field liaison work during the installation period.

2. CG-745 - RMC Fabrication Line

The detail design of Project CG-745 which was started last month has proceeded throughout the month of May with all phases either on or ahead of schedule. By the end of the month over-all design progress is estimated to be 31 per cent complete.

The scope of all hoods on this project has been completed and detail design of each hood is presently underway.

3. CG-756 - Fire Resistant Exhaust Filters

A project proposal requesting \$300,000 total project cost was transmitted to HOO-AEC on May 29, 1957.

FINISHED PRODUCTS OPERATION - UO₃ PLANT

A. Process Technology

1. Calciner Failures

Two calciners have failed in operation due to breakage of agitator blades. "J" cell calciner was shutdown about 6:00 AM, May 8, 1957 and "K" cell calciner was shutdown about 6:00 AM, May 16, 1957.

The failure of agitator paddle assemblies on the two calciners has precipitated an extensive investigation to determine the cause and develop corrective measures. Present plans of the task force set up to handle this problem include a revision of the feed control system and an evaluation of the paddle spacing requirements in relation to expansion differentials of shaft and shell to eliminate interference at all possible conditions. Instrumentation will be installed on one calciner to obtain data on feed control and thermal expansion.

The exact cause of the initial blade breakage has not been determined on either of these units. Cause is believed due to blade interference with feed points or excessive lumping of the calcined UO₃ due to erratic feed control.

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2. U Plant Air Compressor Instrumentation

A design order has been issued to provide scope information on instrumentation required to operate the U plant air compressors, to provide air service for 224-U Building without an operator in attendance. Instrumentation is required to indicate in 224-U the loss of cooling water or electric power, and any other unusual conditions existing at the compressors.

B. Project Activities

1. CG-724 - Recycle of UO₃ Plant Wastes

Additional data from waste sampling indicate that it may be feasible to recycle the wastes within the UO₃ Plant, rather than return them to the Purex Plant for re-work. Preparation of a project proposal has been deferred until further experience with the waste has indicated the action required.

GENERAL ACTIVITIES

A. Process Technology

1. Processing Spent Power Fuels

The feasibility and costs associated with processing within Chemical Processing Department of spent fuels from various private power reactors utilizing initial U²³⁵ enrichments of less than 3 per cent have been given preliminary study. The fuel elements from these power stations vary widely in size, shape, enrichment, and materials of construction.

It was determined by Research and Engineering Operation that the Redox Plant could process these spent fuels in a segregated condition, from the dissolution and feed adjustment steps on, by concentration control of nuclear safety. The spent fuel element handling, storage, chopping, dissolution, metal solution storage and sampling, feed adjustment, and Redox feed storage facilities were examined for installation at either U or T Plant. The total estimated project cost for these facilities including a cross-country encased line for transfer of adjusted feed to the Redox Plant was \$6,000,000. Based upon optimistic development, design, and construction schedules, the project could be completed within three years of authorization.

Certain new facilities would be required at the UO₃ Plant to maintain segregation of the recovered uranium product. These

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facilities are conceived to include concentration, 100 per cent UNH storage, calcination, and UO₃ handling equipment, critically-safe by geometry. Initial feed storage, waste handling, and gas treatment would be performed in existing UO₃ and Redox Plant equipment. The total project cost for the UO₃ Plant modifications was estimated to be \$200,000, not included in the above \$6,000,000 estimate.

2. Critical Mass Laboratory

Engineering evaluation studies have been initiated on a critical mass laboratory facility in cooperation with the Hanford Laboratory Operation. This laboratory is to be designed to perform critical mass experiments on plutonium bearing solutions and slurries. Chemical Processing Department's interests in this facility center around two basic points:

1. A large percentage of the experimental work performed in the facility will be in support of Chemical Processing Department activities.
2. There is a possibility that safety and economic factors may dictate location of the facility within or adjacent to the 200 Areas. The safety and hazards control of the facility in such a case would be of utmost importance to Chemical Processing Department.

3. Specifications

Materials, fabrication, and welding specifications are being reviewed as a preliminary step toward achieving a more comprehensive and less complex set of specifications for Chemical Processing Department use in procurement of equipment. Because Chemical Processing Department Policy Guide 4.4 requires compliance with the ASME Pressure Vessel Code and the ASA Pressure Piping Code, these national standards are included in the examination to assure adequate inter-relation of specifications.

4. Plastics Development

As a solution to problems of contamination confinement in the 200 Area tank farms and the 100 Area reactors, a plastic sheath coil has been developed to facilitate the removal of extremely long equipment from contaminated enclosures. The plastic tube which is compressed around a 2-foot length of pipe unfolds upon withdrawal of equipment. Expansion factors of 50 to 1 have been demonstrated. Presently suggested applications are tank farm pump and reactor tube removals.

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Conceptual drawings have now been completed for a flexible panel box hood. This enclosure extends the principles of simplified construction previously advocated for large hood cells to laboratory size hoods. Advantages of this type of small hood includes complete enclosure of contaminants while maintaining the efficiency associated with open panel hoods. A second feature of significance is the lessened requirements of ventilation flow since the flexible barrier of the working face makes it possible to provide adequate air differential using an exhaust pipe of 1 inch diameter or less.

B. Plant Engineering

1. Layout for Proposed Fire Station

Engineering assistance was provided to the fire protection people to make a layout and establish requirements for a proposed fire station for the 200 areas.

2. Weed Control Program

A study has been initiated to reduce the cost of weed control in the 200 areas. The need for the current extensive program will be reviewed, possible better methods evaluated, a "manual" of standard practices prepared, and standard costs established.

3. 272-W TS Shop Expansion

To provide facilities suitable for high precision machine shop work in connection with operations such as Whitney, plans for modification of the 272-W TS Shops are underway. Scope drawings and specifications were prepared for the expansion of the TS shop into the area formerly occupied by the sheetmetal shop. The facility is to include a furnace and heat treat room, a graphite machining room, a grinding room, and an expanded machining and layout area. The area is to be entirely separate from the rest of the shop space. The lighting level is to be raised to 100 foot candles, and the entire area is to have controlled air conditioning coverage.

4. Steam Generation Study - 200-W Area

The final report on this study was received last month and is now being studied to determine what serious errors may have been made in the consultant's economic evaluation. A number of questions have been raised with the consultant, with the answers expected soon. Some of the inappropriate assumptions appear to be: (a) assumption that very large amounts of heat can be reclaimed by recirculating condensate, (b) assumption that fuel oil would be

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delivered at HAPO for 7.4 ¢/gal. (present price at 100-K area is approximately 11 ¢/gal), (c) assumption that gas rates would be 3.3 ¢/therm regardless of demand, whereas actual rate would probably be approximately 3.5 ¢/therm based on 90% of the maximum demand. Just how seriously these assumptions will affect the whole picture has not yet been determined.

5. Contracts and Consultant Agreements

The following is a summary and brief outline of contracts and consultants agreements being administered by personnel in the Facilities Engineering Operation:

CA-141

This is an agreement for soil mechanics services with Shannon and Wilson for disposal of radioactive wastes. The contract price is not to exceed \$3,500, and the contract administrator is C. R. Bergdahl. This consulting service is required for installing the infiltrometers on Project CG-655 - Crib Methods Selection Tests. Money paid out to date - \$504.09.

CA-142

This is an agreement for soil mechanics services with W. J. Kaufman for disposal of radioactive wastes. The contract price is not to exceed \$3,500, and the contract administrator is C. R. Bergdahl. This consulting service is required for installing the infiltrometers on Project CG-655 - Crib Methods Selection Tests. Money paid out to date - \$614.33.

CA-147

This is a lump sum agreement for \$8,300 with consultants Amman and Whitney for a structural evaluation and economic comparison of alternate waste tank designs. The contract administrator is H. W. Stivers. The final report has been received and is being evaluated. Full payment for services will be made shortly.

CA-156

This is a consultant agreement with Gustav Karla to perform a comparison study, field inspection and analysis of the 200 West steam generation plant. The report to include recommendations on the economic feasibility of replacing the present facilities with alternate systems for supplying the required steam. The contract price is not to exceed \$3,500, and the administrator is G. L. Davis.

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The final report was received last month and is now being examined to determine the validity of the assumptions used for economic evaluation. \$3,451.07 was paid during the month as full payment for services rendered.

DDR-10

Contract DDR-10 with the Industrial Research Division of Washington State College.

Lump sum contract for \$4,403.24

Contract Administration - W. P. Ingalls

Amount paid to contractor to date - none

The program involves destructive physical testing, under controlled conditions, of about 140 remote type studs to establish parameters for forces involved and in-service strength requirements for canyon service.

Work under this contract is nearing the point of actual "production" testing of the approximately 140 studs involved. Preliminary testing of some extra studs has to some extent outlined parameters of the areas to be explored, and indicates the desirability of some additional test work which was not originally contemplated. It is possible that an alteration to the contract, to authorize this additional work, will be forthcoming.

DDR-18

Contract DDR-18 with Bird Machine Company, Walpole, Massachusetts

Lump sum contract for \$9,965

Contract Administration - W. P. Ingalls

Amount paid to contractor to date - none

The contract involves the development of a design and fabrication and testing of a prototype of an oiling system for the Purex centrifuges. It is to provide an independent pumping, and filtered system for recirculating the centrifuge bearing oil.

The vendor is proceeding very aggressively on this work, having completed drawings actually prior to signing the contract itself. These drawings are presently being reviewed at HAPD, but in general it appears Birds' proposed approach to the problem has an excellent chance of being successful. It is hoped a prototype can be undergoing test in perhaps sixty days.

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Project cost information as of May 19, 1957:

Total authorized funds - active projects	\$18,263,000
Total cost to date	12,702,000
Commitments and open work releases	1,810,000
Unencumbered balance	3,750,000
Costs charged against above projects from 4-21-57 through 5-19-57	476,000

2. CG-655 Crib Methods Selection Tests

Disposal tests were started on the type "A" infiltrometer May 22. This facility still requires the installation of a temperature and liquid level recorder as well as piping to measure the hydraulic head loss of the interface.

One type "C" infiltrometer was started May 27, 1957. A second was started May 28, 1957 and the last was started May 29, 1957. The temperature and liquid level recorders will be installed on these infiltrometers about the first week in June.

William L. Shannon, Consultant on soil mechanics visited the infiltrometer site May 17, 1957. He suggested the addition of a small diameter pipe to the type "A" infiltrometer to measure the pressure drop across the interface. This has been added to the installation.

**3. CG-718, Rev. 1 - Fission Product Isolation
(Engineering Feasibility Study and Design Scope)**

AEC Directive HW-415, Modification 1, dated May 15, 1957, authorized the requested funds in the amount of \$50,000.

III. ORGANIZATION AND PERSONNEL**A. Personnel**

R. F. Corlett, Engineer II, transferred to Irradiation Processing Department effective May 15, 1957.

Effective May 1, 1957, B. H. Layfield was transferred to the exempt roll as an Engineering Designer.

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L. D. Gustafson transferred from the Purex Processing Operation to Process Design & Development, Facilities Engineering Operation, on May 1, 1957.

B. Safety

There were no disabling injuries, serious accidents or incidents in the Facilities Engineering Operation during the month of May.

C. Inventions

<u>Inventor</u>	<u>Subject</u>	<u>Report of Invention</u>
C. R. Anderson	Variable Lattice Nuclear Fuel Bed Suspensions Maintained by Degree of Agitation	May 13, 1957
	Variable Lattice Nuclear Reactor Controlled by an Extendable Fuel Support Frame	May 13, 1957

D. Reports Issued

HW-49808	Steam Standard for the Purex Plant, by G. R. Ruzicka, April 24, 1957.
HW-50202	Standard Analytical Service for the UO ₃ Plant, by V. P. Madsen, May 8, 1957.
Strictly Private	234-5 Analytical Manpower Survey, by V. P. Madsen May 6, 1957.
HW-50168	CG-686, In-Line Instrumentation, Redox and Purex Facilities, L-8 Supplement to Scope Revision No. 1, by N. T. Hildreth, May 13, 1957.
HW-50298	Design Scope of the RMC Button Line, by J. R. Fritz and C. F. Yuenger, May 24, 1957.
Draft	Analysis of Redox In-Line Instrumentation Program, by R. N. Donelson, May 8, 1957.
Draft	Power Fuels Processing Facility, by D. E. Braden and W. A. Graf, May 20, 1957.
HW-49750	Project Proposal, Fire Resistant Exhaust Filters, Z-Plant, by R. C. Baker, May 10, 1957.

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HW-49751 Project Proposal, Revision 1 - RMC Fabrication Line, 234-5 Building (Project CG-745), dated April 30, 1957, by D. A. Snyder.

HW-49800 Project Proposal, Revision 4 - Silica Gel Tail-End Treatment Facilities, (Project CG-644) by L. W. Finch, April 24, 1957.

HW-50171 Project Proposal, Revision 1 - Modifications to Redox Plutonium Concentration Building, 233-S (Project CG-692), dated May 13, 1957, by D. A. Snyder.

HW-50173 Construction Data Sheet - Improvements and Additions to Plutonium Fabrication Facilities, 234-5 Building, dated May 20, 1957.

E. Trips

R. C. Hollingshead visited Washington State College on May 21, 1957 to consult with the Division of Industrial Research regarding work on Contract DDR-10.

J. H. Rector visited fifteen different manufacturers of machine tool equipment on a two-week trip, May 9 to May 23 to discuss some of the special machines required for Project CG-745.

On May 7 and 8, H. Radow accompanied by a representative of Purchasing Operation, visited several vendors in Seattle to discuss preliminary plans and drawings of equipment to be procured on Project CG-745.

F. Visitors

Mr. John Woodward, Syntron Company, Homer City, Pennsylvania, visited HAPO on May 14, 1957, to supervise tuning of the Syntron vibrator on the fluorinator assembly for Project CG-691.

William L. Shannon, Consultant on soil mechanics, visited the 200-West Area and the infiltrometer site on May 17, 1957.

[Signature]
Manager

Facilities Engineering Operation

HP Shaw:FC:mh

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DECLASSIFIEDCHEMICAL PROCESSING DEPARTMENT
RESEARCH AND ENGINEERING OPERATIONMay - 1957ADVANCE PROCESS DEVELOPMENT - R. E. TomlinsonReprocessing of Propulsion and Power Reactor Fuels at Hanford

Currently, the Atomic Energy Commission is considering means of reprocessing propulsion and power reactor fuel elements at a minimum capital cost until private industry installs the necessary capacity. A survey of the feasibility of reprocessing low (<3.0 per cent U-235) and intermediate (>3.0 per cent <30 per cent U-235) enrichment fuels in Hanford separations facilities was completed and reported in HW-50294.

The reprocessing of power fuels at Hanford would require plant modifications or additions to (1) receive, store, and mechanically process the fuels (remove excess hardware and possibly cut the elements into shorter lengths), (2) dissolve elements with stainless steel and zirconium claddings, and (3) store and process the solutions in a manner that avoids nuclear criticality. The most attractive plan developed for the reprocessing of slightly enriched fuels involves the use of 221-U for fuel receiving, mechanical processing and dissolution, followed by pipeline transfer to Redox for uranium and plutonium recovery by solvent extraction. Uranium calcination and plutonium reduction would be accomplished in 224-U or UA and 234-5, respectively.

This plan would require a capital expenditure of approximately \$6,300,000. At a 100 ton per year operating rate, the annual operating expenses above those currently planned would be about \$585,000. The comparable total operating expenses, including a pro rata share of Redox manufacturing expense, general overheads, and amortization, would be about \$3,900,000.

The processing capacity of the modified facilities would more than meet the currently predicted needs of the program; additional capacity could be provided for small additional capital investment.

The reprocessing of the intermediate enrichment (27 per cent U-235) PRDC core would require an additional capital investment of \$500,000 for a geometrically safe dissolver. Isotopic dilution to about 2.5 per cent U-235 would also be required for safe processing in Redox, with attendant degradation losses of about \$500 per kilogram. Alternatively, optimism exists that the necessary flowsheet modifications, operating safeguards, and general technology might be developed to permit the reprocessing in Redox without degradation following capital additions of about \$1,000,000.

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PUREX PROCESS TECHNOLOGY**DECLASSIFIED**Feed Preparation

Irradiated uranium with an exposure rate of 3.7 to 6.0 MW/T (369 to 673 MWD/T) and cooling times of 107 to 188 days was prepared as solvent extraction feed during the month. Near the end of the operating period 5×10^{-4} M mercuric nitrate was added to the metal solution tanks to control the emission of iodine from the vessel vent system. A rapid decline in the total iodine discharge from 1.7 to 0.1 curies per day resulted, and no adverse effect on plant operation was detected.

Solvent Extraction

Typical performance of the solvent extraction cycles during the month is tabulated below:

Cycle	Log Decontamination Factor, dF		Instantaneous Waste Loss, Per Cent	
	Uranium	Plutonium	Uranium	Plutonium
Precycle	3.3	3.3	(a)	0.30
Partition	1.2	1.8	(a)	0.17 (IBU = 0.05)
Final	3.1	3.0	0.004	0.23
Overall	7.6	8.1	--	0.70

(a) No uranium analyses.

Plant startup and the subsequent change in rate were accomplished without large gamma activity increases in the intercycle streams. Except for the two initial batches of plutonium which exceeded the gamma and uranium specifications, both the uranium and plutonium products met all specifications. Several batches of uranium product were borderline with respect to plutonium content, however, part of the alpha emitter was known to be neptunium 237. A routine analytical method for determining both neptunium and plutonium in uranium is being developed.

Although the decontamination performance of the plant and the uranium losses were satisfactory, the overall plutonium loss was unacceptable. Part of the plutonium loss resulted from failure of the sodium nitrite addition to the 2AF for approximately one hour. However, the major sources of the excessive plutonium loss were the HCW and the 2BW streams, which averaged 0.4 and 0.3 per cent, respectively. After adjustments in the 2B Column pulse frequency, L/V flow ratio, and the 200, 2AF, and 2BX temperatures failed to reduce the 2BW losses, 0.005 M sulfuric acid was added to the 2BX to chemically strip the solvent. Shortly thereafter the plutonium content of the 2BW dropped to 0.03 per cent, a factor of two below normal. A three-fold reduction in the 2AW plutonium loss, which occurred simultaneously with the reduction of the 2BW losses, has now been accredited to improvement in quality of the 2AF and 200, on the basis of laboratory investigations.

A ten per cent increase in the L/V flow ratio of the HC Column failed to reduce

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the plutonium waste loss, but increasing the nitric acid concentration of the HCX from 0.06 M to 0.10 M apparently reduced the losses by a factor of two. The attendant increase in nitric acid concentration of the IAF decreased the IAW plutonium loss by a factor of two, also. A subsequent two per cent increase in the IAX flow indicated that the remaining 0.1 per cent plutonium in the IAW was inextractable.

A temporary increase from 35° to 40°C in the IBXF temperature effectively reduced the high (0.12 per cent) plutonium content of the 2IF to normal (0.04 per cent); however, both the 2AF and final plutonium product gamma activity started to increase. Following the reduction of the IBXF temperature to 35°C, the gamma activity of the plutonium declined and the loss to the 2IF remained low.

Fifteen tons of uranium in the form of miscellaneous solutions were reworked in the Final Uranium Cycle without incident.

Following plant shutdown on May 27, the HC and 2B Columns were flushed with hot 5 per cent sodium carbonate solution in an attempt to remove any accumulated cruds and improve the wetting characteristics of the plates which may in turn reduce the HCW and 2BW plutonium losses. A small holdup of plutonium which remained in the 2B Column after stripping and jetting was removed by a 60 per cent acid flush prior to the carbonate flush.

Plutonium Concentration

The addition of 0.005 M sulfuric acid to the 2BX had no apparent effect on the button quality or process performance of the 234-5 Building. A very slight increase in the iron concentration of the plutonium product was noted, but spectrographic analyses detected no accelerated corrosion of the I4 titanium tube bundle.

A series of flushes of the plutonium stripper and concentration package removed a normal holdup. No leaks were detected as a result of the stripper and concentrator tube bundle tests.

Alterations to the prototype ion exchange equipment to convert from the cation to the anion process continued. Construction of a final ion exchange product evaporator with a titanium tube bundle is underway.

Organic Treatment

During the plant shutdown at the first of May (caused by poor solvent quality resulting from the addition of 3200 gallons of degraded solvent from the Metal Recovery Plant to the No. 1 Solvent Treatment System), approximately 85 per cent of the solvent inventory was washed with 0.01 M KMnO_4 - 5 per cent Na_2CO_3 solution followed by a two per cent nitric acid. The gamma activity of the solvent was reduced from 10,000 to 3600 uc/gal. Decontamination of the equipment with these same washing agents preceded the solvent washing. After plant startup the residual high-activity solvent in the extraction equipment raised the solvent gamma activity to 5000 uc/gal, but the decontamination performance of the process was greatly improved as evidenced by the increase in decontamination factor of the IA Column from 30 to 100.

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At the conclusion of the May operating period, the solvent was again recycled through the solvent treatment equipment and washed with alkaline-permanganate and nitric acid solutions. Seventeen throughputs (four times the number of throughputs used during the previous washing) reduced the solvent gamma activity from 6000 to 1500 uc/gal.

Solvent studies made by Process Chemistry in investigation of the high HCW and 2BW plutonium losses revealed the following:

- a) The plutonium distribution ratios for the HCW and 2BW were 1.0 and 0.28, respectively, compared to a normal value of less than 0.01.
- b) The 2AF contained an as-yet-unspecified material, which may have been a solvent degradation product picked up by the IBP in the IBS Column, that caused high 2BW losses.
- c) The addition of 0.0025 M H_2SO_4 to the 2BX reduced the plutonium distribution ratio of the 2BW by a factor of three.
- d) The ICW behavior indicated the presence of the same material as found in the 2AF.

Both solvent treatment systems functioned without difficulties during the month. The gamma activity of the IOO ranged from 3000 to 6200 uc/gal while that of the 200 was 13 to 23. Overall solvent losses for the month were 0.29 per cent of the solvent throughput, excluding an accidental loss of 2000 gallons through the IO Column vent line.

A DEP concentration up to 280 ppm in the virgin makeup solvent was completely removed by three batch sodium carbonate washes.

Waste Treatment and Acid Recovery

The Waste Treatment and Acid Recovery equipment performed satisfactorily with volumes of 177, 336, and 202 gallons per ton of uranium added to the 241-A-103 tank as neutralized IWW, carbonate washes and flushes and cell drainage, respectively. The high carbonate waste volume resulted from accelerated solvent washing in an effort to reduce the HCW and 2BW losses. Coating wastes sent to the 241-C Tank Farm averaged 211 gallons per ton of uranium. Overall waste losses for the month were 1.19 and 0.26 per cent for plutonium and uranium, respectively, thus reflecting the high HCW and 2BW plutonium losses. Coating waste losses for plutonium and uranium amounted to 6 and 20 per cent, respectively, of the overall losses.

Approximately 1825 gallons of rework solution from a metal solution tank overflow, containing 510 pounds of uranium and 205 units of plutonium, were reworked with no deleterious effects on column operation.

Self concentration in TK-241-A-103 continued at a boiloff rate of 9.6 gallons per minute. The tank currently is 9.2 M in sodium concentration and contains 62.5 per cent of the final 12 M sodium concentration at the hydrostatic head limit.

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REDOX TECHNOLOGY OPERATION

Feed Preparation

The dissolvers were operated 68 percent of the month, processing metal having exposures ranging from 489 to 1144 MWD/T at power levels of 4.4 to 6.0 MW/T. The iodine-131 emission to the stack averaged 0.023 curie per day of dissolver operation with metal cooling periods of 97 to 158 days. When the dissolvers were not operating, iodine emissions to the stack ranged from 0.02 to 1.3 and averaged 0.35 curie per day. A preliminary investigation indicated a possible correlation between these iodine emissions and the spraying of the canyon crane with solvent (1,1,1-trichloroethane). Further investigation of this theory, which is based upon a postulated release of iodine accumulated in the air tunnel and sand filter, will be required to establish a definite cause-effect relationship. Apparent efficiencies of the silver reactor averaged 99.92 percent during dissolver operation. Because of a drop in efficiency revealed in April operation, the silver reactor in the least used position was replaced with the used reactor which was removed from the same position in February, 1956, and had since been regenerated. Its subsequent performance has been satisfactory.

Two successful cuts of Dingot metal were taken from a 9-unit charge in an up-draft dissolver. Dissolving times of 16 and 18 hours were realized for first and second cuts, respectively, indicating an increase in time cycles of about 50 percent. Cuts were 2.5 to 3 units each.

A series of tests employing 53 percent nitric acid for uranium dissolution was made in the continuing evaluation of the potential effects of recovered nitric acid from the UO_3 plant on Redox dissolver processing capabilities. Time cycles obtained indicated instantaneous rates of 140 percent of Phase II for three up-draft dissolvers and 187 percent of Phase II for three down-draft dissolvers.

Potassium permanganate treatment was employed exclusively in preparing the HAF batches, approximately 40 percent of which contained rework solution ranging from 10 to 50 volume percent and averaging 30 percent. The rework material resulted principally from acid flushes of process equipment and concentrated salt waste batches collected during periods of first cycle losses resulting from column flooding.

Solvent Extraction

The extraction system was operated at rates up to 96 percent of Phase II with one interruption occasioned by failure of the agitator in the HAF feed adjustment tank. Further changes in process conditions were made in the continuing effort to pin-point the causes of the erratic 1A Column losses and plutonium deposition.

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In general the LAW plutonium "losses" showed an erratic, cyclic variation with a period of about two to four days and a range of from approximately 0.1 to 1 percent. These variations continued even after the aluminum nitrate in the LAFS was increased 5 percent and the LAX flow ratio was increased 16 percent to ensure that the solvent extraction conditions were adequate for plutonium (VI) recovery.

Changes were made in the 2A Column flowsheet to increase the quantities of plutonium in the 2AW stream to the LAFS concentrator and thus determine whether inadequate oxidation in the LAFS concentrator was a cause of 1A Column losses. Also, it was desired to revise the flowsheet to one permitting higher processing rates. During the month the 2A extractant and scrub flows were reduced approximately 36 and 25 percent, respectively. However, 2AW plutonium "losses" continued to average below 0.05 percent, even when the L/V ratio was increased to 1.64 from the normal 1.30. The stream reductions represented potential increases in 2A and 2B Column capacities of about 15 and 25 percent, respectively, compared with the flowsheet in effect at the end of April.

Inspection of the 2DF (F-4) tank before start-up revealed the presence of another deposit of uranium nitrate and sodium diuranate similar to that discovered in February. Approximately 1800 pounds of uranium were recovered in subsequent nitric acid flushes of F-4 tank. To reduce the probability of future solids build-up, the caustic addition point for 2DF acidity adjustment was changed from the 2DF (F-4) tank to the 1CU (F-5) concentrator. Also, to avoid possible solids in the LAFS stream, the caustic addition point was changed from the LAFS (F-1) feed tank to the LAFS (F-2) concentrator.

Decontamination

Fluctuation in the acidity of the HAIS, LAFS, and 2DF streams after start-up resulted in the production of six 2EU batches and several 3BP batches with excessive gamma activity. The six high-activity 2EU batches met specification after ozone sparging and silica gel tail-end operations. Thirteen cans of high-activity 3BP concentrate collected in the initial operations were returned to feed preparation for rework and two 3BP batches were reworked through the plutonium cycles. All the reworked product met specifications.

Waste Losses

Over-all recoveries were 99.73 and 99.90 percent for plutonium and uranium, respectively. Losses were incurred as a result of flooding in the HA and HS Columns and in the subsequent, staggered flushes of these columns with 10 percent nitric acid. Additional losses resulted from a temporary interruption in LAW backcycling and the accidental overflow of a small volume of 2AF from the 2AF (E-5) tank into the waste collection system. The brief interruption in LAW backcycling was required during replacement of a failed HAIS pump.

Waste Storage

A single pressure surge of approximately 15 minutes' duration was recorded in the 241-SX tank farm during May. The surge apparently originated in tank 107-SX when an air-lift circulator which had become plugged during the week-end was reactivated. Maximum pressures of 0.07 to 0.11 psi were recorded in tanks 101, 107, 108, and 109-SX and in the condenser building vent and vapor headers.

The solvent extraction waste volume averaged 1075 gallons per ton of uranium, exceeding the nominal flowsheet value by approximately 16 percent as a result of flushing and rework. Coating waste volumes averaged 160 gallons per ton of uranium.

In-Farm Waste Scavenging

Scavenging operations in the 241-C tank farm were resumed on May 4. Samples of the scavenged batch 11-111C-103C taken on May 8 showed average concentrations of 8.1×10^{-4} microcuries of cobalt-60 per milliliter, 1.58×10^3 microcuries of cesium-137 per gallon, and 1.14×10^3 microcuries of strontium-90 per gallon. The poor decontamination performance was probably due to inadequate pH control resulting from the admixture of Purex coating waste leaking into the 151-CR diversion box.

Specific retention ditch 216-BC-15 was filled with 1.23 million gallons of scavenged waste (from TEP plant batches 35-108 BY and 35-11 BY and in-farm batch 10-109C-102C) between April 22 and May 15. Filling of specific retention ditch 216-BC-16 was begun on May 18.

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FINISHED PRODUCTS TECHNOLOGY OPERATIONURANIUM CONVERSION OPERATION**DECLASSIFIED**Process Performance

A total of 10 carloads were shipped during the month. All shipments were within specifications with the exception of one which was slightly under specifications with respect to particle size. The total metallic impurity content (TMI) averaged 69 parts per million parts of uranium, and the gamma activity ranged from 2 to 17% of that of aged natural uranium. The reactivity ratio (925°C reduction and 600°C hydrofluorination temperatures) averaged 0.86.

Nine-hundred-thirty pounds of nitric acid were recovered per ton of uranium processed. The average concentration was 51%.

Continuous Calciners

All calciners were operated during the month with a maximum of four in simultaneous operation at instantaneous production rates of 30 tons of uranium per day.

Agitator arm interference with feed points has been experienced in J and K-Cells. In J-Cell agitator damage was extensive, requiring the replacement of twelve agitator arms. There was no damage to the shaft or calciner shell. The damage in K-Cell will be determined when the cover plates are removed for closer inspection. The cause of the agitator interference has not been definitely established. Comprehensive checks are being made of thermal expansion measurements on the trough, cover plate, and shaft of operating units in an attempt to define the problem.

Removal of the lower plug guides on the off-gas filter sectionalizing valves has not relieved the restriction to valve travel. Frequent valve failures continue to cause premature fouling of off-gas filters.

METAL FINISHING OPERATIONTask I and II

A brief process and equipment description of the new Task I and II facility provided by Project CG-691 has been prepared for operations personnel. Operating procedures are being written.

Recuplex

A total of 77 runs were processed through the Slag and Crucible Hood, including 16 combination powder and Task III fragment runs, 53 Task III fragment runs, 3 Task IV crucible runs, and 5 cleanout runs. Slurry losses averaged 4.0% of the recovered Pu (1.9% cribbed).

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During the month all combined Task III fragment and powder and Task III fragment runs were processed without a coagulation period following the dissolution period. No increase in filtration time, slurry losses, or operating troubles in the solvent extraction system were encountered. Elimination of the six hour feed coagulation period will be continued.

Feed filtration tests without the use of a precoat of filter-aid were made on 55 runs. At month end an additional test is in progress in which the filters are backflushed and the sludges are returned to the next succeeding run without analysis. These tests are intended to reduce the number of slurry analyses required and at the same time reduce slurry waste volumes and losses. Results to date indicate that the tests will be successful. No increase in filtration time has occurred; slurry losses have been reduced; and solvent extraction processing of the feed has been satisfactory.

The Solvent Extraction Hood averaged 1730 liters/day feed to the columns at an operating efficiency of 90%, giving an instantaneous rate of 1910 liters/day. The waste losses averaged 0.0021 g/l or 0.16% of the feed. The solvent extraction system operated satisfactorily throughout the month except for a solvent pump failure caused by the build-up of a precipitate on the impellers.

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PROCESS CHEMISTRY OPERATIONPROCESS ASSISTANCEPurex Process Studies**DECLASSIFIED**

Laboratory studies carried out in support of the Purex Plant were concerned with problems of solvent quality and treatment. In a search for better means of determining solvent quality, two simple tests were developed for determining the plutonium-complexing behavior of impurities in new and used Purex Plant solvent:

1. The "dilute uranium E_3^{0W} " measures the concentration of uranium in the solvent after it has been equilibrated with an equal volume of a standard 0.4 g/l uranium (as uranyl nitrate) solution. This is related to the dibutylphosphate (DBP) concentration by the formula:

$$\text{g/l DBP} = 1.7 (\text{g/l U})_{\text{organic}} - 0.0015.$$

Diluent degradation products also complex uranium in the organic phase, but their effect can be approximately corrected for by running a blank test with carbonate-washed solvent and subtracting this uranium concentration from that obtained with unwashed solvent. This test is similar to the "C" contact test, differing in that the uranium concentration in the standard is lowered from 1 to 0.4 g/l and the 0.01 M HNO_3 is eliminated, to improve the sensitivity of the method.

2. The "plutonium retention number" measures the concentration of plutonium left in the solvent after one volume of it has been contacted with one-fifth volume of a standard aqueous plutonium solution (0.3 g/l Pu(IV) in 6 M HNO_3) and stripped three times with double volumes of 0.01 M HNO_3 . The plutonium retention number is quite sensitive to small amounts of DBP and plutonium-complexing diluent degradation products.

The above tests were used in investigating the high plutonium losses to the HCW and 2BW organic waste streams. In the case of the HCW, the tests showed that degraded solvent was responsible for at least a portion of the persistent HCW plutonium loss of approximately 0.2 per cent. The plutonium retention number of an IOO solvent sample taken from the G-5 tank on May 8 was 8×10^7 counts/min/gal., compared with $\leq 10^6$ for laboratory 30% TBP. Washing samples of the solvent for 10 minutes at room temperature with 3% Na_2CO_3 and 2% NaOH to remove any DBP that may have been present reduced the plutonium retention number to 4×10^7 and 5×10^7 c/m/gal., respectively. More stringent washing with 3% Na_2CO_3 and 3% $\text{Na}_2\text{CO}_3 - 0.01 \text{ M KMnO}_4$ (at 40 C for 20 minutes) reduced the plutonium retention to 2×10^7 and 10^7 c/m/gal., respectively. Addition of 0.06 M ferrous sulfamate to the 0.01 M HNO_3 stripping solution lowered the plutonium retention number measured for untreated solvent to 5×10^6 c/min/gal.

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The plutonium loss in the 2BW (approximately 0.3 per cent) was also believed to be caused by solvent degradation; however, the plutonium retention number of the solvent (200) was only 5×10^6 . Subsequent tests using 2AF as the source of plutonium for the plutonium retention tests and laboratory 30% TBP as the solvent indicated that the plutonium-complexing ligand entered with the 2AF. Substitution of 0.0025 M H_2SO_4 for the HNO_3 in the stripping solution reduced the plutonium retention number from 5×10^8 to 3×10^6 c/m/gallon. A plant test with 0.005 M H_2SO_4 added to the 2BX resulted in a 10-fold reduction in the plutonium loss to the 2BW.

The 2AW plutonium loss decreased three-fold coincidentally with the reduction in 2BW plutonium loss. Extraction studies made with 2AF and 200 sampled before and after the loss reduction showed that both the feed and solvent have improved in quality.

The use of boiling caustic in Purex solvent treatment was found to be beneficial. Boiling Purex 100 with 1 M NaOH under total reflux for four hours gave a Zr-Nb decontamination factor of 26 and a ruthenium decontamination factor of 8. Further boiling, even with fresh NaOH, did not improve the DF's significantly. After nine hours, the gross gamma DF was 24. After boiling, the solvent was spiked with fission product activity from a dilute HAW sample. This was all removed by a simple carbonate wash, indicating that the complexing ligand was also removed by the boiling procedure. The same 100, sampled April 24, was decontaminated only by a factor of two by washing with 0.01 M $KMnO_4$ in 3% Na_2CO_3 for 20 minutes at 40 C.

Redox Process Studies

In continued studies of possible reasons for plutonium deposition in the Redox partition cycle, depolymerization of Pu(IV) polymer under the conditions existing in the Redox LAFS concentrator (F-2) was demonstrated in the laboratory by spiking a Plant LAFS sample to 50 per cent of the total plutonium with Pu(IV) polymer, digesting three hours at boiling, and extracting the plutonium batchwise with fresh hexone. The plutonium remaining after five extractions was 0.6 per cent of that in the feed, compared with 0.3 per cent obtained with the LAFS as received. A second sample of LAFS spiked with Pu(IV) polymer to 34 per cent of the total plutonium and not digested gave a 34 per cent waste loss.

Further deposition studies were carried out by simulating 1A column operation in a multiple batch countercurrent extractor containing five extraction and three scrub stages. The 1AW plutonium loss was normal (ca. 0.15%) until the extractor was shut down and allowed to stand 44 hours with the phases in contact (simulating an unstripped extraction column). Upon startup, the plutonium loss increased to 25 per cent. Examination of the plutonium concentration profile in each stage showed that the high waste loss was caused by the conversion of plutonium from an extractable to an inextractable species in the scrub stages. The exact mechanism of the conversion is unknown. A nitric acid flush of the stages at the end of the run (after five days of discontinuous operation and

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18 throughputs of the feed) showed that 0.6% of the plutonium entering had deposited on the walls of the extractor, with about two-thirds of the total depositing in the scrub stages.

Waste Scavenging Studies

Recommendations have been submitted to Redox Technology for the disposal of Tanks 101-BY, 102-BY, and 103-BY. These tanks have previously been scavenged for Cs-137 and contain about 0.0025 M $\text{Fe}(\text{CN})_6^{4-}$. A portion of the Co-60 has apparently formed a cyanide complex which increases the difficulty of its removal by normal scavenging procedures. Tank 101-BY can be scavenged to below the cribbable limit by scavenging with $\text{Ni}_2\text{Fe}(\text{CN})_6$ and $\text{Ca}_3(\text{PO}_4)_2$ at pH 7.0 followed by NIS at pH 8.3. Disposal of Tanks 102-BY and 103-BY by specific retention (after scavenging) has been recommended because of the inability of present techniques to scavenge Co-60 below the cribbing limit.

It is interesting to note that the cesium content of these tanks has decreased 10-fold over a period of 18 months. The strontium and cobalt concentrations are unchanged.

ANALYTICAL ASSISTANCE

Determination of Metallic Impurities in Plutonium Metal

Investigations of the present carrier concentration method used in the emission spectrographic determination of metallic impurities present in plutonium metal indicate that the method may be biased low for iron, chromium, and nickel. At present, these impurities are determined quantitatively by comparison to uranium oxide standards containing known amounts of metallic impurities. The method is based on the assumption that the carrier distillation of the metallic impurities from plutonium oxide is the same as from uranium oxide. However, recent work with plutonium oxide standards containing known amounts of iron, chromium, and nickel gave low results when compared to uranium oxide standards. Recoveries of the present uranium oxide internal standard (cobalt) from plutonium oxide were extremely low compared to cobalt recoveries from uranium oxide. Current efforts are aimed at basing the carrier concentration method on plutonium oxide standards rather than uranium oxide standards.

Gamma Scintillation Counter for the Determination of Cobalt-60

Development work has been completed and a formal report (HW-49718) issued on the gamma coincidence counting method for cobalt-60. The counting method is based on the counting of the gamma, gamma coincidences arising from the decay of cobalt-60. By discriminating against true coincidences and chance coincidences arising from other radionuclides, it is possible to accurately determine cobalt-60 in the presence of other radionuclides. The procedure requires a minimum of chemical separation and is limited only by the total gamma activity of the other radionuclides present.

234-5 DEVELOPMENT OPERATION**DECLASSIFIED**Continuous Ion Exchange

Decontamination and purification results were obtained from the laboratory-scale continuous ion exchange runs made with Purex 2BP. These runs showed the anion process to be superior to the cation process for both purification and decontamination. The results are summarized:

1. Anion exchange reduced Zr-Nb and Ru-Rh gamma activity to below the level of sensitivity of the counter. The minimum values of DF were 15 to 28 for Zr-Nb, 1.6 to 2.0 for Ru-Rh. The actual decontamination obtained may have been considerably greater.
2. Cation exchange produced a DF of 1.6 to 2.9 for Zr-Nb and 3.0 to 4.0 for Ru-Rh for those samples with high enough activity to be within the instrument range.
3. Gross (or total) gamma DF varied between 1.2 and 3.8 for all runs; anion exchange showed no merit over cation exchange.
4. Anion exchange reduced the heavy metal (Cr, Cu, Fe, Mn, Ni, Pb) content of the plutonium stream by factors of 5 to 20. Light metal (Al, Ca, K, Mg, Na) content was reduced as much as 100-fold. Iron was the major impurity in anion product, ranging from 700-1600 ppm.
5. Cation exchange resulted in almost no removal of heavy metals, and slight removal of light metals.
6. Non-metals were not removed to any extent in either process, except silicon. Silicon is reduced 10 to 20-fold in the anion exchange process due to the high acidity and high temperature in the XA column. This causes the silicon to leave as colloidal silica in the XA waste stream.
7. Silicon carries through the cation process and is precipitated as colloidal silica in the XC product.

Continuous Task I Prototype

Seven runs have been made in the new continuous Task I prototype. These runs confirmed the process operability and capacity.

Feed used was product solution from the Purex plant, except for the first run, which was plutonium nitrate obtained from peroxide precipitations. The as-received solutions were diluted with water and nitric acid to the desired feed composition, and hydrogen peroxide added to adjust the valence to plutonium(IV).

The strike solution was 1 M oxalic acid, with flow rate adjusted to give 0.1M excess oxalate in the slurry and a throughput of around 500 g/hr plutonium. The initial startup was made by starting the streams on rate into the empty

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filter pan, but all subsequent startups have been made with a heel from the previous run. Slurry residence time was controlled by the volume holdup in the pan, which was in turn controlled by the vacuum on the lower half of the drum. Control of feed rate and liquid level in the pan have presented some difficulty, with the result that oxalate excess and residence time have not been well controlled. Fortunately, residence time does not appear to be critical, and operating experience is helping improve feed control.

The low filtrate losses from CP-1 (see table) were due to the relatively pure feed, although there were other factors unique to this run (feed concentration and startup). For runs CP-2 through 5, the filtrate losses consistently decreased as the run progressed, with the minimum loss occurring toward the end of the run. Between runs CP-3 and 4, all liquid in the filter pan evaporated so it was necessary to add some 0.1 M oxalic acid - 3M HNO_3 to make a slurry. This may be the reason for the very high losses experienced early in CP-4. In runs CP-6 and CP-7, the loss increased as the runs progressed but seemed to level off at the maximum value when the run ended.

Starting up with slurry in the pan has worked out well. Whether this procedure is having any effect on filtrate losses has not been determined as yet, but cake filterability has presented no problem. It is necessary to build up a relatively large solids inventory in the pan before appreciable cake is picked up by the drum. Performance of the cake at the doctor blade, however, varied considerably during the early runs. At times the cake was dry and crumbled off the drum very nicely, but more often it came off as a firm paste. The drum vacuum system was then modified to give a little more vacuum to the upper part of the drum and since then the cake has been consistently dry and crumbly. A few runs have been made at high acid concentrations (3.5 M H^+ in slurry) with no apparent effect on the process. The Dynel SD-9 filter cloth is showing signs of blinding, as evidenced by areas of no cake buildup on the drum, but as yet this has not impaired operation.

The calciner performance has been difficult to evaluate because much of the time it has been overloaded with large slugs of cake coming off the drum. As a result, the temperatures have varied considerably and no period of steady-state operation has occurred.

Two sets of purity data obtained so far have shown the separation obtained across the process (filter and calciner). Iron has been the most significant impurity coming through, appearing to 335 ppm in one case and 840 ppm in the other (from feeds containing approximately 10,000 ppm).

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SUMMARY OF TASK I PROTOTYPE RUNS

<u>Run No.</u>	<u>Feed Composition</u>		<u>Residence Time - Min.</u>	<u>SN Losses</u>
CP-1	Pu H ⁺	75 g/l 4.3 M	8 - 15	0.03 - 0.2 g/l (0.07 - 0.4%)
CP-2	Pu H ⁺	92 g/l 4.7 M	10 - 20	0.9 - 2.3 g/l (2 - 5%)
CP-3	Pu H ⁺	89 g/l 3.8 M	~ 20	1.3 - 2.4 g/l (3 - 6%)
CP-4	Pu H ⁺	103 g/l 4.2 M	10 - 20	1.7 - 17 g/l (3 - 30%)
CP-5	Pu H ⁺	98 g/l 3.8 M	10 - 15	1.6 - 2.7 g/l (3 - 7.5%)
CP-6	Pu H ⁺	95 g/l 4.7 M	12 - 15	1.0 - 1.2 g/l (2 - 2.5%)
CP-7	Pu H ⁺	101 g/l 4.1 M	17 - 24	1.6 - 2.8 g/l (3 - 6%)

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**DECLASSIFIED
WITH DELETIONS**Plutonium Purification

The sixth and seventh reductions of laboratory purified plutonium tri-fluoride were made. Button purity was better than in preceeding reductions. These reductions were performed in calcium oxide and calcium fluoride crucibles, respectively. Yields were 71 and 91 percent. The reduction in calcium fluoride proceeded smoothly and the button was easily broken out. Since very highly-purified calcium fluoride can be obtained, further reductions will be done using this material as reduction liner.

The main impurities in the sixth button after the remelting were Ca, 20 - 80 ppm; Ni, 10 - 100; and Fe < 50. Density was 19.54. The main impurities in the seventh button were Al, 8 - 20 ppm; Fe, 50 - 200; and Mg, 10 - 10. Density was 19.36.

In cooperation with H.L.O. personnel, samples of Recuplex product were tested in an anion cycle. Feed was 6 g/l Pu, spiked with impurities, 7.2 M HNO_3 . Operation was at 60 C and the wash was 12 - 16 times the column volume. Elution was with 0.35 M HNO_3 . Very high purification of all metallic ions was noted except for iron. The iron content of product measured 160 and 130 ppm from feeds containing 510 and 100,000 ppm. All other metals were 20 ppm or less.

**DECLASSIFIED
WITH DELETIONS**Ceramic Development

Last month a satisfactory RCDS-1901 calcium fluoride crucible was slip cast using alkaline slip. Four more such crucibles were made this month and demonstrated that crucibles can now be routinely made from calcium fluoride. The calcium fluoride was oven-dried and calcined at 1300 C, then reduced to -48 mesh powder, and ball milled wet for 11 hours. The slip had a pH of 11.9, specific gravity slightly above 2. The slip cast crucibles were sintered at 1100 C after drying. The crucibles were smooth, vitreous-looking, and free of blisters. Three of the four were out of round to varying degrees at the open end because the setter plates cracked during firing. One, whose setter plate did not crack, was circular.

Spectrographic analysis of one of the crucibles showed no gain in iron (compared to the starting material), but there was a significant increase in both silicon and aluminum. This is attributable to erosion of the ball mill and balls during the 11-hour ball milling.

To determine the effect of calcining temperature on pH of slurry, tests were made at temperatures from 900 to 1300 C. In each test a sample of oven-dried calcium fluoride was brought to the indicated temperature for one hour. The sinter cake was broken up, powdered, and suspended in distilled water. The pH was read on a Beckman meter using a high pH electrode. Results are indicated below:

<u>Calcining Temp. C</u>	<u>pH of Slurry</u>	<u>Comments</u>
Not calcined	3.8	
900	8.7	Shrinkage less than at higher temperatures.
1000	10.5	
1100	11.1	
1200	12.1	
1300	11.9	

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These results show that alkali formation is related to calcining temperature. So far, no attempts have been made to make casting slips from material calcined at 1000 or 1100 C. The results with alkaline slip from material calcined at 1300 C were so good as to remove any practical incentive for returning to acid slip.

The stock supply of calcium fluoride was found to contain 1.06 percent water. Calcining tests were also made at 1200 and 1300 C using this original untreated material as opposed to the oven-dried. The pHs found were nearly the same, indicating that moisture plays little part in the reaction producing the alkali.

As pointed out last month, there was some question as to the physical effect of a small content of calcium oxide in a calcium fluoride crucible. It was found that the crucibles did not gain weight during storage, and appeared quite stable.

INVENTIONS

All Research and Engineering Operation personnel 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 May, 1957. 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.

BUSINESS TRIPS

M. J. Szulinski visited Union Carbide Nuclear Company, Oak Ridge, Tennessee, May 13 to 16, and Union Carbide Nuclear Company, Paducah, Kentucky, May 16, for discussions on continuous oxide production.

F. Baranowski and A. Perge of the AEC Division of Production in Washington, D. C., visited M. K. Harmon and K. M. Harmon May 17, to inspect Redox process, power reactor fuel reprocessing, and radiochemical laboratory facilities.

RE Tomlinson

Acting Manager, Research and Engineering
CHEMICAL PROCESSING DEPARTMENT

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EMPLOYEE RELATIONS OPERATION

I. RESPONSIBILITIES

There were no changes in responsibilities assigned the Operation during the month.

II. ACHIEVEMENT

FIRE PROTECTION OPERATION

A. Fire responses

There were two C. P. D. Fire responses during the month, with a loss of \$40. One was at the 241-T Tank farm on May 22 when metal removal personnel had been engaged in weed burning around the fence of the tank farm during the 8-4 shift. At 6:00 PM a fireman on a tour of the area noticed a wooden pole burning that supported a steam line. Fire was extinguished but the pole had already suffered damage. The second alarm occurred when maintenance personnel at 277-W, 200 W who were working on sprinkler system accidentally tripped the alarm.

There were two fire responses other than C. P. D. with a loss of \$310. A Thorn & Marble welder accidentally touched his torch to a 20' x 20' tarp igniting it, The tarp was a total loss, amounting to \$60. The second fire response occurred when a one-half ton Army pickup truck had a flat tire. The tire ignited and spread to the entire pickup. The loss amounted to \$250.

One assist was given IPD Fire Protection during the month on brush fires.

B. Fire extinguisher service 200-E, 200 W, Batch Plant, Phone Exchange and Yakima Barricade.

During the month, 425 fire extinguishers were inspected, 5 installed, 2 delivered, 15 seals broken and not reported, 10 were serviced, and 350 were weighed.

32 gas masks were inspected and 12 serviced.

20 hand lines were inspected.

C. Services to other Operations

Assisted Power & General Maintenance in pumping out septic tanks in 200E and 200-W areas. A total of 159 man hours was spent by the operation.

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PERSONNEL DEVELOPMENT AND COMMUNICATIONS

A. Measurement Statistics

Participation in Training Courses

Monthly Personnel		128
Process and Equipment Orientation	1	
PEM-I (enrolled)	36	
Non-Exempt Personnel Development	5	
Process and Equipment	1	
Craft Training	28	
Cost Control	19	
Facilities Engineering Information	6	
Projectionist Training	3	
Management Orientation	5	
Data Processing	6	
Radiation Protection Problems	18	

Weekly Personnel		352
Non-Exempt Personnel Development	34	
Process and Equipment	42	
Craft Training	225	
Technicians Orientation	5	
Projectionist Training	10	
Classified Documents - Preparation & Handling	35	
Facilities Engineering Information	1	

G.E. Supervisory Selection Program - Number Completed	10
Technical Graduates on Rotation	5
Technicians In Training	5
Management News Bulletins issued	7
GE NEWS Items	14
Booklets and Pamphlets reviewed	1
Letters to Employees	1
Priority Messages	5
OPG's Issued	13
General Manager's meetings with exempt employees	3
Films shown	20

B. Comments on Statistics

Two employee appointments; OPG's first disabling injury; sale of Richland telephone system; and 321 Building minor explosion were priority messages.

The first two groups completed PEM-I.

Classified documents training was presented by Classified Files and Security Specialists for OPG secretarial-clerical personnel.

Polio inoculation was the subject of a letter to employees.

DECLASSIFIED**C. Employee Communications**

CPD provided 14 stories for the GE NEWS. A story and picture describing a new boring machine produced in Switzerland and installed in the P & GM Shop; a feature story including 3 pictures describing the planning and teamwork in Redox decontamination tasks; personal accomplishment was the keynote of a picture of 5 men whose total service was 135 years, and 29 employees who received attendance awards; suggestion awards were featured in 3 issues with 5 pictures and stories; a Lab. Asst., known statewide for her horsemanship was the subject of a picture and story; the first disabling injury was publicized; HAPO secretaries touring CPD were pictured; two promotions were publicized.

The purpose of a new GE NEWS feature "The Plant Panel" column was explained in a letter to Level 3 Managers.

The Annual Report of the General Electric Company was mailed to 129 Stock Bonus Plan non-participants.

The polio inoculation program, sponsored by Richland Public Health and Richland Medical Association was explained in a letter mailed to employees' homes. CPD employees' requests for inoculation were tabulated by Communications and sent to Public Health. Management was informed of the program by letter and through the Management News Bulletin.

"Around the CPD Round Table", a bi-monthly publication of Round Table topics and information was initiated. Managers are emphasizing this program and increasing the number of meetings. General information was given to all managers and first-line supervisors. A partial survey shows 36 supervisors regularly conduct Round Table meetings. 78 have requested literature.

D. Public Communications

Three potential news stories were investigated. Two are not feasible at this time. A story on the use of stored fission products has possibilities and is being pursued.

Atomic Power Development Associates visited Purex and participated in a conference with Purex managers.

CPD films, available and proposed, were listed for Relations and Utilities as an information source for the 1958 Geneva Conference.

E. Personnel Development

Non-exempt people are maintaining a high interest in the Non-Exempt Personnel Development sessions and in process and equipment lectures presented by the Specialist-Training. Six craftsmen presented craft lectures which were very well received and elicited many questions.

The Preparation and Handling of Classified Documents, presented by Classified Files and Security Specialists, gave secretary-clerical personnel

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a better understanding of methods and know-how.

Twenty educational films were shown by various operations whose projectionists qualified by the Specialist-Training. Another projector was placed in CPD service.

One promotion was made on the basis of Supervisory Selection Program results. Reviews were furnished to managers in two other cases. Five new recommendations were received and ten evaluations were completed.

Non-exempt Self Development Program appraisals for January through April were reviewed. The quality of the appraisals was good. Improvement in appraisal technique is needed in some areas.

Two groups completed PHM-I and appropriate graduation ceremonies were held. Certificates of completion were presented. Plans are underway to schedule three classes in late summer.

A weekly series of Labor Relations Conferences was initiated. Union Relations personnel will discuss specific topics and analyze problems presented at the conferences. Matters of interest to all exempt employees will be covered including Labor Laws, the GE-HAMTC contract and problems concerning non-bargaining unit employees.

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UNION RELATIONS OPERATION

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The first two sessions of the Labor Relations Conference Series were held during the month. The series is continuing on a weekly basis. Interest was expressed by those attending the first sessions.

Correspondence and meetings with the Union relative to the Radiation Monitoring jurisdictional dispute continued during the month. The area of disagreement appears to have been narrowed somewhat, but full agreement has not yet been reached.

During the month an analysis of C.P.D. grievances received since September was completed. The analysis showed that approximately half of the grievances filed were filed in connection with jurisdictional problems between the crafts, that 75 per cent of the grievances in this category were answered unsatisfactorily at Step I, and that only 16 per cent reached the Step II discussion stage. It is significant that the number of grievances filed apparently reflect the Council-Company relationship with respect to problems brought on by reorganization, arbitration of the laundry case, and the implications inherent in the Wonacott (Radiation Monitor jurisdiction) case, toward the end of the year. Relationships have shown improvement since that time, with a definite decrease in the number of grievances at Step II for the Department.

Within the Chemical Processing Department, the check-off system, which pertains to the deduction of union dues from employees' pay checks, is as follows:

	<u>May</u>	<u>April</u>
Bargaining unit employees in C.P.D.	994	1016
Bargaining unit employees utilizing check-off	654	643
Percentage of total bargaining unit employees using check-off	65.70%	62.69%

Following is the summary of grievance statistics for the month of May, 1957:

	<u>Unit</u>	<u>Nonunit</u>
Grievances received year to date	74*	1
Grievances pending at Step II on 4-30-57	11	0
Grievances received during the month	14	0
Satisfactorily answered at Step I	4	0
Settled at Step I through expiration of 90-day time limit	8	0
Processed at Step II	2	0
Pending at Step II on 5-31-57	11	0
Pending at arbitration	1	0

* 27 grievances pertaining to vacation scheduling were received in one lot, and were processed at Step II as two grievances - one for Millwrights and one for Pipefitters.

SALARY & WAGE ADMINISTRATION

A new position "Specialist, Accident Prevention" was established in Employee Relations to replace the position "Specialist, Plant Disaster and Civil Defense."

A new position "Supervisor, Monthly and Weekly Payroll" was established for the Financial Operation to consolidate the functions of the positions "Supervisor, Weekly Payroll" and "Specialist, Monthly Payroll."

Two new positions "Senior Auditor, Provisional" and "Supervisor, Project Cost Accounting," were established for the Financial Operation.

The Financial positions "Specialist, Office Procedures," and "Specialist, Project Cost" were revaluated.

Four position reconciliations were completed in connection with the above position changes.

Work was continued on development of the new Redox organization with analysis of the proposed new position guides and evaluation of the new positions completed.

A meeting with Redox managers was conducted to present information and discuss the Position Evaluation System for determination of salary levels.

A 0.59% adder adjustment of our Fixed Rate salaries was authorized effective May 1, 1957.

A study of the work assignments of the non-unit Chief Operator position was made to determine its status under FLSA regulations. It was concluded that the work is properly classified at present as nonexempt. Discussions in meetings with Labor Relations personnel and with third level managers confirmed this opinion.

In connection with a grievance, a review of a unit job in Finished Products was made, resulting in the determination that the classification of Separations Utility Operator is appropriate for the duties involved.

A meeting for the purpose of explaining the January 28, 1957 Secretarial Plan and its application was held during the month with the Facilities Engineering Operation secretaries. Management of the other CPD components have been informed that a similar service is available to them if they wish to have the plan explained to their secretaries as a group.

Job descriptions for non-unit nonexempt jobs have been completed for all CPD organizations with the exception of eight secretarial jobs and two clerical jobs. Job descriptions for non-unit nonexempt jobs are 95% complete.

Reclassifications of five Design and Drafting employees were effected to conform to the new Design and Drafting classification structure which became effective as of April 15, 1957.

Administratively, papers were processed and discrepancies incident thereto handled with supervision concerned as listed for nonexempt employees in the statistical portion of this report.

	<u>Exempt</u>	<u>Nonexempt</u>
<u>ADDITION TO ROLL</u>		
New Hires and Rehires		0
Reactivations	3	4
Transfers from Other Departments	1	3
Reassignments from Non-Exempt to Exempt	2	
Reassignments from Exempt to Non-Exempt	0	
<u>REDUCTIONS FROM ROLL</u>		
Terminations	1	
R. O. F.		
Deactivates and Leaves		
Transfers to Other Departments or Divisions		5
Reassignments from Non-Exempt to Exempt	2	
Reassignments from Exempt to Non-Exempt		
<u>CHANGES IN STATUS (NO SALARY CHANGE)</u>		
Intra-Departmental Transfers	6	27
Reassignment - Title Change	3	
Level Changes - Increase	1	
Level Changes - Decrease		
Location Changes		
Reclasses		5
<u>CHANGES IN SALARY</u>		
Promotions	1	15
Demotions	0	7
Merit - Salary Review	31	
Merit - Interim	1	
Automatics		36
Temporary Reclassifications		8
Salary Adjustments (Gen'l Adj. on Firemen)		
<u>REQUISITIONS</u>	2	11

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<u>Chemical Processing Department</u>	<u>May</u>	<u>April</u>	<u>Year to Date</u>
Disabling Injuries	1	0	1
Serious Accidents	6	0	7
Medical Treatment Injuries	63	58	289
Overexposure Incidents	1	1	2
Potential Overexposure Incidents	0	1	2
Radiation Occurrences	21	30*	131
Fires	3	3	8
Security Violations	4	5	17

*Thirty-two radiation occurrences were erroneously reported for April

Comments on Statistics

The first Disabling Injury in the Department was classified during the month. Progression of a contusion of the right knee of a Redox chemical worker necessitated corrective surgery on May 23, 1957. Since the original injury, a trip and fall on the same level, occurred on March 8, 1957 the rates will be adjusted retroactive to the original date of occurrence. Complete details are discussed in Disabling Injury Investigation CPD #57-1.

An upsurge of accidents and medical treatment injuries with potential for severe injury and appreciable property damage and loss was noted. Two employees were exposed to oxides of nitrogen; two employees slipped on a wet floor; a chain fall fell while the load was being lifted (no injury); a portable compressor became disengaged from the truck during travel (no injury). Details of all accidents were reported in Serious Accident Investigations except for one of the fume cases which is pending formal classification.

A Redox chemical worker received a local overexposure of 3.4 rads to the arm during process sampling. Delayed personnel survey affected the degree of exposure.

A favorable trend in radiation control experiences was reflected in a new low of 21 occurrences in one month.

Of the three fires, loss from equipment damage totaled \$52.00. A flying spark from a 234-5 button ignited a small filter; waste rags ignited spontaneously outside 224-U; a steam line pole in 241-T Tank Farm was ignited from uncontrolled weed burning. Prompt discovery and extinguishment minimized losses.

Four security violations were reported: one occurred in April but investigation was not completed until May.

Safety Programs

Who's Who in Safety continued for the second month. Eighteen entries were received as compared to 26 during April. The winner, G. B. Murphy of the Power and General Maintenance Operation, was suggested by F. W. Oates of the same Operation. The General Manager presented certificates of recognition to both men. Publicity in the GE News and within the Department was arranged.

Seven messages were posted on the safety marquee boards.

Training and Instruction

Eight new employees attended the Health and Safety monthly orientation. Eight Chemical Processing Department people received 32 hours basic rescue refresher training.

A talk on "Current Radiation Protection Problems" was presented to exempt personnel in the Personnel Development Training Program.

Advice and Counsel

Purex Maintenance - special acid hood for use over assault mask
 202-A - trap pit procedures
 222-S - roof fire protection
 222-S handling of tetrabromothane
 234-5 - project proposal review and changes - combustible filter replacement
 234-5 Development Lab - hydrogen gas cylinder installation
 277-W - welding booth construction
 HLO - Radiation Protection Standards revision
 HLO - Standardization of portable radiation monitoring instrument sources
 General - location of area crosswalks and relocation of 200 East main gate inside parking lot
 272-W - installation of overhead lights from crane bridge
 Facilities Engineering - installation of anhydrous ammonia cylinder - 271-B
 231-Z - location of welding equipment
 224-UA fire risks and roof protection
 224-UA - Gerlinger fork lift load and rated capacity

Inspection, Investigation, and Audit

Department I-131 emission was within the weekly control limits.

Audit of the Power and General Maintenance Shops and 200 East and West General Maintenance Operations was completed. The three months follow-up audit of the Uranium Reduction Operation was completed. Audit of the Redox Operation is 50 per cent complete.

One Disabling Injury and 5 Serious Accidents were formally investigated and reported. One additional accident was investigated as Serious but the formal classification is pending recommendation of the Industrial Medical Operation.

Reports Issued

Serious Accident Investigation #57-2
 Serious Accident Investigation #57-3
 Serious Accident Investigation #57-4
 Serious Accident Investigation #57-5
 Serious Accident Investigation #57-6
 Disabling Injury Investigation #57-1

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PERSONNEL PRACTICES OPERATION

	<u>Exempt</u>	<u>Non-exempt</u>	<u>Total</u>
<u>Additions to Payroll</u>	2	7	9
New Hires	0	0	0
Reactivates	1	3	4
Re-hires	00	0	0
Re-engages	0	1	1
Transfers into C.P.D.	1	3	4
Promotions from nonexempt to exempt	0	0	0
<u>Removals from Payroll</u>	2	26	28
R.O.F.	0	2	2
Retired	0	2	2
Deceased	0	1	1
Illness	1	7	8
Leave of Absence	0	3	3
Transfers out of C.P.D.	0	5	5
Resigned	1	6	7
E-2-U Home Responsibility	0	1	1
E-3-U Husband Left Vicinity	0	1	1
E-10-U Return to School	1	0	1
E-9-C Another Job	0	4	4
Promotions from nonexempt to exempt	0	0	0
<u>Requisitions for Personnel (Non-exempt)</u>			
Number on Hand 5/1/57	6		
Number Received	10		
Number Filled	10		
Number on Hand 5/31/57	6		
<u>Requests for Transfer (Non-exempt)</u>			
Number on Hand 5/1/57	143		
Number Received	26		
Number Transferred	3		
Number on Hand 5/31/57	166		

Service Pins

A total of 23 pins were issued as follows:

10 Yrs. Service
5 Yrs. Service

12 Male
9 Male

0 Female
2 Female

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Attendance Awards**DECLASSIFIED**

Pass folders were issued to 29 persons for perfect attendance as follows:

1 Yr.	3 Persons	4 Yrs.	4 Persons
2 Yrs.	5 Persons	5 Yrs.	4 Persons
3 Yrs.	7 Persons	6 Yrs.	6 Persons

Six inquiries in regard to credit references, records of employees, or other aspects of employment for C.P.D. employees were answered during the month.

During the first week of May, seven Separations Utility Operators were given ROF notices. Of this number two were placed in other jobs at HAPO. Two of the seven waived the ROF and voluntarily terminated in order to accept employment elsewhere, one ROF notice was withdrawn, and the remaining two were ROF'd. Both of the persons ROF'd were offered employment in other operations at HAPO but each declined the offers and accepted ROF's instead.

The ratio between Process Operators and Utility Operators was adjusted in accord with the ratio agreement resulting in the downgrading of six Process Operators.

An additional 13 ROF notices were prepared and sent to affected individuals in the Utility Operator classification. These will become effective June 14.

Four supervisory selection tests were given during May and three persons requested tests for possible craft trainee jobs. The stenographic tests were given to two employees as a trial test only. No requests for this test have been received as yet since it has only been available since May 20th in this Department.

Requests for Transfer (Exempt)

Number on Hand 5/1/57	27
Number Received	3
Number Transferred	0
Number Closed Out	0
Number on Hand 5/31/57	30
Number of Interview Trips	2

Applications for Employment (Exempt)

Applications Received during May	5
Hired	0
Closed Out	3
Invited for Interviews	5
Applications on Hand 5/31/57	3
Open Requisitions	3

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Efforts have been started to find other assignments for personnel listed as available with other components of the Company outside HAPO. In this connection a list with partial descriptions of jobs available at AGT has been obtained. Copies of these openings have also been given to other departments at HAPO.

Information on the opportunities available in CPD to Engineering and Scientific personnel as experienced applicants was given to Relations and Utilities. This material will be used to formulate a brochure as a recruiting aid for experienced and PhD applicants.

<u>Suggestion Plan</u>	<u>April</u>	<u>May</u>
Suggestions Received	166	114
Acknowledgments to Suggesters	174	115
Suggestions Pending Acknowledgment	12	11
Suggestions Referred to Operations for Investigation	174	115
Suggestions Pending Referral to Operations	12	11
Investigations Completed and Closed	118	153
Adopted Suggestions Approved by Board	49	77
Adopted Suggestions Pending Approval by Board	25	28
Total Net Tangible Savings	\$55,085.84	\$17,740.17
Total Cash Awards Paid during Month	3,203.00	2,405.00

In addition to the above suggestions there are 17 Board approved suggestions which have not been paid but are ready for payment or currently being audited by the Financial Operation

Total Number of Suggestions Outstanding to Operations at the end of the month	288	249
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Award checks delivered to 3rd level managers amounted to \$2,405.00 during May. One of these awards was for \$640.00 to T. J. Owen for suggesting a replacement of manually operated valves by air operated valves in the 8th level head tanks in the 202-S Building which resulted in \$5,157.00 estimated tangible savings.

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Participation In Benefit Plans

	<u>April</u>	<u>May</u>
Insurance Plan	99.7%	99.7%
Pension Plan	98.8%	99.0%
Stock Bonus Plan	57.5%	58.1%
Good Neighbor Fund	63.5%*	63.9%

* This figure was reported in last month's report as 69.1%. This was erroneously computed and should have appeared as 63.5%. It has now appeared as 63.5%.

During May a meeting was held with about 25 members of Maintenance Operation in the 224-U Building for the purpose of discussing benefit plans. This meeting was held at the specific request of the Finished Products Operation.

During May two Chemical Processing Department employees were retired on normal retirement effective June 1. All matters pertaining to their retirement regarding Insurance, Pension Plan, Savings and Stock Bonus Plan were discussed with them.

Three General Manager's Information Meetings were held during May with a total in attendance of 67 supervisory and exempt personnel of C.P.D.

As a result of the recent military status survey, the military status files have been revised and have been divided into the following categories for both exempt and non-exempt employees:

Overage - Veterans, Inactive Reserve - Ready Reservists - Standby Reservists - Non-Veterans (does not include those for whom we routinely request deferments) and Selective Service.

Inasmuch as we are principally concerned with the categories: Ready Reserve, Standby Reserve, Non-Veterans, and Selective Service; this and future monthly reports will be restricted to actions in these categories.

Records now reveal that C.P.D. has a total of 142 employees who are subject to military training through Selective Service or Armed Forces Reserve actions. They are categorized as follows:

	<u>Exempt</u>	<u>Non-Exempt</u>
Ready Reserve	14	15
Standby Reserve	12	10
Non-Veterans	14	63
1A	0	15
2C	1	0
3A	6	45
4F	7	3
*Selective Service	14	0
1A	2	0
2A	12	0
TOTAL	54	88

*During May there was one removal from Selective Service files.

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Deferments

Deferments Requested (May)	2
Deferments Granted (May)	1
Deferment Requests Pending	5
Routine	3
Appeal	2

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Personnel Development Program

Prior to the month of April appraisal notices for 114 non-exempt employees to be appraised during April were mailed to 4th level managers. Of these which were due by the 5th of May, seven have yet to be returned.

Prior to the month of May appraisal notices for 110 non-exempt employees to be appraised during the month of May were mailed to 4th level managers. Of these which are due by the 5th of June, 53 have yet to be returned.

Total outstanding for the months of April and May	70
Number to be appraised during the month of June	136

Duplicating

Orders on Hand 5/1/57	76
Orders Received	792
Orders Completed	812
Orders on Hand 5/31/57	57
Total Copies Produced	197,246
Embosograf Signs Made	285
Verifax Copies Produced	1,733
Ozomatic Copies Produced	13,394

As stated in last month's report, a second Xerox developer tray was prepared for continued use of the original can of developer where practical. We are now reproducing satisfactory masters from originals that lend themselves to this old developer. Clear, sharp originals are being used with the old developer instead of the new; and some forty masters have been made in addition to the original 1,330 from this first can of developer. From this experiment it appears that with good copies to work with we should get many more masters than the original 1,330.

The new telephone cable to serve "B" Plant has not been spliced in yet but it is expected that the work will be completed in the early part of June.

During the month a meeting was held with J. P. Turping with regard to the establishment of an automotive pool at "Z" Plant. As a result, vehicles assigned to Finished Products Operation, Hanford Laboratories, and the SS Accountability Operation located at 2704-Z has been consolidated into a pool for use of employees of all three operations. Definite results are not known as yet as some time will be required to determine the feasibility of such an arrangement.

OPERATIONS SECTION

Mail Service

Total Pieces of Mail Handled	74,893
Registered Deliveries	263
Library Mail, Pounds	1,086

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III. ORGANIZATION AND PERSONNEL

A. Meetings

The first two meetings of the Labor Relations Conference series were held during the month.

During the month personnel of the Employee Relations Operation attended 50 meetings in connection with their assigned responsibilities.

The first PEM-I graduation and dinner was held with W. M. Mathis as the principal speaker. W. K. MacCready presented the certificates to the graduates.

Meetings were held with consultants from the New York office on various aspects of Employee Relations.

The Manager, Personnel Practices visited Company sites in other localities to discuss Personnel Practices' problems with counterparts.

Four safety meetings were conducted by Health and Safety personnel and nine safety meetings were held within the Operation.

Eight round table and information meetings were held.

B. Personnel Activities

In Fire Protection Operation there were 55 outside drills, 50 inside drills. 11,600 feet of hose and 335 feet of ladders were used in drills. A total of 562 man hours was spent in training.

C. Safety and Security

Three minor injuries occurred in Personnel Practices during the month; two of them to a duplicating operator and a third one to a motor messenger.

There were no security violations in Employee Relations Operation during May.

D. S. Roberts, Manager
Employee Relations

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END

**DATE
FILMED
9/17/92**