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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

JULY, 1957

GENERAL SUMMARY

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PRODUCTION

The separations plants operated according to established schedules; however, the charging of low exposure uranium reduced plutonium output to 95% of the official forecast. The lower exposure uranium was charged in order to provide optimum feed conditions for the start-up of the new continuous Task I facilities in the 234-5 Building. On July 4 a general low level fallout of fission products occurred from the Purex plant stack. The fallout was promptly detected and personnel protection and decontamination measures were initiated. Cause of the fallout has not been firmly established.

Although the shipping schedule for UO_3 was exceeded, the production of UO_3 was 92% of the official forecast as a result of numerous equipment problems encountered in the operation of the continuous calciners. The gas-fired calciners were returned to service during the month.

ENGINEERING

At the request of the Atomic Energy Commission, the technical and economic feasibility was evaluated for the recovery of plutonium from the underground stored wastes. It was concluded that the recovery of the plutonium in the stored wastes is probably technologically feasible but prohibitively expensive. There appears to be little incentive, therefore, to undertake the required development and construction programs, since the predicted recovery costs of about \$160 per gram would exceed the value of the plutonium recovered.

Completion of the Purex plant prototype plutonium concentration continuous ion exchange equipment was delayed beyond the target date of August 1, 1957, by a complete work stoppage of Minor Construction pipefitters for the entire month of July. Other craft work is essentially complete.

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A week-long run made in the laboratory-scale continuous ion exchanger during the past month provided further confidence in the Purex anion exchange process. Operation was chemically satisfactory in all respects over the temperature range of 50 C - 70 C and over the feed acidity range of 5 M - 7.2 M HNO_3 . The equipment is operable in excess of desired Purex flow rates. Difficulties may be anticipated in the operation of inlet and outlet stream filters.

Conceptual design on a prototype ion exchange bed for plutonium recovery from the Purex LWW stream is underway. The final pressure drop data have not been established as yet, but preliminary estimates indicate that there is sufficient height to allow gravity flow through a single critically-safe column at a capacity factor of 3.2. Operation with a single column at a capacity factor of 4.0, however, is questionable. Two instrument development problems remain; a method of determining the Pu loading on the resin, and a method of determining the depth of the resin bed.

A silver-nitrate reactor having a remotely replaceable packed capsule was designed and approved for use in Purex operations. It is estimated that the use of this type capsule will involve a savings of approximately \$30,000 per replacement.

An important resolution in the chemical processing of E metal was made with the definition of limiting nuclear-safe dimensions for slab and annular dissolver design concepts. The annular concept now offers a promising dissolver design for obtaining the Redox Phase III rate criterion with either E metal, I and E elements, or conventional solid slugs.

The installation of the temporary continuous Task I and Task II hood in the RG Line is essentially complete and initial start-up underway.

All design activities on Project CG-745, RMC Metal Fabrication Line, were terminated during the month due to a lack of funds. The overall design progress on the project was approximately 73% complete.

The final drafts of the engineering report and conceptual design drawings have been completed covering the proposed critical mass laboratory.

A five year forecast of Plant Acquisition and Construction Project work, as well as equipment project work, was completed and issued in July. This forecast is believed to be the first of its kind at HAPO inasmuch as the basic cost components of each potential project have been scheduled by quarters in chart form.

GENERAL

Approval was received from HOO AEC during the month to place the Bismuth Phosphate Plants (B and T) in Standby Condition IV.

A special comparison of June's cost with the normal going rate was transmitted to the local AEC in order to illustrate and explain the impact normal year end adjustments and activities have on costs.

[REDACTED]

During July, the Manager, Internal Audit, was assigned to a HAPO Task Force, established by the General Manager, HAPO, in order to obtain pertinent data, concerning some 21 jobs being performed by plant maintenance forces. The Task Force was formed at the request of the HOO-AEC as a result of a request for data by the Regional Attorney, Department of Labor, as an aid in reviewing the Davis-Bacon aspect of the work. Seven of the jobs in question involve CPD maintenance forces.

A 1.77 adder adjustment in the non-exempt wage rates was made effective July 29, 1957. All chemist type positions were reclassified to professional status. Organization analysis work and a resultant proposal for reorganization of the Employee Relations Operation was completed.

Action was initiated to relieve the General Electric Company of management responsibility of the 213 J & K magazines. Advice as to the procedure for effecting the transfer is expected from HOO-AEC.

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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. Groszwith
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

CHEMICAL PROCESSING DEPARTMENT

NUMBER OF EMPLOYEES

JULY 31, 1957

<u>OPERATION</u>	<u>EXEMPT</u>		<u>OTHER</u>		<u>TOTAL</u>	
	<u>6-30-57</u>	<u>7-31-57</u>	<u>6-30-57</u>	<u>7-31-57</u>	<u>6-30-57</u>	<u>7-31-57</u>
GENERAL MANAGER'S GROUP	10	10	1	1	11	11
PRODUCTION	7	7	4	4	11	11
PUREX	43	43	260	253	303	296
REDOX	54	55	295	295	349	350
FINISHED PRODUCTS	57	56	326	328	383	384
POWER AND GENERAL MAINTENANCE	46	46	275	261	321	307
FINANCIAL	22	22	48	48	70	70
FACILITIES ENGINEERING	79	80	29	28	108	108
RESEARCH AND ENGINEERING	68	67	26	26	94	93
EMPLOYEE RELATIONS	32	32	59	56	91	88
	418	418	1323	1300	1741	1718

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DECLASSIFIEDCHEMICAL PROCESSING DEPARTMENTPATENT SUMMARY
FOR
MONTH OF JULY, 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.

INVENTOR

C. R. Anderson

TITLEVariable Lattice Control Means
For Nuclear ReactorsACTING GENERAL MANAGER
CHEMICAL PROCESSING DEPARTMENT

CHEMICAL PROCESSING DEPARTMENT
PRODUCTION OPERATION

July, 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

Although the separations plants processed uranium in excess of the amounts scheduled, increased building inventories and the charging of low exposure uranium reduced plutonium output to 95% of that forecasted. The lower exposure uranium was charged in order to provide a more uniform feed material to the new continuous Task I facility in the 234-5 Building, the startup of which is imminent. Operation of the separations plants was normal excepting for a short period during the latter part of the month when relatively high radiiodine emissions were encountered in Purex plant during a processing test of younger irradiated metal.

Operation of the continuous calciners was hampered by numerous equipment difficulties, and UO_3 production was 92% of the forecast. During the month the gas-fired calciners were returned to service to supplement the continuous calciner production. The shipping schedule for UO_3 was exceeded during July.

Production Operation SS Material Management Procedures were prepared and issued in document number HW-50300-L. The efforts of other concerned Operations in the Department were coordinated to meet the requirements of the SS Accountability Operation.

Production charts and a narrative presentation were prepared for presentation to the Military Liaison Committee during July.

1. Purex Operation

Tons uranium delivered to storage
Average production rate per operating
day (tons)

<u>July</u>	<u>June</u>
357.6	369.1

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1. Purex (Continued)

	<u>July</u>	<u>June</u>
Average yield, %		
Uranium	98.1	97.2
Plutonium	93.5	95.2
Total Waste Loss, %		
Uranium	0.25	0.17
Plutonium	0.85	0.73
Average cooling time (days)	114	121
Minimum cooling time (days)	70	107
Percent operating time	78.3	92.0

2. Redox Operations

	<u>July</u>	<u>June</u>
Tons uranium delivered to storage	171.8	100.2
Average production rate per operating day (tons)	8.4	10.4
Average yield, %		
Uranium	100.7	100.6
Plutonium	87.4	102.2
Total Waste Loss, %		
Uranium	0.23	0.18
Plutonium	0.57	0.69
Average cooling time (days)	118	124
Minimum cooling time (days)	108	107
Percent operating time	66.2	32.2

3. 234-5 Operations

	<u>July</u>	<u>June</u>
Batches completed through Task I	394	393
Batches completed through Task II	378	403
Runs completed through Task III	189	197
Reduction yield, %	87.82	98.01
Waste disposal (units)	448.81	344.77

4. UO₃ Operations

	<u>July</u>	<u>June</u>	<u>To Date</u>
Uranium accepted (tons)	448.65	501.12	21,506.79
Uranium shipped (tons)	448.80	399.79	21,299.09
Average cooling time (days)	124	130	
Minimum cooling time (days)	114	113	

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5. Power

	<u>200 East</u>	<u>200 West</u>
Raw water pumped, gpm	8,484	4,621
Filtered water pumped, gpm	1,579	930
Maximum steam generated, lbs/hr.	206,000	92,000
Average steam generated, lbs/hr.	135,320	68,468
Total steam generated, M lbs.	100,677	50,940
Coal consumed, est. (tons)	6,412	3,492

6. Waste Storage

	<u>Equivalent Tons U</u>	
	<u>July</u>	<u>June</u>
Salt waste reserve storage capacity - Redox	8,051	8,149
Salt waste reserve storage capacity - Purex	6,465	6,519
Coating waste reserve storage capacity-Redox	15,991	16,163
Coating waste reserve storage capacity-Purex	4,959	5,317

B. Production Planning and Scheduling Operation

A report was issued on the economics of Task I recycle processing in CPD. Unit processing costs were derived for recycle processing at Redox, Purex and Recuplex. Capacity assumptions were developed for the Recuplex facility from which, along with unit cost data, optimum recycle processing schemes were determined. Indications are that, following reduction of the presently accumulated slag and crucible backlog to a normal level, economic advantages may be realized by operating Recuplex on a 10 shift per week basis.

A new official quarterly forecast covering a five year period which will become effective August 1, 1957 is being prepared.

Arrangements have been made to procure seven additional railroad flat cars. The cars have been made available by another government agency.

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B. Production Planning and Scheduling Operation (Continued)

During July the self-concentration of Purex waste in tank 103-A continued; however, a net increase of 74,000 gallons was experienced as a result of adding 373,000 gallons of water to maintain the liquid level above the bottom circulators. Since self-concentration began in July, 1956, the space reclaimed in A Farm amounts to 2,426,000 gallons (67.9% of total Purex waste stored in A Farm) as compared to 3,767,000 gallons (32.5%) reclaimed at SX Farm where self-concentration started in November, 1954. The latter figure was revised this month in order to discount previous credit for water boil-off, included in self-concentration in the past. Consequently, in this and future reports the term self-concentration will be used to denote recovered storage space resulting from salt waste boil-off and will exclude from the calculation such extraneous additions as condensate, water, etc. added solely to maintain liquid level in a tank. After transferring 234,000 gallons of waste from 101-A to 106-C, Purex salt waste was routed from the building to tank 101-A on June 26, 1957. The tank contents started boiling July 14, 1957.

C. Essential Materials

The decision to reactivate the gas-fired calciners at the UO_3 plant required that the activities connected with the lay-away of the propane storage equipment be suspended.

It has been determined that propane is available by railroad tank car and delivery of the initial car is scheduled for August 5, 1957. The transfer spot at T Plant has been prepared for safe handling of the propane. The delivered price via tank car has been calculated at 14.4 cents per gallon; the delivered price in small trucks has been 19.5 cents per gallon. Annual savings are estimated to be \$4,000.

Savings of \$13,502 were reported for FY 1957. These are as follows:

1. \$4,542 by receiving caustic soda in tank trucks. The net savings is \$3,542 since expenses of \$1,000 resulted from equipping the plants for tank truck deliveries.
2. \$270 by volume ordering ferrous sulfamate solution.
3. \$1,386 by buying ferrous sulfamate solution in larger containers.
4. \$8,304 by buying as much nitric acid as possible in the first year of a three year contract.

D. Reports and Documents

1. Prepared and Issued

HW-51310	Essential Material Consumption - June, 1957 - Purex Plant, M. A. Thress
HW-51311	Essential Material Area Report to Cost and Purchasing - June, 1957, M. A. Thress
HW-51312	Essential Materials Ordered, D. E. Peterson
HW-51198	UO ₃ Plant Production Schedule - July, 1957, B. F. Campbell
HW-51199	234-5 Building Production Schedule - July, 1957, B. F. Campbell
HW-51200	Redox Plant Production Schedule - July 3, 1957, D. McDonald
HW-51201	Purex Plant Production Schedule - July 3, 1957, D. McDonald
HW-51348	Chemical Processing Department Waste Status Summary for May, 1957, R. E. Roberts
HW-51656	Economics of Task I Recycle Processing, July 19, 1957, B. F. Campbell
HW-50300-L	Production Operation SS Material Management Procedures, H. F. Tew
HW-51193	Production - June, 1957, H. F. Tew
CLVI-16	Hanford Separations Capacity Study, July 3, 1957, J. H. Warren

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 July, 1957.

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C. Security

There were no security violations in the Production Operation during the month.

- D. Members of the Military Liaison Committee visited HAPO and the Chemical Processing Department during the month.

VR Chapman
Acting Manager
PRODUCTION OPERATION

CHEMICAL PROCESSING DEPARTMENT
PUREX OPERATION

July, 1957

I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Processing Experience

1. Normal Processing

The plant continued in operation from the June production period at a 1.92 CF until July 13, when a scheduled shutdown was taken to coincide with Finished Products Task I conversion plans. Processing was resumed on July 20, at a 1.44 CF and continued through the month. On-line efficiency was 78.3 percent. The July production commitment was exceeded by 2.2 percent. Extraction column waste losses for plutonium averaged less than 0.3 percent the majority of the operating period, but losses experienced from process tests, two periods of column instability, and flushing operations raised the overall loss to 0.85 percent for the month. The overall uranium loss to waste for July was 0.25 percent. Product quality was excellent throughout the run period.

Immediately preceding the scheduled outage of July 13, a flood of the final plutonium cycle 2B column allowed organic to enter the plutonium stripper and concentrator. No indication of the flood was apparent from the 2B column instruments, and the difficulty was diagnosed primarily from erratic operation of the stripper and concentrator. Approximately 64 liters of solvent, containing about 10 Kg's of plutonium, were accumulated and are being held pending the development of a scheme for efficient recovery. An additional 7 Kg's of plutonium were removed by subsequent aqueous flushes. This material was recovered by processing through Recuplex.

Difficulty was experienced in maintaining a 1.92 CF dissolving rate with two units (A cell dissolver out of service due to a plugged silver reactor) early in the month. The situation was alleviated by an increase in the dissolver heels and changes in dissolving procedure which shortened the dissolver time cycle by 1-1/2 hours. The A dissolver was returned to service the latter part of the month after the plugged silver reactor had been cleared by ammonium hydroxide and water flushes.

Dissolving operations were stopped prior to the July 13 shutdown to reduce dissolver heels and feed stocks through the E5 tank to a minimum. This action was taken in conformance with a new plan

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to zero the head end SS inventory at least every three months to re-establish the accountability base.

Self-generated heat in the 241-101-A underground waste storage tank was sufficient to produce boiling during the month. Salt wastes were introduced to this tank near the first of June. When the liquid level in the tank reached the suction of the liquid recirculators, their use was initiated and a minor "burp" occurred. The rapid boiling was similar to that experienced in 103-A tank when the recirculators were started after a period of idleness. Boiling in the 241-103-A tank continues at a rate of about ten gallons per minute.

2. Special Processing

During the scheduled shutdown period an attempt was made to evaluate the performance of the prototype silver reactor in C Cell by measuring radio-iodine in the off-gas during dissolution of metal with a cooling time of 72 - 84 days. Eighteen tons of this material were charged to the dissolver. During two separate dissolution periods samples taken at the mid-point and downstream of the reactor showed insufficient iodine activity for reliable analysis. During this period 291 stack emissions totaled 0.1 curies of radio-iodine for the entire plant. Following the plant startup on July 20, I_{131} stack emission increased to more than four curies per day for a three-day period (July 20 through 22). Inasmuch as the dissolver off-gas monitors failed to confirm the high emission rates it was assumed that the iodine was released from the short-cooled metal solution via the vessel vent system. Five batches of uranium produced from the short-cooled metal were isolated to permit U_{237} decay prior to shipment to the UO_3 calciners.

Approximately 1600 units of plutonium were reworked within the building as a result of leakage from a plutonium sampler tank circulating pump (L-9) to the hood floor. Eight tons of out-of-specification uranium collected in June were reprocessed through the final uranium cycle by increasing the feed rate to this cycle for two days.

During the shutdown the acid waste concentrators were emptied for work on the condensate trap pits; R cell equipment was given a nitric flush; the final uranium cycle 2D column was thoroughly flushed; and the #1 organic system was washed with a permanganate-carbonate solution. A flush of the final plutonium 2B column was also made, removing approximately 1.4 Kg's of plutonium.

B. Radiation Experience

1. Radiation Occurrences

Five radiation occurrences were experienced during the month. The first case was a general low level fission product fallout

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during the undressing operation following job completion.

C. Mechanical Experience

1. Remote Crane Wheel Bearings

Two idler wheel bearing failures were experienced on the light end of the remote crane on July 12 and 17. The first failure occurred while the crane was being operated; the second was detected during inspection. Creepage of the Rollway bearing inner race on the wheel axle caused the race to contact the bearing housing, and resulted in bearing failures and damage to one wheel axle. Two new bearings and one complete wheel assembly were required to effect repairs. Keeper plates were installed on the end of each axle to prevent the inner races from creeping off the shaft. Similar plates installed on the wheels at the cab end of the crane in January 1956 proved adequate to restrain inner bearing race creepage.

2. Concentrator Steam Traps

Nine concentrator steam traps, located in the condensate pits south of 202-A building, were reconditioned during the scheduled shutdown. These traps had been bypassed in the preceding run period because of malfunction. Examination of defective units disclosed extensive corrosion to the internal mechanisms which necessitated replacement of most of these parts. Severe corrosion was also evident in the trap castings, as well as in the inlet and outlet piping. Facilities Engineering was requested to determine if better materials are available for this service than those presently installed and to determine the extent of corrosion of the buried steel manifold which collects condensate from all pump and trap pits at the rear of the building.

3. Condensate Pit Sump Pumps

Three pump failures were encountered in the steam condensate pits south of the 202-A building. Subsequent inspection revealed loose bolts in the pump columns, broken impellers, and excessive wear to shafts and bearings. The standard practice of bonding bolts on pump columns with wire lacing was not adhered to at the time of the original installation; consequently, the bolts loosened from vibration, causing damage to impellers, shafts, and bearings. Appropriate action was taken to preclude the possibility of similar failures from this cause.

4. Air Compressor - 241-A

The #1 Allis Chalmers rotary air compressor at 241-A was dismantled on July 23 to investigate the cause of noisy operation and overheating. Internal inspection revealed excessive wear of the rotor blades and slight bearing damage. It was determined that overheating was caused by malfunctioning of the solenoid valve which

controls cooling water to the compressor jacket. To eliminate overheating from this cause an orifice was installed in the by-pass line to assure a supply of cooling water at all times. The compressor operated satisfactorily following the replacement of the eight damaged rotor blades and bearings.

5. L-3 Tube Bundle

The L-3 tube bundle in the plutonium concentration package was regasketed on July 18 due to a slight leak at the top flange. Inspection of the original flexitallic gaskets revealed corrosion deterioration. Since similar failures have been observed before, teflon gaskets were substituted.

6. 241-A Waste Farm Vapor System

Several small leaks developed in the drain leg and body of the de-entrainer vessel in the off-gas vapor line from the underground waste storage tanks. Replacement of the vessel and inspection of the buried vapor header has started.

D. Analytical Control Experience

Considerable increase in the analytical work load resulted from the presence of organic solvent in the product solution just prior to the July outage (See IIA, 1, above). Many samples of supposed aqueous streams contained varied percentages of organic material and required some ingenuity and adaptation of analytical procedures to determine total plutonium content.

A comparison was made of analytical results obtained from standard Gilmont samples of D-2 (coating waste) material and from larger bulk samples of the same material. The study was undertaken to check the validity of the uranium and plutonium values from the accountability viewpoint. No significant difference was found between the two sampling methods.

An intensive review was made of all methods using standard curves. Recalibration was performed on the X-ray photometer curve for plutonium and on the tributylphosphate curve as determined by the oscillometer. All other methods were found to be in good control.

During the past month a new test for solvent quality, the plutonium retention test, was received from the Research and Engineering Process Chemistry group and placed in service.

E. Improvement Experience

(For more detailed information in these and other items see the Research and Engineering portion of the Chemical Processing Department report.)

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1. Process Tests and Revisions

The following program has been initiated to better define the parameters of high activity waste self concentration and permit optimum utilization of available waste tank storage space.

- a) Carbonate wastes were routed to tank 241-A-102 on July 5.
- b) Corrosion coupons and concrete specimens were placed in tank 241-A-103. (Coupons were removed on 7-26-57 for testing).
- c) A temperature profile device was installed in tank 241-A-103 on July 26, 1957.
- d) Routine waste tank liquid and vapor phase sampling for pH and oxides of nitrogen was started.
- e) The sodium molarity in tank 241-A-103 is being increased incrementally to determine its effect on sludge formation and nitrogen oxide evolution.
- f) Laboratory studies of the NO₂ and sludge formation problems are being accelerated.
- g) A continuous NO-NO₂ monitor is being fabricated and will be installed in the tank farm condenser vent system.

Backcycling of the 2WW waste stream to the HA column feed for routine product recovery was tried for the third time. Three consecutive batches of HA feed, containing a total of 35 units of plutonium from the 2WW stream, were processed. High HCW losses, peaking at 0.93 percent, plus instability in several columns, resulted. A total of approximately 70 units of plutonium were lost in the HCW during this test.

After the desirability of sulfuric acid addition to the HCX stream was established, the nitric acid concentration of the stream was reduced from 0.1 M to the original 0.01 M flowsheet value and the 1AF nitric addition increased to maintain the 1AF acidity. A slight reduction in the HCW losses was noted.

The sulfuric acid concentration in the HCX stream was increased to .005 M and decreased in the 2EX stream to .0035 M. A slight additional waste loss reduction in the HCW was observed. The decrease of sulfuric acid to the 2EX was made to reduce the sulfate ion concentration in the final product and thus minimize the possibility of plutonium sulfate precipitation in product containers.

Nitric acidity of the 2EX was slowly increased from 0.01 M to 0.15 M to reduce the possibility of a polymer formation in the column. Waste losses were not affected.

At month end, adjustment of the 2AF acidity by nitric acid addition

to the IBS column rather than to the J5 (2A feed) tank was under evaluation. Acid addition to the IBS column offers the following advantages; 1) complete interchangeability of UO_2 recovered acid and Purex recovered acid in the building; 2) increased stability of the IBS column with the possibility of greater throughput capacity. A possible control of the fission product split between plutonium and uranium may also result. Initial test results are favorable.

A permanent head tank for sulfuric acid addition to the HCS stream was installed and put into service.

2. Inventions and Discoveries

No inventions or discoveries were reported in the Purex Operation during July.

F. Events Influencing Costs

An appraisal of the essential elements of the Power Operators' duties at Purex led to the consolidation of activities, and the total complement of Power Operators was reduced from ten to seven. An annual savings of approximately \$21,000 in labor costs will result.

III. ORGANIZATION AND PERSONNEL

A. Safety

There were no disabling injuries or serious accidents at Purex during July. A total of nine medical treatment injuries were reported.

To promote interest in safety and permit all personnel an opportunity to express safety ideas, a Safety Display Case was installed in the Purex building entrance lobby. Displays are changed every two weeks, with each Purex component assuming responsibility in turn for the display.

B. Security

There were no security violations during the month.


MANAGER
PUREX OPERATION

OC Schroeder:JCG:gt

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CHEMICAL PROCESSING DEPARTMENT
REDOX OPERATION

JULY, 1957

I. RESPONSIBILITY

Effective August 1, 1957 responsibility for the Bismuth Phosphate Plants (T & B) is to be transferred from the Redox Operation to the Power and General Maintenance Operation. The transfer of property and equipment has been completed and all parties concerned have been notified.

II. ACHIEVEMENTSA. Processing Operation1. Production Rates and Operating Continuity

The Redox Facility was scheduled for continuous operation from 7-8-57 through 7-31-57. Processing was started on 7-8-57, at a rate of 80% of nominal, and was continuous at this rate until 7-21-57. At this time the process was shutdown due to the plugging of the backcycle jumpers to the 1-A and 1-S columns and the subsequent failure of the D-14 backcycle pump. Unplugging of the jumpers and replacement of the D-14 pump were completed on 7-25-57 and operations were resumed at a rate 80% of nominal. On 7-27-57 the processing rate was increased to 100% and remained so for the balance of the month.

The mechanical efficiency for the period during which the facility was scheduled to operate was 86% while the overall operating efficiency for the entire month was 65%. The production commitment for the month was exceeded by 1%.

The shutdown period at the beginning of the month was utilized to perform extensive decontamination work in the facility. These efforts were largely confined to the canyon proper, the crane maintenance platform, crane-way, sample galleries, and the railroad tunnel. The general radiation levels in these areas were significantly reduced by this effort.

All product produced during the month was within shipping specifications, however, 13 batches of UNH had higher gamma ratios than desired and were ozonated and blended to meet shipping specifications. Waste losses were lower than normal for the month, although two batches of waste exceeding normal throw away limits were discarded. These two batches of above normal waste were attributed to the malfunctioning of the 1-A and 1-S columns at the time the backcycle jumpers plugged. The plutonium losses to waste streams represented 0.32% of

the month's plutonium production, while the uranium losses represented 0.20% of the uranium production.

The iodine 131 emission to the Redox stack during July averaged 0.56 curies per day of dissolver operation with metal cooling periods of 107 to 127 days. Evidences of iodine break-through on the B-3 and A-3 reactors occurred on 7-11-57 and 7-15-57 respectively. In each case, reactor regeneration procedures were immediately initiated. Although the A-3 reactor was regenerated twice and the B-3 reactor three times, these two continued to be the main source of the iodine emitted throughout the month. Since regeneration procedures have not been effective, installation of replacement units is now being considered.

The processing shutdown which occurred on 7-21-57 and extended through 7-25-57, due to the plugging of the backcycle jumpers and the subsequent failure of the D-14 pump, was delayed approximately 16 hours as a result of a total power loss to the 60-T Crane. The crane failure occurred when the current collector wheels jumped off the trolley cable and placed a severe bend in one of the trolley cables.

The second shipment of Chalk River fuel elements was received on plant site on 7-31-57. At month end plans were being formulated to process this material through the C dissolver.

2. Equipment Experience

a. F-2 Tube Bundle

On 7-8-57, a leak developed in the left hand tube bundle of the F-2 concentrator. Since operating conditions made it undesirable to immediately change the tube bundle the defective unit was blanked out and concentration effected by using only the right hand tube bundle. The failed bundle will be replaced during the next scheduled shutdown.

b. H-4 Coil Bundle

On 7-8-57, a rise in the Jordan instrument which monitors the condensate and cooling water from all boil up vessels in the 202-S Bldg. indicated a leak in the H-4 coil bundle. The unit was replaced on 7-11-57 without loss of production time and without incident.

c. H-4 Weight Factor Jumper

The H-4 weight factor jumper failed due to an in-cell leak on 7-17-57. Replacement was made on 7-19-57 and subsequent operation has been satisfactory.

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d. Plugged Backcycle Jumpers (1-ABS & 1-SBS)

On 7-21-57 the backcycle jumpers to the 1-A and 1-S columns became plugged during routine processing operations. No reason for the plugging has as yet been determined. Clearing of the plugged jumpers was effected by draining a 10% nitric acid flush of the 1-A and 1-S columns back through the jumpers to the D-14 backcycle concentrator vessel. Subsequent operation has been satisfactory indicating the flushing procedure was successful in removing the restrictions.

e. D-14 Backcycle Pump

On 7-21-57, the D-14 pump failed due apparently to a seized shaft. Efforts to free the pump with steam were unsuccessful and on 7-22-57 a new pump with glass bearings was installed. This is the second installation of a glass bearing pump in the Redox Facility. The first was in the F-1 position on 4-9-57. Both of these units are currently operating satisfactorily.

f. G-5 to H-2 Jet Jumper

During the early part of July considerable difficulty was experienced in getting the G-5 to H-2 jet to pick up. On 7-21-57, all efforts to make the jet pick up were unsuccessful and a new jet jumper was installed. At this writing, the new unit is performing in a satisfactory manner.

g. Steam and Air Jumper to G-5 to H-2 Jet

After the installation of a new G-5 to H-2 jet on 7-21-57, it was found that the gaskets on the steam and air jumper to this assembly were leaking badly at the wall connector. Attempts to regasket and reinstall the jumper were unsuccessful and on 7-22-57 a new jumper was installed.

h. Dissolver Coil Outlet Jumper

On 7-24-57, a new coil outlet jumper on the "A" dissolver was installed because of a bad leak at the weld above the lower head. Investigation as to the cause of this failure has revealed that the water segregation jumpers in the dissolver coils are vibrating excessively at the point of water injection. A complete redesign of these jumpers is currently under consideration.

B. Maintenance Operation

1. Operating Continuity and Equipment Maintenance

The facility operated at a mechanical efficiency of 86% during

the period of scheduled operation.

Canyon equipment replaced during the month included the H-4 Oxidizer coil bundle, the D-14 backcycle pump, and four jumpers.

2. Inspection and Maintenance

A total of 232 inspection cards were issued during the month, of which 116 were returned by the respective foreman, together with 76 from previous months. At the present time 222 inspection cards are outstanding, the majority of which are in the instrument group. This increase over previous months is due to the lack of available manpower. As replacement manpower is obtained, this backlog of outstanding inspections is expected to be reduced to a normal level.

Considerable trouble was experienced this month with the optics on the 60-T canyon crane. Replacement of both the left and right hand optic heads was necessary in order to increase the visibility of the crane operators. Difficulties were also experienced with the rotational mechanism on the left hand optic on 7-23-57 and again on 7-31-57, necessitating extensive repair before satisfactory operation was again established.

On 7-23-57 a total power loss to the 60-T canyon crane occurred when the current collector wheels jumped off the trolley cable. This caused one support bracket to be badly damaged, a supporting insulator to be broken and a severe bend in one of the trolley cables. Repairs were completed on 7-24-57 and subsequent operation has been satisfactory. Improved radiation working conditions on the crane with respect to time limits permitted repairs to be made in approximately 16 hours. Previous to the extensive canyon and crane decontamination program, which was initiated during May, it is questionable whether this work could have been completed inside of two weeks.

On 7-29-57, a second electrical failure was experienced on the 60-T canyon crane when the insulation on the crane charging wrench became so worn that it shorted out. Repairs were effected by splicing in a new section of cable.

The D-14 backcycle pump which failed on 7-21-57, probably due to a bearing seizure, was replaced with a glass bearing pump. This is the second glass bearing pump installed in the Redox Facility, the first having been placed in service on 4-9-57 in the F-1 feed tank position. The D-14 installation was made in an effort to resolve the frequent pump failures in this position.

Following the installation of the D-14 pump, noted above, it was found that the D-14 thermohm jumper could not be installed due to a bent head. A new rigid jumper was

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fabricated, however, this jumper also failed to make up properly and after repeated attempts at installation was finally abandoned. A flexible jumper was subsequently fabricated and installed on an adjacent wall connector before satisfactory operation was again established.

The P-106 nitric acid transfer pump, located on the 3rd level AMU, in the 202-S Building, was relocated to the P-508 position because of its proximity to an electrical switch gear panel. This precautionary measure was taken to eliminate a potential failure in critical electrical equipment should a nitric acid leak occur.

C. Waste Handling and Decontamination Operation

1. Waste Handling

a. <u>200 East Area</u>	<u>Gallons</u>
Waste Scavenged	912,000
Waste Received (Purex Coating)	202,000
Waste Received (Purex Start-up)	170,000
Waste to Ditches	1,570,000
Waste to Cribs	None
b. <u>200 West Area</u>	<u>Gallons</u>
Redox Coating Waste Received (U Farm)	23,375
Salt Waste Received (SX Farm)	187,737
Waste Transferred from S Farm to U Farm (Redox Coating)	200,000
Total Gallons Boil-Off Salt Waste	160,239

2. Equipment Decontamination

a. Regulated Steam Pit

A total of 7 pieces of equipment and 14 vehicles were decontaminated during the month. The total manhours charged to decontamination work was 236. Of this total 80 hours were charged to railroad decontamination work and timekeeping at Riverland.

b. 221-U Building

Two Redox pumps were decontaminated in the 221-U Canyon during the month. Radiation levels were reduced from 8.5 rads/hr to a maximum of 150 mr/hr at 2 inches. These units were cleaned with a solution of caustic and permanganate followed by a nitric acid wash. Inspection after disassembly of the first unit by Engineering and Operation Personnel revealed bearing failure, which in turn scored the shaft. Repair work on this unit is

now in progress.

Two pieces of equipment (one pump and one agitator) are being shipped to the 221-U Building from the Purex Plant for decontamination and repair. These units are expected early in August, 1957.

3. T and B Plant Lay-Away

Approval of Standby Condition IV for the Bismuth Plants (T & B) was granted this month by the A.E.C. Effective August 1, 1957 the responsibility for these plants is to be transferred to the Power and General Maintenance Operation. The transfer of property and equipment has been completed and all parties concerned notified.

4. Purex Waste Handling

A total of 256,000 gallons of Purex coating waste was transferred from the 105-C tank to the 112-BY tank for permanent storage. Forty manhours were charged to the Purex Operation for waste handling during the month of July.

5. Redox Waste Handling

A total of 200,000 gallons of Redox coating waste was transferred from the 107-S tank to the 107-U tank for permanent storage. Prior to this transfer a periscope inspection was made of the 107-U tank for structural condition. This inspection was made by both Engineering and Operational personnel and the tank was found to be in good condition.

6. Waste Scavenging

A total of 912,000 gallons of waste was scavenged during the month representing 91.2% of the forecast. Production was again limited by the availability of settling tanks. Two additional settling tanks have now been activated at C Farm and the installation of piping to the tanks is currently in progress. These tanks, in addition to the three presently in use, will project the scavenging program in 200 East Area.

7. General

The drum filling facilities for nitric acid, sulphuric acid, and caustic were transferred from the 221-T Canyon Building to the 221-U Building this month. All present users of this service have been notified.

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D. Analytical Control Operation

1. Control Statistics

<u>Month</u>	<u>Samples</u>	<u>Determinations</u>
June	2621	5841
July	3177	7262

2. Building Maintenance

Principal 222-S and 219-S Building maintenance included repair of a steam leak in the 101 tank gang valve, installation of a sand guard around the 207-SL retention basins, repair of a steam sump jet in tunnel, installation of a combination glass and plastic hood window in room 4-E where hydrofluoric acid fumes were attacking the glass.

3. Equipment Experience

During the latter part of June considerable trouble was experienced with the isotron source and the electronic circuit of the mass spectrometer. The instrument was subsequently taken out of service and a general overhaul of the instrument is currently in progress. During the interim period the analytical analysis, requiring the use of the mass spectrometer, are being performed by the Hanford Laboratories Operation.

An Alpha Scintillation Counter (on loan from the Research and Engineering Group) is now being used for duplicate counting of radioassay discs. This program has been undertaken to aid the Process Chemistry Group evaluate the desirability of using these instruments for routine control.

4. Assistance to Process

Examination of a black solid deposit from a Redox steam line revealed it to be largely Fe_3O_4 (magnetite) presumably from corrosion. Results have been forwarded to operating personnel for evaluation.

Continuation of a previously started sampling and assay program has led to an apparent satisfactory practice in measuring the nitrate formation in the Redox inert gas system. Samples taken after the water cooling spray at the burner have shown an average nitrate concentration of 0.27 grams per 1000 cu. ft. with a concentration range of 0.11 g to 0.78 g. These figures indicate approximately 2 pounds of nitric acid entering the system each month. Experiments with variations in the burner air supply are now planned since it is possible that a small increase in the excess oxygen in the burner may decrease the nitrate

formation.

5. Analytical Procedures

Use of an electrically driven mechanical vibrator in the determination of packed density of UO_3 powder was adopted this month after extensive testing relative to the validity of analytical results. The mechanical vibrator eliminates the potential safety hazard in the previous method which required tapping the container on the bench top. In addition it provides a faster settling rate and a more readable surface.

Investigations conducted this month indicate that the addition of two percent lithium fluoride to the sodium fluoride flux used in the fluorimetric assay for uranium improved the precision of the method. This change has therefore been incorporated in the standard procedure.

Discussions have been held with members of Research and Engineering, Finished Products, Accountability and Hanford Laboratories in relation to a proposal concerning compositing of UO_3 carloads for isotopic content analysis. The method seems to be practical and will result in definite savings in analytical time. Details of the recommended procedure are now being worked out and will be adopted effective August 1, 1957.

E. Radiation Monitoring Operation

1. Radiation Occurrence Experience

A total of ten radiation occurrences were reported during the month. Of significance were three occurrences involving inadequate or no self monitoring during process sampling operations. In no case was the daily working limit of exposure exceeded. There were three instances of skin contamination, all of which involved particulate contamination during work on the crane. There were four RO's related to contamination spreads. The one with the greatest potential involved a plutonium spread in the 233-S Building loadout room where masks are not required for routine operation. Appropriate action has been initiated in the area of inadequate self monitoring and improved communications pursued in the instances of the contamination spreads. The problems involving particulate type skin contamination continues to be perplexing in that there is no apparent lack of care involved in the employees' work or in the way the protective clothing is being worn.

2. Personnel Exposure Experience

On a followup to the June canyon deck decontamination program the cell cover blocks were identified by lettering

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the key block. Personnel dose rates were 500 to 3000 mrad/hr for this work. The canyon was traversed from the west entrance to the east entrance for the first time in well over three years. The traverse was primarily of an inspection nature and the maximum exposure received was 70 mrad. Although there is considerable work to be done, it is felt that a major accomplishment has been performed in contamination control in the Redox Canyon. Repair work on the 60-Ton Crane following the 440 volt electrical supply breakdown was performed in personnel dose rates of 100 mrad/hr. Here again the personnel dose rates were relatively low and were a direct result of the extensive May decontamination program conducted on the Redox Crane.

3. Other Contamination Experience

Equipment decontamination in the U Plant canyon proceeded satisfactorily with the first pump being decontaminated from 8.5 rads/hr to 150 mr/hr at 2 inches. Actual repair of the pump was performed in reasonable personnel dose rates.

Skin contamination was slightly more prevalent this month as compared to previous months with seven of the nine cases related to crane work. As best can be determined considerable quantities of loose dust type contamination has built up in this general work area and unfortunately the Minor Construction activities on the crane maintenance platform have prevented any corrective measures on this contamination problem. It is hoped to bring this dust contamination problem under control as quickly as possible.

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

The air compressor at the 241-SX tank farms was changed from a belt drive to a direct drive during the early part of the month. This change has improved the air supply to such an extent that no shortage of compressed air has been experienced since the modification. Previously, frequent shortages occurred.

Two mechanical seals for the L-6 sample recirculating pump in the 233-S Building arrived from the vendor on July 18. One seal was installed on a spare pump in the shop where it underwent satisfactory operability tests. Due to the difficult working conditions encountered in the 233-S Bldg. Greenhouse, it is now planned to replace the entire pump

in the 233-S Bldg. rather than attempt the seal installation on the installed pump in its present position. Attempts will then be made to salvage the removed pump by installing the second mechanical seal. This will then provide a spare unit for this position.

With the concurrence of the Redox Technology Operation plans have been made to fill the 107-SX tank (currently Redox salt waste receiving tank) to a level of 22 feet before re-routing. At this time the air-lift circulators are to be turned off and the 107-SX tank will be used as a test tank for evaluating both bumping and sludge temperature effects. Maximum fill limits for other waste storage tanks will then be established on the basis of data obtained from this test.

Instrumentation at the SX tank farm has been very erratic since installation, and unplugging of the dip tubes has been very difficult and at times impossible as no bleed-off for flushing was provided when the installation was made. Work was therefore started this month on the installation of a test bleed-off system at the 107-SX tank, which it is felt will make possible unplugging of the lines.

Improvements started this month in the womens rest and lunch rooms to bring these quarters above standard, include replacing the outmoded stove, installation of a separate ventilation exhaust system with increased flow, and minor convenience features such as vanity benches and shelves. The tile floor and planned wall redecoration will give these rooms an attractive, clean appearance.

3. Inventions or Discoveries

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

G. Events Influencing Costs

The increased production quota for the Redox Operation during the month of July will result in a significant drop in unit costs for the facility as compared to previous month cost figures.

An SAR was issued this month to provide for the reduction of \$34,777 worth of spare electrical assemblies over the next nine months. After the stock has been depleted, the source of spares will be from a stock of component parts which were set up about two years ago. In addition to this, \$4,900 worth of obsolete charging yokes, pump and agitator parts were removed from inventory and excessed.

Experience has proved that the resultant savings from the installation of the isolation valves to the panel board gang valves in the 202-S Building may be much greater than originally anticipated. Prompt repair service is now possible to the gang valves because

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they can be isolated without taking a whole section of the building out of service by a steam shutdown. Currently a replacement of the seat is all that is required. Formerly the holder and sometimes the valve itself required replacement because the seat had been permitted to leak through until a steam shutdown would permit repair. This caused further damage to other valve components. Reduced steam loss will also result in additional savings.

A customer for intermittent analytical service has been found in the 234-5 Development, Research and Engineering Operation. It has been demonstrated that work involving use of the gamma ray spectrometer formerly done by Hanford Laboratories can be handled more expeditiously at the 222-S Building Laboratory. Procedures to handle this work on a routine basis were set up this month and future work, as required by the customer, will be performed in the 222-S Analytical Laboratory.

The financial report on installed spare equipment for FY 1957 for the Redox Operation indicates that \$106,044 was expended for pumps, \$43,800 of which was spent for the F-1 position and \$40,120 for the D-14 position. This means that 78% of the Redox pump expenditures for this period were for these two positions. Since April 13, 1957 a glass bearing pump has been operating satisfactorily in the F-1 position. A second glass bearing pump was installed in the D-14 position this month. Although the D-14 failures have been largely due to bearing seizure rather than seal leaks, it is felt that the failure in the D-14 position may also be corrected by the glass bearings. Should the glass bearing pumps prove successful in these two positions, the facility should realize a considerable cost savings in pumps for FY 1958.

A revision to the "Equipment Not in Construction" budget for the Redox Operation for FY 1958 has been submitted for approval. This revision requests an increase from the originally submitted budget of \$321,850 to \$385,000 and is due to a change in accounting practices whereby the FY budget is for moneys actually expended during the fiscal year. Carry-overs for commitments at the end of FY 1957 will now have to be absorbed by the FY 1958 budget.

H. Plant Development and Expansion

1. Design Liaison, Construction Checking

CG-643, Redox Capacity Increase - Phase III

All work previously authorized has been completed. Project Proposal Revision 2, requesting total project funds is now being routed within G.E. for approval.

CG-648, Redox Auxiliary Iodine Removal and Nitric Acid Recovery

The only work remaining to be done by the Labor Service Forces is minor alteration work occasioned by design

revisions. This work is mechanical work and has been held up by the pipefitter strike. Cold operability tests have been started.

CG-692, Modifications to 233-S Concentration Building

Approvals have been received from the A.E.C. increasing funds to \$120,000. Layout work has been completed, and some electrical work started on the auxiliary ventilation system. It is planned to concentrate on the ventilation requirements first because of the urgency of this portion of the project. The filter box is 90% complete at the White Bluffs Shops.

CG-722, Recovery Acid Receiving Station - Redox

The scope document, based on railroad tank car transportation, has been reviewed and the project proposal is nearing completion.

CG-718, Fission Product Recovery - B Plant

Document HW-50668, an engineering study of a Cesium Recovery Plant was issued this month. The study dwells on the conversion of B Plant to perform the wet chemistry phase of cesium recovery and the feasibility aspects of the project. Design scope of the wet chemistry phase was started July 1, 1957.

CG-764, Test Wells - 216-BC Crib Area

Work authority from the A.E.C. for this project has not been received. A request has been made by the commission that the project be managed by the A.E.C. rather than G.E. as originally proposed.

CG-720, Modifications to Redox SWP Facilities

Bids were opened on 6-27-57, with awarding of the contract to the Hale Construction Company at \$32,000 for the fixed price. This bid was well below the fair cost estimate of \$40,000. The contractor is to be on site by 9-1-57. Construction Operation has a good start on their portion of the work, having raised the ventilation duct work at the east end of the 202-S Building to clear the new structure and having made the opening through concrete to the sample gallery for a dummy elevator.

CG-657, Improvements to Redox Ventilation Plant

Both cell ventilation units have been received, tested and stored in the 2101 Warehouse. The crane switchgear enclosure has been completed. The project was closed out effective 7-31-57 with two (2) deviations and one exception:

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Deviations: (1) Platform to hold portable vent unit was not provided (2) Portable vent units were not installed in canyon. Exception: (1) Complete installation of the platform to provide access to the crane cab blower and enclosure blower filters.

CG-717, Transfer Facilities for Redox Non-Boiling Wastes

The Construction Operation has started excavation for pump pits and pipe trenches at the 241-SX Tank Farm. The domes of tanks 112, 114, and 115 have been exposed and forms built preparatory to pouring concrete.

P-126 PR Cage Reactivation

A decision has been made to fabricate a replacement plutonium concentrator of Phase I design in the event that the PR cage must be reactivated. The assumption is made, with concurrence of the Finished Products Operation, that the 20 g/l product of this vessel will be processed in Recuplex. This decision was reached when a \$4,500 estimate was received for design of a critically safe concentrator to produce the 100 g/l solution required for normal 234-5 Building operation.

P-127 Extended Backcycle

A work order has been issued to the Construction Engineering Operation for the design of the six jumpers required to route the 2 DW partition cycle aqueous waste to the F-2 partition cycle feed concentrator, as the first phase of an extended backcycle program as proposed in HW-48019.

P-129 "E" Metal Program

A "Plant and Equipment Analysis Report" has been written recommending preparation of a project proposal to secure funds for critically safe enriched-metal dissolvers in the Redox Operation. A design order has been issued in the amount of \$2,000 for preparation of the proposal. The report, taken from subject matter in document HW-48491, forecasts use of "E" metal dissolvers by 1-1-59 at a cost of \$800,000. This time schedule is not adequate to meet production schedules. One dissolver will be needed, not later than July 1, 1958.

I. Reports Issued

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

III. ORGANIZATION AND PERSONNEL

A. Safety

There were no disabling injuries, serious accidents or incidents

in the Redox Operation during July, 1957. Seven medical treatment injuries were reported during the month.

At the 202-S Building, a gate was installed across the opening on the loading dock by the dry chemical storage to prevent the possibility of the forklift truck being driven off the dock.

A design order was issued this month for the preparation of an informal request to provide fire protection equipment for the 222-S Building. Equipment requested includes a sprinkler system in the storage rooms on the duct level and drainage facilities for the sprinklers and detectors in the remaining space on the duct level. The use of fire resistant paint is also under consideration.

Job hazards of the more active analytical procedures used in the 222-S Laboratory have been reviewed and eleven procedures revised and rewritten.

Relocation of the UO_3 mixer to a standard analytical hood and the Roto-tap screening apparatus, used for determining particle size of UO_3 , to a modified junior cave has decreased the air contamination readings in room 4E of the 222-S Laboratory by a factor of 100.

Additional platforms were installed this month at each half level in the 202-S Building pipe shaft as an added precaution against the possibility of workman falling down the shaft.

On July 16th, Mr. K.A. Jones of the Travelers Insurance Co. made third party inspections of unfired pressure vessels in the Redox exclusion area. All vessels received a complete inspection except the Process and Instrument air vessels, which could not be taken out of service because the building was in operation. These vessels will be inspected at a later date. An official report will be forthcoming from Travelers on the status of Redox vessels, however, the inspector's verbal comments indicated all vessels in good condition.

B. Security

There were no security violations in the Redox Operation during the month of July, 1957.

C. Personnel Activities

Lillie S. Meyers, W-3495-6760, was named "Who's Who in Safety" for the month of June. Nomination was by Dorothy A. Ricketts, W-5321-6760.

On 7-19-57, 38 Technical Graduates and "Summer Hires" were conducted on a tour of the 222-S Analytical Laboratory and the

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202-S Processing Area.

J. L. Jackson, Shift Supervisor, Analytical Control Operation attended the Engineering Sessions of the "Data Processing Survey Course" at W-10 on July 8 and 10.

Nine Redox Operation Supervisors and Chief Operators attended "Labor Relations Conference No. 1", as presented by the CPD Training Group, during July.

C.E. Davis, Radiation Analyst, Radiation Monitoring Operation attended the Engineering Sessions of the "Data Processing Survey Course" at W-10 on July 15, 16, and 17.

Eight Supervisors of the Redox Maintenance Operation attended a "Maintenance Seminar", as presented by P.J. Norderhus and R.M. Shervem of the Facilities Engineering Operation, on July 18, 1957.

Chas. S. Grosz
Manager
Redox Operation

CT Grosz:HW Murray:sla

CHEMICAL PROCESSING DEPARTMENT
FINISHED PRODUCTS OPERATION
MONTHLY REPORT

JULY 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

Fabrication schedules were met but button production fell short of schedules by approximately 16%.

The production load continued at a level near the capacity of the plant. Feed was received from only the Purex plant for the first half of the month. Purex suspended operations for a week at mid-month for scheduled flushing and cleaning operations. Feed started coming from Redox on July 12, and continued steadily for a week when a shutdown for repairs was necessary. Deliveries were resumed a few days later. During the last ten days of the month feed was received from both Purex and Redox and higher rates were necessary in order to maintain this large production load. About twice as much material was also received from the Product Recovery Operation as was delivered from this source in June. The quality of the feed was maintained at a very high level during the entire month with the exception of seven Purex batches which were substandard due to column flooding. It was necessary to recycle part of this material in the Purex plant and part of it through Recuplex to make it suitable for feed to the RMA Line.

The production of plutonium buttons fell short of schedule by 16% this month. This negative variance was due to a combination of both process and equipment difficulties. About 7% of the underage was associated with buttons which failed to meet density specifications. Two percent was related to the processing of smaller than normal batches in wet chemistry and thereby limiting the capacity of the plant. Seven percent of the underage was due to equipment troubles which were so severe that schedules were affected. Firm plans have been established for recovering this underage in future months.

Equipment problems were unusually severe during the month in the wet chemical equipment. Delays were experienced due to plugged lines and valve failures early in the month and the plant was scheduled to work both the holiday as well as one Saturday in order to maintain schedules. Operations progressed smoothly for a few days,

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A. Metal Finishing Operation (Continued)

then difficulties again were experienced in the wet chemical equipment. In this case a broken hydraulic line contributed to a severe contamination spread and operations were interrupted for nearly two days. Mechanical interferences also developed as the result of installing new piping in a conveyor hood for connecting existing equipment with the new continuous type wet chemical equipment and some significant process delays were experienced until these troubles were corrected. The plant was scheduled to work another Saturday in order to compensate for these delays.

B. Product Recovery Operation

Successfully tested on nineteen runs, was an increase in dissolver charging from eight to ten reduction crucibles (S & C), alone and in combination with fluoride powders and casting crucibles. In order to maintain proper organic to aqueous specific gravity relationships, a reduction in the ANN salting strength was required. This, in turn, was compensated for by the increase in dissolved salts from the crucibles. To date there has been no ill effect on filtration rates of these solutions despite the decrease in ANN (which acts as a coagulating agent for the many silica fines) and only minor disturbances to the extraction columns. The tests will continue and increases to sixteen crucibles per charge are planned. Replacement of the D-2 dissolver, which failed in June, were completed and calibration initiated on July 31.

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B. Product Recovery Operation (Continued)

Extraction column performance was marred by the failure of two sets of bellows on the H-1 column, once on July 10 and again on July 16. A total of twenty-six hours apparent downtime was experienced. However, recovery of the solution spilled on the hood floor from these incidents and those of the preceding month caused frequent column flooding and additional lost time to account for an on-line efficiency of 80% and instantaneous rates averaging only 1757 liters/day. Waste losses were in control at 0.57%. Production through Recuplex was ca. 34.3 Kg of which ca. 14.8 Kg was metal scrap, 3.9 Kg from off-standard Purex feed, and 1.9 Kg from rag flushes, filter boat flushes, etc. It should be noted that scrap metal recovery effort has been curtailed due to the failure of the Hood 41 dissolver on July 19; a replacement is on order. The Hood 40 dissolver heater failed on the same day but repairs were effected quickly. Finally, the agitator shaft in G-58 tank (used for treating organic washes) bent without apparent cause; operation has continued without replacement (due in November) by increasing the heating cycle slightly.

Considerable effort was expended in trying to determine the cause for the six Kg plutonium underaccounting in June across the extraction section. It was found that the load-out valves were leaking through and, hence, more plutonium was being sent to Metal Finishing Operation than the record showed. Examination of their books did not substantiate this and it is theorized that the extra plutonium was compensated for by a shortage in the shipments from the parent plants.

C. Uranium Reduction Operation

Mechanical troubles continued unabated during July resulting in production being limited to 91.8% of schedule. The primary cause can be attributed to failure of the powder handling facilities to accomplish the required milling. There was sufficient material processed to meet the schedule, but remilling facilities were inadequate to rework all the material on hand which failed to meet particle size specification. However, commitments for shipping to the customer were met in all cases. A total of 365,520 pounds of 100% recovered nitric acid was transferred to Purex during the month. A backlog of UNH equivalent to 163.5 tons of uranium was on hand at various sites awaiting processing through the Uranium Reduction Operation.

Chief operating difficulties involved the powder handling system during July when as yet unexplained failures occurred resulting in about 150 tons of material being out of specification relative to particle size. The major portion of this material has been remilled to proper specification. Feed point plugging gave a great deal of trouble during the month and was aggravated by the failure of the feed filter system to function properly. Off-gas filters continue to plug resulting in considerable lost production time. At month end the fume vent header is again essentially plugged and a shutdown is scheduled for cleanout early in August.

Modifications to K calciner are complete and this unit will be activated early in August.

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C. Uranium Reduction Operation (Continued)

An experimental wet filter was installed in H Cell during July and has performed very well. The experimental system is somewhat undersized but has given very good results as a substitute for the dry-type Adams filter.

As about 90% of the feed point trouble seems to occur at the #4 location, L Cell was activated with No. 4 point blanked. The unit has operated satisfactorily with a decrease of only about 10% in the product output.

Foreign material (stud bolts) accidentally dropped into a calciner resulted in serious damage to one unit (L calciner) during the month.

The Engineering Task force four-shift coverage was discontinued during July when they were unable to ascertain any new information regarding the calciner operation. Maintenance forces were installed on a three shift basis to expedite repair work and eliminate excessive use of overtime.

As an aid to production, the Luckey Pots were activated for part of the month. About 35 tons of material was processed through these pots before it was necessary to shut them down so remilling could be done through this system.

Actual calciner performance during July was as follows:

Unit	Days Scheduled	Days Operated	Ave. Rate*per Op. Gr. Day	Ave. Rate* per Scheduled Day	On-Line Effic. %
G	31	11	3.90	1.39	35.4%
H	31	12	3.62	1.40	38.7%
J	31	28	4.52	4.05	90.3%
K	31	0	0.0	0.0	0%
L	31	17	4.69	2.57	54.8%
M	31	28	5.75	5.20	90.3%
Total	186	96	4.72	2.44	51.6%

* output basis

G Cell: Down until 7-13-57 to replace bent agitators. Vent piping change installed in June proved impractical as it plugged on 7-19. The system was repiped to its original set-up and restarted 7-21. The unit ran until 7-26 when the filter became plugged and the unit was shut down due to excessive fuming.

H Cell: Down until 7-20-57 when the wet filter system was put into operation. Ran satisfactorily for rest of month.

K Cell: Down all month for major mechanical modification.

C. Uranium Reduction Operation (Continued)

L Cell: Down from 7-2 to 7-5 for filter replacement. Ran from 5th through 7th when excessive noise developed. Bent thermohm and agitators were repaired and the unit restarted on 7-11-57. Crashed down on 7-13 when noise again developed. The unit was unloaded and two stud bolts were removed from the trough which had caused extensive agitator damage. Repairs were made and the unit was restarted on 7-18 with feed point #4 blanked off experimentally. Shutdown on 7-29 with plugged feed points.

M Cell: Ran satisfactorily until 7-8 when it became necessary to replace the filters. Unit was restarted on 7-10 and ran very well until 7-27 when serious feed leakage developed in the "hot box". Restarted on 7-28 and it ran satisfactorily for balance of the month.

D. Maintenance Operation

In Task I, difficulties associated with the sampling of the SNCT tank, unit 1, have been corrected by replacing the volume chamber with a larger unit. The same revision is to be made on unit 2, 3 and 4 which occasionally fail to sample due to low vacuuming. It was necessary to replace the pressure switch on the hydraulic pump for the diverter rams.

In Task II, the bearings on the lathe carriage travelling blocks failed and were replaced. The hydrogen fluoride rotometers at station 2 and 5 were dismantled and cleaned.

In Task III, solenoid valve failures were corrected. A grounded circuit was located and corrected.

In Task IV, it was necessary to replace heating elements on furnaces 2 and 3 and thermocouple wells in furnace bottoms 1 and 4. The refrigeration systems for all furnaces were recharged with Feon during the month.

In Task V, it was necessary to replace head and spindle bearings on the 200-B hood hemisphere lathe.

In Task VII, the heat trap in unit 5 failed and was replaced. Four thermocouple vacuum gauges were replaced as well as the motor on the express car for Task VII. Replacement for tripod bellows which failed during the previous month are scheduled for delivery during August.

In Recuplex, it was necessary to replace the H-1 column pulser bellows type during the month. Removal of the failed D-2 dissolver and installation of the new dissolver in the slag and crucible hood was accomplished successfully. Piping connections to new dissolver are essentially complete and calibration is in progress at month end.

The new temporary continuous Task I and II unit in hood 9-B is 99% complete at month end. Acceptance tests are in progress. Calibration of instruments is progressing satisfactorily.

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D. Maintenance Operation (Continued)

In the plutonium metallurgy operation (HIO) work during the month consisted in the installation of small equipment, motors, pumps, furnaces and equipment for impact and creep hoods. A rolling mill, lathe and grinder have been cleaned, repaired where necessary and installed electrically in the 272-Z Building.

In the Analytical Control Laboratories it was necessary to completely overhaul the densitometer, arc stand, mutisource unit, and camera of the spectrographic laboratory equipment.

The major work performed by the Uranium Reduction Plant Maintenance group during the month of July was in two primary categories, maintaining present equipment and effecting revisions that are considered improvements to the continuous calciners.

The major repair work during the month consisted of the following: Removing and cleaning off-gas DOV'S, changing Adams filters in the off-gas system, repairing and replacing Calciner UNH feed points, cleaning and repairing UNH feed rotometers, calibration of feed point thermal transmitters, replacing the complete set of brushes on ACA Motor to K Cell, bench testing and reinstalling centrifugal switches on all Calciners, rebuilding drive slip coupling on G Cell Calciner, replacing Calciner agitator assemblies (two in L Cell and one in G Cell), replacing X-30-1 Calciner UNH feed pump, replacing instrumentation lines to X-19 tank, making complete overhaul to C-2 pump including new motor, making extensive repairs to X-4-2 Exhauster, repairing many leaks in UNH feed piping located in the Calciner cell hot boxes, and reactivating the Luckey Pots for production. Many of the repetitive items mentioned above will be improved or eliminated as the Calciner improvement program is effected.

Work accomplished to date on the Calciner improvement program consisted of the following:

G-Cell: Drilled and pinned Calciner agitator shaft expansion joint eliminating the unpredictable expansion at this point. Revised oiling system to Calciner agitator bearings from a pressure system to a constant level system. Install sound detection system on G-Cell Calciner; contact-microphone was mounted on #4 thermocouple well and the speaker located in the operating gallery.

H-Cell: Drilled and pinned Calciner agitator shaft expansion joint. Installed revised seats and plugs in the UNH feed DOV's. Removed Adams filters in off-gas system and installed wet separators to clean the Calciner off gas. Shortened agitator blades to provide greater clearance at the feed points and thermowells. Revised oiling system to Calciner agitator bearings from a pressure system to a constant level system.

J-Cell: Drilled and pinned Calciner agitator shaft expansion joint. Revised oiling system to Calciner agitator Bearings from a pressure system to a constant level system.

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D. Maintenance Operation (Continued)

K-Cell: Drilled and pinned Calciner agitator shaft expansion joint. Shortened agitator blades to provide maximum clearance at the feed points. Installed bumper rings on agitator blades located on both sides of the feed points to prevent the feed points from getting into the path of the agitator. Relocated the four thermometer wells out of the path of the agitator. Installed seven additional thermocouples to provide additional temperature measurements. Revised agitator shaft bearing housing to permit shaft expansion at this point. Installed revised seats and plugs in the UNH feed DOV'S. Replaced the Fisher-Porter air transmitters on the four feed rotometers with Foxboros. Repaired or replaced all shell thermocouples. Made Calciner weir adjustable to determine desirable bed level. Revised oiling system to Calciner agitator bearings from a pressure system to a constant level system.

L-Cell: Revised oiling system to Calciner agitator bearings from a pressure system to a constant level system.

M-Cell: Drilled and pinned Calciner agitator shaft expansion joint. Revised Agitator shaft bearing housing to permit shaft expansion at this point. Revised thermometer nozzles and wells. Revised oiling system to Calciner agitator bearings from a pressure system to a constant level system.

Powder System: Installed bin level indicators on the collection bins to all Calciners and X-22-1, X-22-2, X-28-1, X-28-2 bins. Revised piping from X-22-1, X-22-2 and X-28-1, X-28-2 to permit special handling of powders to determine cause of oversize particles.

In an effort to expedite the work on the improvement program and accomplish the necessary maintenance work required to maintain the equipment in the Uranium Reduction Plant the maintenance employees were put on X, Y, Z Shift to perform the maintenance work in addition to a day crew which are assigned to the improvement program work. In order to provide the additional personnel the shift work of Project CG-691 (New Task I and II) was discontinued.

E. Analytical Control Operation

A total of 8882 determinations were made on 2349 samples received in the Analytical Laboratory during the month. This was a slight increase in activity over last month; a result of more requests for analytical work from the Research and Engineering Operation.

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E. Analytical Control Operation (Continued)

Five plutonium metal exchange samples from Dow were analyzed for Chemical Assay, Carbon, 70-58, and spectrographic impurities. These will be compared with analyses from Rocky Flats and Los Alamos. On the last exchange HAFO results checked very favorably with those of the other two sites.

The supervisor of the Final Inspection Operation attended a meeting on non-destructive testing at Rocky Flats during the week of July 15th. The representatives from Rocky Flats, LASL, and HAFO discussed mutual problems on radiography and non-destructive testing techniques in regard to model 65 fabrication.

F. Radiation Monitoring Operation

Eleven radiation occurrences were documented in July as compared to ten in June. The breakdown for the various operations is as follows: Metal Finishing - three, Product Recovery - two, Analytical Control - one, Maintenance - two, Uranium Reduction - three, Radiation Monitoring - none.

Sixteen cases of skin contamination were reported in July as compared to twelve cases in June. The breakdown for the operations is as follows: Metal Finishing - three, Product Recovery - one, Analytical Control - two, Maintenance - eight, Uranium Reduction - two, and Radiation Monitoring - none.

There has been no change in the exposure problem of the Metal Finishing Operation. Re-interpretation of badge readings is expected early next month.

The contamination problems in the 224-UA Building mentioned in last month's report have not improved but no radiation occurrences were attributed to the building.

Four new cases of internal plutonium deposition were discovered in CPD during the first six months of 1957. All cases concerned employees in Finished Products and were described in Radiation Occurrences. The deposition did not exceed 1% of the maximum permissible limit in any case and the work status of the involved employees is unaffected.

The 234-5 stack emission averaged 18 uc of plutonium/day during July. This is nearly a factor of two increases over the previous month and nearly a factor of four increases over the average for the previous six months. The most obvious and probably the major contributor is the exhaust from Task II. This exhaust carries considerable HF fumes from Task II process leaks and causes rapid deterioration of the primary filter. An accelerated program of inspection and filter replacement has been adopted in order to reduce this emission.

The failure of a gasket on the primary filter box servicing hood #13 in room #264 caused a gross spread of contamination in rooms 263 and 264. All of the contamination was contained within these rooms and subsequent cleaning is continuing.

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G. 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.

H. Events Influencing Cost

Purex has agreed to set up an inventory account for Recovered Nitric Acid which will result in more realistic payments to the Uranium Reduction Operation.

In the Uranium Reduction Operation overtime worked by operations and maintenance in an endeavor to meet production commitments will have a significant bearing on costs for July. Additional personnel have been added to the rolls of operations and maintenance has gone on a three shift schedule in an attempt to eliminate this overtime. It is anticipated the higher-than-normal costs will be experienced by this operation for several months to come.

I. Plant Development and Expansion

1. Project CG-745 - RMC Fabrication Line

This project is being held in abeyance pending receipt of funds. All action is stopped. Detailed design stands at 73% completion.

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

All equipment for the temporary continuous unit has been installed in hood 9B. Calibration of instruments is progressing satisfactorily. All chemical and servicing lines were connected to the unit for functional testing.

3. Project CG-723 - Recuplex Conversion

Design work is approximately 96% complete on the equipment necessary to convert Recuplex to a manufacturing facility. Bids on all vessels are expected by the end of this month. It was necessary to redesign the de-entrainment section of the concentrator in order to satisfy requirements of nuclear safety.

I. Plant Development and Expansion

4. Project CG-734 - RMC Button Line

Arrangements were made during the month to speed detailed design on the equipment to be provided under this project. A revised project proposal requesting authorization of construction funds is scheduled for submission to the Atomic Energy Commission by month-end.

5. Project CG-756 - Z Plant Filter Replacement

Design of equipment which is provided as a part of this project was started on July 15. Three filters have been ordered from the Cambridge Company for testing and are expected by August 17. Orders will be placed for replacement filters at the rate of about 100 per month after satisfactory completion of efficiency tests.

6. Project CG-613 - UO₃ Expansion

The installation of the feed box calrods has been completed. The capacitance type bin level indicators are being installed in the cyclones and bag filters.

Some of the 2 $\frac{1}{2}$ " piping in the powder unloading system has been found to be undersized and must be replaced with 3" pipe. This work is scheduled to be performed August 1, 1957, by Construction Operations through a sub-contract to a Fix Price Contractor because of the pipefitters strike.

Test wet filters for the calciner off-gas lines have been installed in H Cell to determine their effectiveness in removing uranium solids from the calciner off-gas system. Preliminary tests appear favorable.

Several modifications are being performed on the K Cell calciner to test the effect of these changes on the efficiency of calciner operation. The modifications include: Bumper rings on the agitator paddles to prevent interference of feed points and thermohm wells with the paddles, relocation of the thermohm wells out of the calciner agitator paddle orbit, reduction of the length of the agitators paddles to increase the clearance between the paddles and the feed points, installation of thermocouples to check the efficiency of calciner agitation and feed temperature control, installation of baffles in the calciner cover to reduce powder carried into the calciner feed control valves.

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

The tie-in of the absorber jet discharge line to the new 80' stack is scheduled for August 1, 1957. The blower for the high stack is scheduled on site about August 15, 1957.

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I. Plant Development and Expansion (Continued)

8. Project CG-725 - UO₃ Plant Liquid Waste Handling Facilities

The scope for the above project is scheduled for issuance during the first week of August 1957. The Project Proposal will request funds for only that portion of the scope which includes the installation required for reworking waste at the Uranium Reduction Plant. If it is found facilities for recycle of the waste to Purex Plant is required, a revised project proposal based on the remainder of above scope will be processed.

9. Project CG-722 - Utilization of 224-UA Acid at Purex and Redox

The revised scope and the revised Project Proposal are currently being prepared, and the Project Proposal should be ready for GE departmental signatures about the 4th week of August. Detailed design for the UO₃ Plant portion of this work is essentially complete except for modifications to the existing railroad tank car spot. Work release on the U Area portion of the project should follow shortly after approval of the Project.

10. Preliminary Project Proposal - Uranium Reduction Plant Improvements

A Preliminary Project Proposal requesting funds for design studies and initiation of detailed design for Uranium Reduction Plant Improvements has been approved by GE and is being reviewed by the local AEC review board.

11. Capital Work Orders

Capital work orders for the following items have been issued:

1. Installation of stairways in the powder handling room.
2. Inter-tie of the 224-U and 224-UA powder handling systems.
3. Automatic vacuum control for the concentrator off-gas system.
4. Re-routing of the D-1 to X-1 concentrated waste stream via the C-3 tank.

J. Reports Issued

HW-51392 Chemical Processing Department, Finished Products Operation,
Z Plant Monthly Report, June 1957, by W. N. Mobley.

III ORGANIZATION & PERSONNEL

A. Organization Changes

None

B. Safety Experience

No disabling injuries were experienced during the month. There were eighteen medical treatment injuries experienced this month compared with ten in June. Frequency rate rose from 1.41 to 3.11.

C. Radiation Experience

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

D. Security Experience

No security violations were experienced during the month.


E. Personnel Activities

Twenty-three supervisors attended Labor Relations Conferences during the month.

Three non-exempt employees attended Personnel Development Meetings.

Three non-exempt employees attended CPD Process and Equipment Meetings.

One supervisor from the Analytical Control Operation is on loan to the Product Recovery Operation for training.


W. N. Mobley, Manager
Finished Products Operation

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CHEMICAL PROCESSING DEPARTMENT
POWER AND GENERAL MAINTENANCE OPERATION

JULY 1957

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I. RESPONSIBILITY

The responsibilities assigned this operation remained unchanged during the month.

II. ACHIEVEMENT

A. Operating Continuity

There were no outages of steam, water, or emergency electrical services that affected continuity of operation of the prime production facilities.

B. Inspection, Maintenance, and Replacement

The Shops Operation devoted top priority to assisting the Finished Products Operation in overcoming problems connected with the UO₃ continuous calciners. Items requiring shop fabrication included blade guide rings, thermowells, hammer mill screens, calciner arms, and off-gas baffles. In addition, 16 calciner blades required modification. Work in progress at month end included fabrication of 10 new blades and eight feed nozzle assemblies. Final completion date of these items is contingent upon delivery of type 347 stainless stock from an off-site vendor.

Fabrication of an HA pulse column for the Purex Facility was started July 9, and is scheduled for completion September 5. The job is assigned a high priority, however, completion is dependent upon the delivery date of the extraction and scrub plates which are being furnished by Construction Engineering Operation.

Other high priority work in the Shops Operation includes the fabrication of two sets of H₄ tube bundle coils. These are standby items for the Redox Facility, however they are considered critical inasmuch as the stock of spares has been depleted and a failure at this time would result in a production curtailment until a set could be fabricated.

The inspection by a third party (Travelers Insurance Company) of the No. 4 steam generating units in each area (200 East and West) was completed as scheduled. Conclusions established indicate the units are in a good state of repair.

The ventilation systems in the 105-H and the 115-H buildings were rebalanced at the request of the Irradiation Processing Department.

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Definite control of directional flow was obtained which will reflect improved contamination control. A report is being compiled which will include recommendations for maintaining the correct air balance for these buildings.

The 200 East Tank Farm lay-away program continued according to schedule. Five nagle pumps, four sluice nozzles, one 30' deep well pump, and five filters were removed and buried during the month. As existing filters atop the tanks are removed, tube type evaporators, which were original equipment for these tanks, are being installed.

The 200 East General Maintenance Operation continued to lend assistance to the 241-CR scavenger waste program. Principal among the services rendered this month was the relocation of five pumps and their associated pipe jumpers, and the covering of a 500' long waste trench with heavy craft paper to curtail the spread of contaminated dust particles.

Close liaison was maintained between the Shops Operation and production plants. The adjustment of shop work schedules to meet urgent demands for services were made without seriously jeopardizing other scheduled shop activities. Premium labor costs were held to a minimum in meeting urgent customer demands. Among the items required by the production plants were a silver nitrate reactor, four pieces of rotating equipment, and ten cell pipe jumpers, all of which were delivered to the job site on schedule.

A defective D-2 dissolver weighing approximately 2.5 tons was successfully removed from the slag and crucible hood of the Recuplex Operation in the 234-5 Building and replaced with a new unit. To prevent the spread of contamination a plastic tent was utilized to house the work area. Personnel wearing "Plastic Man" apparel entered the work area through plastic tunnels to perform the work. Upon completion of the job the defective unit was removed from the building and buried. The entire job was accomplished with a minimum of exposure to personnel.

A discarded concentrator was buried in a pit dug adjacent to its above ground location in the 200 West Area overground storage garden. The highly contaminated unit, previously removed from the 221-U Building, was stored in a 20' x 20' x 10' box which in its deteriorated condition was likely to cause a spread of contamination. To prevent such an incident it was deemed advisable to bury the box and its contents with a minimum of moving and handling.

C. Improvement Experience

A request was made to the AEC to relieve the General Electric Company of management responsibility for the 213 J&K magazines located on the south side of Gable Mountain. These facilities have been declared of

no current or potential use to CPD and are currently being used by the U.S. Army for munition storage. It has been indicated that these facilities might reasonably be transferred to the Army. The AEC has not as yet taken action on the request.

Savings in the amount of approximately \$6,000 annually was realized in that a total of 16 (net) people were removed from the roll during the month.

Reduction of the stock of spare parts, for which this operation is responsible, continued. Of that portion of the stock inventoried to date a reduction of 18.5% has been accomplished.

III. ORGANIZATION AND PERSONNEL

A. Safety and Security

The Operation incurred no disabling injuries. There were twenty-one medical treatment cases reported, which reflects a frequency rate of 4.87 for the month.

No security violations were in evidence.

The Tool and Die Shop located in the 272-W Building has been officially declared a blue tab area. An Atomic Weapons Clearance is now required for access. New security locks have been installed on the doors and a check system inaugurated to eliminate security violations involving unlocked doors and file cabinets.

B. Personnel Activities

There were five employee suggestions submitted during the month of which two were acceptable.

Twenty-two members of P&GM management attended Labor Relation Conferences during the period covered by this report.

T. G. LaFollette, Manager
Power & General Maintenance Operation

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CHEMICAL PROCESSING DEPARTMENT
FINANCIAL OPERATION

JULY, 1957

I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Product Cost

All year end closing statements and transactions were completed as scheduled.

Detailed revision of the FY 1958 budget was completed, excepting F.E.O., and summary budget statements were issued to Level 3 management. At month end continuing effort is being concentrated on further detailed breakdown of the revised budget in order to provide Level 4 management with detailed quarterly budget statements early in August.

A new report detailing the content of Indirect Salary Expense was designed and ready for use during FY 1958.

The Indirect Material and Equipment Not Included In Construction Projects reports were revised in order to present additional pertinent data and reflect recent changes in reporting requirements.

Special effort was devoted to the study of differences in metal fabrication unit costs between HAP0 and Rocky Flats.

Standard liquidating rates for Analytical Control Operations were reviewed and revised as necessary. Then new rates were discussed with the affected managers of Analytical Control and their concurrence obtained for use during FY 1958.

A special comparison of June costs, with the normal going rate, was transmitted to the local AEC in order to illustrate and explain the impact normal year end adjustments and activities have on costs.

In order to provide an aid in closer cost control in the specialized operation of P & GM, Power and Shops Operation, and FEO Drafting Operation, a special purpose operating report for Level 5 management was prepared at the request of these operations.

A rough draft of the CPD Advice for "Control of Reactor and Other Special Materials" was prepared and routed for final review.

Final disposition of all Standby Essential Materials was completed as of July 1, 1957. In addition, funds for all Standby spare parts scheduled for excessing were provided for by accruals made in connection with year end closings.

B. Personnel Accounting

The Personnel Accounting operation has received and processed garnishments at the rate, on an average, of one a month. While this frequency is relatively minor, the work involved in processing the garnishment and preparing the necessary statement entails considerable detail work.

Almost 100% of insurance claims submitted received payment benefits, however, the few claims refused usually in the area of "Complication of Pregnancy", results in some misunderstandings and ill will toward the Insurance Plan. In order to prevent these misunderstandings and possibly forestall grievances, each refusal of payment by Metropolitan is forwarded to Union Relations for investigation.

Statistics:

1. <u>Number of CPD Employees</u>	<u>Monthly</u>	<u>Weekly</u>	<u>Total</u>
Employees at Beginning of Month	418	1 323	1 741
Additions and Transfers In	1	9	10
Removals and Transfers Out	(1)	(32)	(33)
Transfers from Weekly to Monthly	0	0	0
Transfers from Monthly to Weekly	0	0	0
Employees at End of Month	<u>418</u>	<u>1 300</u>	<u>1 718</u>

2. <u>Overtime Payment During Month</u>	<u>July</u>	<u>June</u>
Non-exempt Employees	\$22 908*	\$24 201*
Exempt Employees	<u>4 495</u>	<u>3 456</u>
Total	<u>\$27 403</u>	<u>\$27 657</u>

* Payments to non-exempt employees cover a four-week period.

3. <u>Gross Payroll</u>	<u>July</u>	<u>June</u>
Non-exempt Employees	\$630 781*	\$690 128*
Exempt Employees	<u>319 322</u>	<u>319 624</u>
Total	<u>\$950 103</u>	<u>\$1 009 752</u>

* Payments to non-exempt employees cover a four-week period.

4. <u>Pension Plan</u>	<u>July</u>	<u>CY to Date</u>
Number retired	1	1
Number who became eligible for participation	4	28
Number who elected to participate	4	28

	<u>July</u>	<u>CY to Date</u>
5. <u>Insurance Claims Paid</u>		
Employee Life Insurance	0	3
Amount	0	\$43 961
Employee Weekly Benefit Claims Paid	9	166
Amount	\$1 105	\$16 900
Employee and Dependent Accident and Health Claims Paid	149	1 742
Amount	\$13 560	\$172 342
6. <u>Suggestion Awards</u>		
Number of Awards	0	269
Total Amount of Awards	0	\$8 918
7. <u>Preferential Rates</u>		
Number added	0	0
Number eliminated	0	1
Number currently in effect	57	57
8. <u>Number of Military Allowance Payments</u>		
	0	1
Amount	0	\$ 448

C. General Accounting

The June pre-closing and post-closing Trial Balance of General Ledger Accounts and reports of travel, living and non-reimbursable expenses were delivered to Contract Administration on schedule.

An audit of General Ledger entries is currently being made by the local AEC audit staff.

There were 30 active CPD projects with \$14.0 million authorized funds as of June 30, 1957. Expenditures of \$8.9 million and commitments of \$1.5 million have been incurred against these projects. Costs of \$511,000 were incurred during June.

No additional project authorizations were received during July.

Preliminary Cost Closings were completed during July on the following project and informal request:

IR-219	Equipment Removal and Relocation of Boiler Shop-277-W Bldg.	\$14 690
CA-675	Change House Facilities - 275-W Bldg.	<u>6 561</u>
	Total	<u>\$21 251</u>

The CWIP Plant and Equipment changes in Progress Report and the Summary Cost Report and Estimate for June were delivered to Contract Administration on schedule.

Plant and Equipment balances at June 30, 1957 were as follows:

<u>Plant and Equipment</u>	<u>Asset</u>	<u>Reserve</u>	<u>Net</u>
In Service	\$265 493 580	\$116 118 567	\$149 075 013
Held for Future Use	46 402 655	31 945 427	14 457 228
Not Used Nor Currently Useful	<u>1 995 036</u>	<u>1 995 036</u>	<u>-0-</u>
	<u>\$313 891 271</u>	<u>\$150 059 030</u>	<u>\$163 832 241</u>

July depreciation charged to product cost amounted to \$968,655 including R & UO general use and IPD export water assessments of \$88,506 and \$9,064 respectively.

The proposal to place the T, B and TBP facilities in the Plant and Equipment Not Used Nor Currently Useful property account under condition status IV was accepted by the Commission. An inventory of the plant and equipment in these facilities is currently being taken by Property Accounting and Power and General Maintenance.

The first of the inventories of movable property scheduled to be taken in FY 1958 was completed. A physical inventory of movable property in the custody of 200 East - General Maintenance was started on July 22, 1957 and the physical count was completed July 25, 1957. Reconciliation of the book and physical count is now in progress.

D. Auditing

During the month, the Manager, Internal Auditing was assigned to a HAPO Task Force, reporting to the Manager, CEO, established by the General Manager, HAPO, to obtain pertinent facts, and prepare a report of findings for the Commission, concerning some 21 jobs performed by plant maintenance forces. The Task Force was formed at the request of the Commission as a result of a request for data, by the Regional Attorney, Department of Labor, as an aid in reviewing the Davis-Bacon aspect of these jobs. Of the jobs in question, seven involve CPD maintenance forces.

The audit reports covering CPD's activities relating to S. S. Accountability in Redox, Purex, UO₃ and 234-5 were issued during the month.

During the month of July, 190 purchase requisitions were reviewed to ascertain whether or not proposed expenditures were reimbursable.

Field work in connection with the following audits is progressing satisfactorily:

1. Management of Capital Assets
2. Payroll and Timekeeping Practices
3. General Ledger Accounts*

* Audit work in this area is being co-ordinated with efforts of L. B. McNeill, Auditor, AEC Audit Branch in order to achieve maximum audit coverage and to minimize duplicating of efforts.

E. Procedures

In cooperation with the Industrial Engineering group a McBee Key Sort System was designed to aid them in recording data for their time and motion studies.

The forms files are in the process of reorganization to improve the system and eliminate duplicate forms and consolidate similar forms.

Considerable time was spent getting information on CPD's Stock Bonus and Savings Bonds accounts. This information is to be used to effect plant-wide reconciliation of these accounts.

In cooperation with the Manager, Product Cost a detailed procedural study of the Operation was initiated during the month.

F. Measurements

The Chemical Processing Department Annual Savings and Improvement Report was prepared and issued.

Establishment of an acceptable productivity measure is progressing satisfactorily. A Departmental review of the proposed productivity measure was held on July 23rd. As a result of this review, several slight revisions were made prior to the review with the General Manager, HAPO, held on August 2nd.

The Chemical Processing Department Measurements Report for FY 1957 was issued.

III. ORGANIZATION AND PERSONNEL

A. Safety and Security

A safety and security meeting for all Financial Operation personnel was held on July 30, 1957.

No major or minor injuries were experienced during the month.

There were no security violations experienced during the month.

B. Reports Issued

HW-51254 - Secret - CPD Essential Materials Inventory and Consumption Report for Month of June by S. R. Myers

HW-51375 - Secret - June Unit Cost Information-CPD by K. G. Grimm

HW-51376 - Secret - June Redox Unit Cost Information by B. M. Dobbs

HW-51377 - Secret - June Purex Unit Cost Information by B. M. Dobbs

HW-51378 - Secret - June Finished Products Unit Cost Information by B. M. Dobbs

CLVI-15 - Top Secret - CPD Production and Conversion Cost Forecast-CY 1957 by K. G. Grimm

CLVI-28 - Top Secret - CPD Cost and Production Performance - FY 1957 by G. H. Temple

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CLVI-30 - Top Secret - CPD Savings and Improvement Report - 1957
by K. G. Grimm


Manager-Finance

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G-6

August 8, 1957

CHEMICAL PROCESSING DEPARTMENT
FACILITIES ENGINEERING OPERATION

July, 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. Pu Recovery From LW Stream

Conceptual design on a prototype ion exchange bed for plutonium recovery from the Purex LW stream is underway. As presently visualized, the ion exchange column will surmount TK-F15 on the spare 32-inch flange. All solutions will enter the top of the column so that no hold-down grid will be required above the resin bed. This circumvents a difficult design problem because of the resin swelling tendencies. The final pressure drop data have not been received from the Hanford Laboratories as yet, but preliminary estimates indicate that there is sufficient height to allow gravity flow through a single critically-safe column at a capacity factor of 3.2 without back-up into the P&O Gallery. However, operation with a single column at a capacity factor of 4.0 is questionable. Two instrument development problems remain; a method of determining the Pu loading on the resin, and a method of determining the depth of the resin bed.

2. Step-Plate Mixer-Settler

Equipment fabrication and installation in the 321 Building for testing and development of a step-plate mixer-settler for Purex organic washing is essentially complete. It is expected that trial runs will begin on August 5, 1957.

3. Waste Tank 103-A

The two aneroid pressure gauge on the Purex Plant waste tank 103-A have been placed in service and a pressure increase (approximately

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$\frac{1}{2}$ " of water) will activate the recorder to identify the rate of rise and maximum pressure experienced in the event of a bump. It is believed that the time lag in the switch to activate the recorder will not distort the recording of the rate of rise. One gauge has a pressure scale of 0 to 20 inches of water and the other gauge has a pressure scale of 0 to 100 inches of water. It is still not planned to intentionally produce a "bump" in the 103-A storage tank.

4. Steam Condensate Line Failures

Recurring failure of mild steel piping in the steam-trap pits outside the Purex Building has prompted investigation to determine the cause of failure and to devise corrective measures. The traps carry steam condensate from process evaporators and dissolvers. The failures are in contact-maintained piping; however, access is difficult and requires that the plant be shut down. Present indications are that failure results from general corrosion of the mild steel by steam condensate containing appreciable amounts of oxygen and/or carbon dioxide.

A potentially serious aspect of this problem is that the main condensate header for discharging Purex steam-condensate is a mild steel line buried behind the main building. Presumably, similar corrosion is occurring in the main header.

5. Alpha Monitor

The Purex Alpha monitor performance has continued to be satisfactory although some counting rate meter repairs were required. The degassers in the sampling system have shown evidence of becoming plugged and were back flushed to reduce plugging. The 2AW monitor has been particularly valuable to the plant operation at high processing rates.

B. Plant Engineering

Failure of a wheel bearing in the Purex crane on July 11 caused some difficulty in getting the crane back to its maintenance area. A charging operation had been completed very shortly before the failure occurred. The failure was in the #4 trailing wheel on the light end of the crane, the same location as the initial failure approximately eighteen (18) months ago. These failures are believed to result from a slightly tapered or elliptical condition of the axle. Subsequent inspection of grease sampled from all other wheel bearings revealed ferrous particles in the similar bearing of #2 trailing wheel on the light end. This bearing was in a partially failed condition and has been replaced. In no case has damage to the tapered roller bearing on

the other end of the axle been present. This grease sampling procedure will be routinely performed in the future on a 90 day cycle and should minimize the possibility of a crane breakdown. The new second crane is being supplied with an improved bearing design employing only tapered roller bearings, which it is believed will eliminate this trouble.

1. Instrument Air Compressors

An appropriation request has been approved and requests for bids prepared to obtain gear boxes to speed up the instrument air compressors in the Purex building. A preliminary design based on an earlier feasibility study was completed last month. Final detailed design can proceed as soon as a vendor is selected and exact dimensions of the vendor's gear boxes are known. This system should provide adequate quantities of instrument air without the additional expense of new compressors and switch gear.

2. Silver-Nitrate Reactor

A silver-nitrate reactor having a remotely replaceable packed capsule was designed and approved for use in Purex operations. It is estimated that the use of this type capsule will involve a savings of approximately \$30,000 per replacement, as compared with the present practice in use at Purex.

C. Project Activities¹

1. CG-647 - Purex Plant Off-Gas Treatment Facilities

Final inspection of the contractor's work was held July 12 and clean-up of exceptions was accomplished July 15 on which date beneficial use of the facility was obtained. Purex Operation is proceeding with calibration and cold run activities on the facility. Final operation of this facility was delayed eight days by lack of fitters during the month of July. The facility is scheduled for hot operation in the month of August.

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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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2. CA-719 - Additional Facilities to Handle Purex Tank Farm Vapor Wastes

Subsequent to the start of detail design for the subject facilities, numerous problems were encountered in the existing tank farm vapor system that necessitated a review of the design scope. Repairs performed recently on the loop seal to one of the contact condensers encountered radiation levels considerably higher than was anticipated in the original design scope for the new facility. These radiation levels are considerably in excess of the levels under which physical or contact maintenance of the proposed facility could reasonably be expected to be performed. Also the condenser off-gas exhaust system, constructed of carbon steel has been found to be severely corroded and rapidly approaching the point of failure. Corrosion of this carbon steel system has been caused by the periodic handling of acidic vapors. Sampling and testing of vapors in the vapor handling system indicate that acidic vapors are formed, subsequent to the condensation of the vapors from the waste tanks. The vapors to the contact condensers and the condensate from the condensers have a pH of about 9. However, the non-condensibles exhausted from the condensers are occasionally acidic and corrosive in nature. A review of these problems and their effect on the facility indicate the need for revision of the design scope. Major changes in the scope are expected to include:

- a. Increased shielding wall thickness for the condenser house, pump pits and piping encasements.
- b. Provision of a diversion box for alternate routing of condensate in place of direct buried valving.
- c. Provisions for semi-remote connectors to surface condensers and the condensate tank pumps.
- d. A new condenser vent system complete with stainless steel exhaust fans, de-entrainment vessels, stack and piping.

The proposed revisions to the design scope of the facility are being reviewed to determine if more economic approaches could be achieved.

REDOX OPERATION

A. Research and Development

Work was initiated with Process Control Development, Hanford Laboratories Operation, for development of a gamma absorptometer to be combined with an improved pH system for use on Redox IAFS stream. Combining the pH

cell and gamma absorptometer as a single unit offers conservation of space and will provide an opportunity to improve the pH system.

B. Process Technology

1. E Metal Processing

An important resolution in the chemical processing of E metal was made by the Hanford Laboratories with the definition of limiting nuclear-safe dimensions for slab and annular dissolver design concepts. The maximum allowable slab thickness was defined as twelve (12) inches; the maximum annular thickness in a seven (7) foot diameter dissolver as eleven (11) inches. The annular concept now offers a promising dissolver design for obtaining the Redox Phase III rate criterion with either E metal, I and E elements, or conventional solid slugs. Preliminary design work is in progress to define further engineering development and/or design verification testing that may be needed prior to construction of the dissolvers. A target beneficial use date, prior to January 1, 1959, precludes extensive developmental activities and necessitates early completion of this phase of work. Consequently, every engineering effort and approach will be made to minimize any additional development work required. Plans have been made with the Hanford Laboratories to expedite any tests that may be required and to effect close liaison between the developmental and design functions.

2. Buried Pipes

Sixteen 2" Schedule 40 stainless steel pipes leading from the pipe galleries to the cells have been examined by the eddy current test method in an effort to detect the degree of corrosion that may exist in the piping. Five of these lines show evidence of corrosion, with two lines being damaged over the entire length. In one case the degree of attack is greater than 50 percent of the wall thickness. Two other pipes were partially corroded with about one-third and one-half their lengths attacked, respectively. In the fifth pipe, start of corrosion was detected.

C. Plant Engineering

Two tools have been fabricated which will permit the remote removal and replacement of the Bakelite plate and contacts in the canyon electrical wall connectors. These are presently being tested for practical use.

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1. Cross-Over Oxidizer, E-7 Design

The final design package covering replacement of the cross-over oxidizer vessel, E-7 was completed and transmitted to the Redox Operation. This vessel has never been spared since plant start-up and a failed coil mars its present integrity. Major features of the new design include:

- a. Removal of the tower side entrance leg.
- b. Removal of the pump flange.
3. Retention of all existing nozzle locations so that no new cell jumpers will be required.

This design is to be used for construction of a replacement spare E-7 vessel.

D. Project Activities

1. CG-648 - Redox Plant Off-Gas Treatment Facilities

The Fixed-Price Contractor completed his work and beneficial use of the facility was obtained July 9, 1957. Due to the strike of the pipefitters, some delay was encountered in making changes and completing exceptions. However, those changes necessary for calibration and cold run activity were performed by the fixed-price sub-contractor.

FINISHED PRODUCTS OPERATION - "Z" PLANT

A. Research and Development

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1. Neutron Monitoring

A well for the Recuplex D-10 tank has been completed in the 300 Area Technical Shops. The well along with two preamplifiers has been delivered to Z Plant. It is expected that the test well, BF₃ tubes, preamplifiers and associated electronic equipment will be installed and ready for use during August. Further testing of the prototype neutron monitoring setup will then continue at Z Plant. Neutron monitor application is being considered for Task I supernate and the filtrate line from the conversion filtration cycle.

2. Chip Briquetting Press

Necessary modifications to drawings of a prototype chip briquetting press have been made and shop alterations to the parts involved are underway. The press will be reassembled for additional test operation. A drawing showing installation of this press in a hood is complete. Subsequent to testing, the press will be installed in the RMA line for production testing.

B. Project Activities

1. CG-691 - Continuous Tasks I and II

The installation of the temporary continuous Task I and Task II hood in the RG Line is essentially complete and initial start-up underway. The calciner has been operated satisfactorily at a temperature of 350° C and solutions have been pumped in and out of the various vessels in hood H-9B. It is expected that hot tie-ins will be made in early August.

2. CG-745 - RMC Fabrication Line

All design activities on Project CG-745, RMC Metal Fabrication Line, were terminated during the month due to a lack of funds. The overall design progress on the project was approximately 73% complete. In shutting down the design an effort was made to bring each group of drawings and purchase specifications to a convenient stopping point and whenever possible to close out each set that pertained to a particular hood as a single package. A report is being prepared for future reference which will give the exact status of each set of drawings and purchase specifications and describe what work, if any, remains to be done. It is estimated that the final close out cost will be approximately \$71,500.

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3. CG-734 - RMC Button Line

The scope document for the RMC Button Line which defines the basis for detail design, was approved during the month except for several minor items. These items are listed on the approval letter which has been approved by the Chemical Processing Department representatives. The principal item concerns an overall space reduction in the RMC Button Line which will provide more space for future fabrication line facilities. The other items involve minor changes in process equipment and an expanded PR can facility which will allow storage of PR solutions. This expanded facility is to have: (1) a PR can unloading station with scales and unloading head; (2) a PR can decontamination station; (3) lag storage vessels for about 200 liters of plutonium nitrate solution; (4) piping and instrumentation to provide flexibility in transferring feed to hoods H-5, H-7, or HC-7. This equipment will permit several PR cans to be unloaded independent of the feed rate into the process. The lag storage vessels now being considered for Room 166 are similar to the L-9 and L-10 sampler vessels in Purex. Two such vessels would be mounted horizontally on the south wall of the room each having a 100 liter capacity.

All of the design money on this project has been authorized and the detail design is presently underway.

FINISHED PRODUCTS OPERATION - UO₃ PLANT

A. Process Technology

1. Plant Improvement Program

A baffle for reducing the dust loading in the UO₃ continuous calciner off-gas was designed for insertion in the off-gas nozzle. Two baffles have been fabricated and will be installed on a test basis on the next calciner which is taken out of service for an Adams dry filter cartridge change.

The present UO₃ continuous calciner off-gas Adams dry filters, with provision for back-blowing with air to remove the collected dust, have an average operating life between filter cartridge changes of about 20 days with approximately 24 hours required for the change. The design of a wet scrubber installation of the disc-donut type for this service was completed. As presently planned, each scrubber will handle two calciners; the scrubbing liquid will be 50% nitric acid. Conversion of the present dry Adams filters to wet separators has been suggested by the UO₃

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Plant engineering task force. This modification will be evaluated.

Difficulties have been experienced in meeting the required final UO_3 particle size specification. The calciner product is presently routed through a cyclone with the bottoms passing through a hammer-mill to storage and the overheads directly to storage. The feasibility of obtaining particle size control by attrition of the calciner product by air at supercritical velocities is being studied.

A new design has been completed of the "hot" box for the UNH feed control valves. This new box features interchangeable piping, and versatility in allowing one feed point at a time to be taken out of service without shutting down the calciner. This design makes easy removal of parts possible so that defective components can be quickly replaced.

Recommendations which have been made to eliminate agitator failures are being incorporated into the "K" cell calciner. The work on this calciner is scheduled to be completed and the unit put in operation in the near future.

The test wet filter installation on "H" cell was placed in service on July 20, 1957.

Isometric drawings of the 224-UA Building were prepared, illustrating the equipment layout and the flow of the product handling system, calciner feed piping, and the calciner off-gas system. These sketches will be used to clarify the process flow and operation and to simplify system analyses for contemplated revisions.

GENERAL ACTIVITIES

A. Research and Development

A 35 mm, Robot Royal Automatic camera with a Strobo flash unit has been received for photographing the interior of waste storage tanks. The Photography Unit of Communications and Personnel Development Operation, is presently experimenting with this equipment for possible adaption to colored slides, and to become familiar with its operation. An enclosure is being designed which will prevent contamination of the equipment when lowered into a storage tank. A remote positioning device is being developed to permit a sequence of exposures without removing the equipment from the tank.

1. Gamma Monitoring System

A typical gamma monitoring system was assembled in the laboratory and tests are being conducted to gather operating characteristics of the system. This information is needed for future design and development work. The system components presently being evaluated are: Gamma Scintillation Probe, Linear Amplifier, and Log Count Rate Meter. Noise measurements were taken directly at the scintillation probe and a graph was plotted correlating noise versus voltage. Representative impulses generated by the probe for various voltages and signal cable lengths were recorded photographically. Data reflecting average signal amplitudes for various flux levels is being obtained. Noise, gain, and wave form data was taken along with count rates for different control settings when the amplifier was used in a complete gamma monitor system.

2. Titanium Connectors

Vendor tests of experimental titanium male connectors have shown very satisfactory results. Test of a standard stainless steel male connector under identical conditions demonstrated strength and performance inferior to that of the titanium nozzles.

3. Contracts and Consultant Agreements

a. Contract DDR-10

Contract DDR-10 with the Industrial Research Division of Washington State College, Lump sum contract for \$4,403.24.
Contract Administrator - W. P. Ingalls
Amount paid contractor to date - none.

Work under this contract is progressing slowly but satisfactorily. Physical testing is some 60% complete; plotting of results as a preliminary to preparation of a summary report is in progress. Various additions to the scope of this work have been agreed to which will add some \$1,500 to the total cost. A contract amendment will be prepared to authorize these changes.

b. Contract DDR-18

Contract DDR-18 with Bird Machine, Walpole, Massachusetts.
Lump sum contract for \$9,965.
Contract Administrator - W. P. Ingalls
Amount paid contractor to date - none.

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All parts of the prototype Purex oiling system which Bird has developed are in their shop being fabricated. Test operation in their plant is tentatively scheduled for mid September.

c. Consultant Agreement CA-147

Twenty-five copies of the final report for consulting agreement CA-147, "Waste Storage Tank Design," submitted by Ammann and Whitney, consulting engineers, accompanied with a Commentary Report prepared by H. W. Stivers, has been distributed to interested HAPO personnel. A meeting is scheduled with CEO, August 22, 1957, to discuss this material and firm-up concepts for future tank designs.

B. Process Technology

1. Critical-Mass Laboratory

The final drafts of the engineering report and conceptual design drawings have been completed covering the proposed critical mass laboratory. Complete resolution of all radiological safety aspects has not been obtained. Differences in shielding aspects of the design are being resolved and any resulting changes will be incorporated into the design. At that time the final report will be issued. Resolution of all shielding aspects is expected by August 1, 1957.

2. Plastics Development

Further refinements have been made in the development of a transparent respiratory hood. The hood, as currently designed and successfully demonstrated, is made of 20 gauge transparent vinyl plastic and fits snugly around the neck. Complete visibility, and sufficient air for deep breathing without fogging or lung strain provide important advantages over present respiratory equipment. Following further evaluation it is planned to use the hood within plastic suits.

Doors on either side of an air lock leading to the large fan room in the basement of 271-T Building have been modified to permit use of the fan room as a testing and training center for use of plastic suits. Using this new demonstration facility, it is planned to train personnel by collapsing the suits, adjusting air flows, and otherwise manipulating the working variables. It will thus be possible to avoid any undue concern by personnel entering suits in contaminated work areas without prior experience.

C. Advance Engineering

1. Five-Year Forecast

A forecast of Plant Acquisition and Construction Project work, as well as equipment project work, was completed and issued in July. This forecast is believed to be the first of its kind at HAPO inasmuch as the basic cost components of each potential project have been scheduled by quarters in chart form.

D. Plant Engineering

A study was made for the Financial Operation to devise a method for computing equivalent plant production, recognizing material in process in addition to actual completed production. The purpose of the calculation is to permit a unit cost determination which will more accurately reflect the true product cost. Computation procedures were developed for Redox, Purex, and the 234-5 Plant plutonium production, and a method was presented for charting unit cost and product trends.

E. Project Activities

1. Financial

Project Cost information as of July 21, 1957:

Total Authorized Funds - Active Projects	\$13,980,000
Total Cost-to-Date	8,980,000
Commitments and Open Work Releases	1,817,000
Unencumbered Balance	3,183,000
Costs Charged to Above Projects from June 16, 1957 to July 21, 1957.	390,000

Project CG-644 dropped from Active Status during period ending July 21, 1957. Total cost, \$28,672, Authorized Funds, \$33,000.

Project CG-721 transferred to "Abandoned Projects," June 30, 1957.

2. CG-655 - Crib Methods Selection Tests

This project was closed out effective July 1, 1957, as per H. P. Shaw's letter to H. H. Schipper dated July 12, 1957, because of the cancellation of Advance Engineering funds by the AEC. The head tanks will be used on another job. Water flow at the end of the test was too low on the Type "C" infiltrometers to be measured with water meters. The flow was checked with a calibrated container.

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3. CG-686 - In-Line Monitoring Instruments, Purex and Redox

A process design report (HW-51055) defines the revisions required to the scope of the project. Cost estimates, force requirement and critical material charts, and schedules have been prepared. It is estimated that the total project cost will be \$633,000 for a revised and enlarged scope of work, an increase of \$83,000 over the current authorization. A comment draft of the project proposal (Revision 1) has been circulated.

III. ORGANIZATION AND PERSONNEL

A. Personnel

D. H. Waldkoetter, Secretary, transferred to the Fuels Preparation Department July 8, 1957.

B. Safety

Safety while on vacation was the principal topic of discussion during the regular monthly safety meetings.

C. Inventions

Variable Lattice Control Means for Nuclear Reactors, by C. R. Anderson dated July 22, 1957.

D. Reports Issued

HW-48064 - Project Proposal, Rev. 2 - Redox Capacity Increase, Phase III (Project CG-643), dated June 3, 1957, by R. H. Silletto.

HW-49679 - Project Proposal - Additional Ventilation for Purex P & O Gallery (Project CG-766), dated May 10, 1957, by L. W. Finch.

HW-50661 - Project Proposal - Miscellaneous Improvements, UO₃ Plant (Project CG-767), dated June 10, 1957, by L. W. Finch.

HW-50695 - Project Proposal, Revision 1 - RMC Button Line, 234-5 Building (Project CG-734), dated June 11, 1957, by D. A. Snyder.

HW-51435 - An Analysis of the Need for Critically Safe Dissolvers at the Redox Plant, dated July 18, 1957, by R. H. Silletto.

Design Progress Schedule, Project CG-756, Fire Resistant Exhaust Filters, Z Plant, dated July 11, 1957.

Design Progress Schedule, Project CG-734, RMC Button Line, 234-5 Building, dated July 25, 1957.

Construction Status Chart, Revision 1, Project CA-513-E, Second Remote Crane, dated July 30, 1957.

Manpower and Expenditure Schedule, Revision 1, Project CA-513-E, Second Remote Crane, dated July 30, 1957.

Chemical Processing Department Five-Year Forecast of Equipment and Plant Acquisition and Construction Work, by D. R. Gustavson, dated July 5, 1957.

HW-51055 - Process Design Report, In-Line Instrumentation, Redox and Purex, Fiscal Year 1957 Program, by R. N. Donelson and R. J. Pence, dated July 1, 1957.

Letter "CG-655 - Crib Methods Selection Tests" to H. H. Schipper, AEC, from H. P. Shaw, dated July 12, 1957.

Letter, O. C. Schroeder from J. B. Fecht. "Purex In-Line Instrumentation Sample Gallery Improvement Program," dated July 23, 1957.

Standards for Office Space, by G. B. Smith, dated July 16, 1957.

E. Trips

There were no off-site trips made by Facilities Engineering Operation personnel during the month.

F. Visitors

Roy C. Duncan, Duncan Equipment Company of Seattle, Washington. D. W. Carlson, Packaging Engineering, Visking Corporation of Terre Haute, Indiana.

Francis Muro, Technical Sales Representative of Visking Corporation, Seattle, Washington.

The above named individuals visited HAPO on July 23 to discuss plastics development.

HP Shaw
Manager
Facilities Engineering Operation

HP Shaw:FC:mh

CHEMICAL PROCESSING DEPARTMENT
RESEARCH AND ENGINEERING OPERATION

JULY, 1957

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ADVANCE PROCESS DEVELOPMENT

Plutonium Recovery From Stored Wastes

At the request of the Atomic Energy Commission, the technical and economic feasibility was evaluated for the recovery of plutonium from the underground stored wastes. It was concluded that the recovery of the plutonium in the stored wastes is probably technologically feasible but prohibitively expensive. The plutonium is associated with sludges, most of which are stored in tanks not equipped for sluicing operations. Many of the sludges were produced in the waste scavenging program, and therefore contain ions not heretofore encountered in solvent extraction operations. The value of most of the wastes per unit volume is less than the estimated cost of reprocessing, based on cost records from the metal recovery program. There appears to be little incentive, therefore, to undertake the required development and construction programs, since the predicted recovery costs of about \$160 per gram would exceed the value of the plutonium recovered.

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Research and Engineering.

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Irradiated uranium with exposure rates of 4.2 to 6.5 MW/T (300 to 633 MWD/T) and cooling times of 101 to 139 days was dissolved and prepared as solvent extraction feed during the month. After a test dissolving of one nine-ton charge of 92-day "cooled" material, which had been added to a normal dissolver heel, failed to produce sufficient iodine to detect in samples taken downstream of the prototype dual-pass silver reactor, eighteen tons of 72 to 84-day "cooled" uranium were charged to an empty dissolver. Again samples taken for radioiodine analyses at the midpoint and downstream samplers of the prototype reactor were below detectable limits, although more than twice the normal amount of uranium has been dissolved without a reactor regeneration. Based on overall plant iodine emission data during the test, the efficiency of the prototype dual-pass silver reactor at the present time is greater than 99.99 per cent. A subsequent eight-fold increase in iodine discharge from the stack was attributed to increased iodine released from the vessel vent system (the silver reactor is presently out of service) during processing of the short "cooled" material.

Solvent Extraction

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

<u>Cycle</u>	<u>Log Decontamination Factor, dF</u>		<u>Instantaneous Waste-Loss, Per Cent</u>	
	<u>Uranium</u>	<u>Plutonium</u>	<u>Uranium</u>	<u>Plutonium</u>
Precycle	3.4	3.4	(a)	0.33
Partition	1.1	1.7	(a)	0.18 (IBU=0.04)
Final	3.2	3.1	0.004	0.04
Overall	7.7	8.2	--	0.55

(a) No uranium analysis.

The overall decontamination performance of the plant was excellent during the month in spite of decreased decontamination in the HC and IC Columns due to temporarily poor interface control. Poor response of the 2A Column interface probe also continued to be a problem; however, the decontamination and recovery performance of the column has not been appreciably affected. Reduced pulse frequency and increased 2AF temperature (40° to 50°C) were used to stabilize column operation.

All batches of both plutonium and uranium met specifications except the final batch of plutonium (See Plutonium Concentration); however, the gamma activity of the uranium product increased to the upper limit just prior to shutdown. A hot five per cent sodium carbonate flush of the 2D Column failed to reduce the gamma ratio of the uranium product to normal (0.4 to 0.5) at startup, but decontamination performance became normal after several days of operation.

In general, the overall plutonium recovery was improved over previous month's operation. This improvement is attributed to the reduction of HCW and 2BW losses by the addition of sulfuric acid to the HCX and 2BX streams. Reduction of the sulfate concentration in the 2BX from 0.005 M to 0.004 M had no effect on the 2BW plutonium losses (0.01 per cent), but complete elimination of the sulfuric acid from the 2BX at startup resulted in losses up to 0.4 per cent. Increasing the HCX sulfuric acid concentration from 0.0035 M to 0.005 M and decreasing the HCX nitric acid from 0.1 M to 0.01 M reduced the HCW plutonium losses two- to three-fold; however, the effect on the IAW plutonium losses has not definitely been determined.

Two different attempts to process three successive batches of HAF to which 2WW had been added resulted in excessive HCW plutonium losses (up to 0.9 per cent). Addition of 0.005 M sulfuric acid to the HCX did not appreciably reduce these losses. Coincidental with the second 2WW rework attempt, unstable and lower than optimum frequency operation of the HA Column caused a HAW plutonium loss up to 1.9 per cent which was not attributed to 2WW reprocessing.

Extensive flushing of the 2B Column during shutdown removed 25 per cent of a normal day's plutonium production which is a factor of ten greater than normal column holdup. It is now hypothesized that this buildup of polymer caused flooding in the 2B Column (and eventual plant shutdown) by restricting the cross-sectional area within the column. In order to prevent the continued accumulation of plutonium in the 2B Column, the 2BX nitric acid concentration has been increased incrementally from 0.01 M to 0.11 M. No change in the performance of the column has been noted.

The demineralized water filter, containing 98 individual Fulflo Fiberglass elements, became plugged with a black oily substance after processing an estimated nine million gallons of water. However, only about 1.4 million gallons were filtered by the replacement cartridges before these became plugged with similar material. An investigation is currently underway to identify and determine the source of this substance.

Plutonium Concentration

Plant operations were suspended one day prior to the scheduled shutdown because an organic phase was detected in the final plutonium concentrator. This condition resulted from undetected flooding in the 2B Column which permitted excessive amounts of solvent to be transferred into the plutonium concentration equipment. Approximately one and one half day's production of plutonium was contained in the degraded solvent drained from the concentrator while an additional day's production was removed when the equipment was extensively flushed with nitric acid. This off-standard plutonium product is being processed through the Recuplex facility.

Completion of the prototype plutonium concentration continuous ion exchange equipment was delayed beyond the target date of August 1, 1957, by a complete work stoppage of Minor Construction pipefitters for the entire month of July. Other craft work is essentially complete.

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Solvent Treatment

Prior to the July shutdown, precycle upsets caused a peak in gamma activity in the I00 of 3400 uc/gal; however, the activity level soon returned to a normal 1700-1800 uc/gal. Alkaline-permanganate washing (0.01 M KMnO_4 - 5 per cent Na_2CO_3) of the I00 during plant shutdown further reduced the gamma activity to 800 uc/gal. Despite this low solvent activity at startup, samples indicated the I00 immediately increased rapidly to 5400 uc/gal. Accelerated carbonate wash changes and centrifuge cleanouts, coupled with the use of both centrifuges, slowly reduced the gamma activity of the solvent to 2600 uc/gal. Incomplete cleanout of the G3 organic centrifuge, after the alkaline-permanganate solvent washing, now appears to have been responsible for the unusual activity surge.

Both solvent treatment systems functioned without operational difficulties during the month. The gamma activity of the 200 ranged from 14 to 37 uc/gal and the overall solvent losses were 0.37 per cent of the solvent throughput. Nitric acid flushing of accumulated "cruds" from the Second Solvent Treatment System resulted in the removal of 1.6 per cent of a day's plutonium production.

Waste Treatment

Processing of solvent extraction wastes was normal in the Waste Treatment and Acid Recovery sections of the plant. Waste volumes sent to the 241-A Tank Farm were 144, 393, 26 and 210 gallons per ton of uranium processed for neutralized IWW, solvent washes, centrifuge cleanouts and cell drainage, respectively. Coating wastes equivalent to 290 gallons per ton were stored in 241-C Tank Farm. The high solvent wash volume reflects the special batch washing of solvent and the equipment flushing during shutdown. Overall waste losses for the month were 0.88 and 0.26 per cent for plutonium and uranium, respectively. Coating waste losses for plutonium and uranium amounted to 9 and 31 per cent, respectively, of the overall loss.

After the second attempt to process three successive batches of HAF containing about 1700 gallons of 2WW again resulted in excessive HCW plutonium losses (up to 0.9 per cent), 2WW backcycle was discontinued until additional laboratory information is available.

Self-concentration has commenced in TK-241-A-101, and all Purex wastes except coating removal are now routed into this tank. The current boil-off rate is three gallons per minute. A self-concentration plant study program centering around 241-A-103 tank, which is evaporating water at a rate of 9.1 gallons per minute, involves the following phases:

- (a) determination of the tank temperature profile,
- (b) monitoring for NO and NO_2 ,
- (c) exposure of corrosion coupons within the tank vapor space,
- (d) routine liquid and vapor phase sampling, and
- (e) incremental increase in sodium ion concentration toward 9.0 M.

Although the NO_2 evolution from the 241-A-103 Tank has dropped off to an apparently normal 10 to 30 ppm in the off gases, excessive corrosion of the black iron condenser vent system from previously high concentrations (700 ppm) will require that replacement of certain equipment pieces be made.

Test Program

The test program in the Purex Plant for the next six months was documented in HW-51332, "Purex Test Program - July Through December, 1957", G. C. Oberg, (Confidential), July 11, 1957.

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REDOX TECHNOLOGY OPERATIONFeed Preparation

The dissolvers were operated 70 percent of the month, processing metal having exposures ranging from 325 to 633 MWD/T at power levels of 4.3 to 6.5 MW/T. The iodine-131 emission to the stack averaged 0.56 curie per day of dissolver operation with metal cooling periods of 107 to 127 days. Although one of the silver reactors was regenerated twice and one, three times, these two continued to be the main source of the iodine emitted throughout the month. The apparent efficiency of the silver reactors for the period of the dissolver operation was 98.85 percent.

Testing of the potential effects of nitric acid, recovered from the UO_2 Plant and the 293-S Redox Nitric Acid Recovery Facility, on Redox dissolver time cycles was completed. The final series of tests was made using 50 percent nitric acid for the initial addition and 53 percent acid for the incremental addition, with the balance of required acid (equivalent to one-fifth of the total acid consumption) being added as 60 percent to achieve the optimum over-all time cycles. Time cycles were demonstrated equivalent to 156 percent of Phase II in three up-draft dissolvers and equivalent to 192 percent in three down-draft dissolvers. Since a lower initial acid concentration tends to reduce iodine emissions to the stack, use of 47 percent nitric acid for the initial addition and 60 percent for the incremental addition was resumed upon completion of the tests.

Permanganate treatment was employed exclusively in preparing the HAF batches, approximately 40 percent of which contained rework solution ranging from 16 to 49 volume percent and averaging 22 percent. The rework material resulted from earlier (June) acid flushes of process equipment, and concentrated salt waste batches collected during periods of HA Column losses caused by accidental under-salting.

The excessive dilution of the HAF resulting from a leak in the helical coil of the feed solution oxidizer necessitated coil replacement by July 11, three days after the start of continuous processing. The failed coil had been installed on September 26, 1956. The replacement coil is a helical type made of 304-L stainless steel welded with 308-L rod without subsequent heat treatment.

Solvent Extraction

The extraction system was operated at rates up to 120 percent of Phase II with an interruption occasioned by failure of the HAIS pump and by operating difficulties with the centrifuge feed jets which required their replacement. The new HAIS pump, No. 9, has glass bearings instead of the carbon bearings used in the earlier pumps in this position. Recent inspection of one of these earlier failed pumps disclosed that a carbon bearing was bonded so tightly to the shaft that it was necessary to chip it off with a hammer in order to remove

it. The shaft surface was not damaged and no evidence of interpenetration was found. However, if this resulted from swelling of the carbon (known to occur) upon exposure to the peculiar chemical characteristics of the HAIS stream, it is to be hoped that glass bearings will solve this problem.

All product batches met specifications except twelve 2EU batches which contained too much radio-ruthenium and were ozonated. Eight of these twelve 2EU batches met specifications and the others were blended in the storage tanks with material meeting specifications. The high gamma activities were caused by extensive rework operations and temporary high acidity in the HAIS stream.

Throughout the July operation, the LAX flow ratio was maintained at 30 percent above the ratio used in June. Since this flowsheet change, the LAW and 2AW plutonium losses have shown none of the erratic high values characteristic of the earlier operation with high MWD/T metal and low LAX ratios. Preliminary laboratory studies show that rapid reduction and polymerization of plutonium may occur in the hexone phase of two-phase, acid-deficient systems simulating the 1A Column scrub section. Also, the apparent rate of this reaction leading to plutonium deposition is markedly increased by increasing the initial plutonium concentration. The plant and laboratory data indicate that the plutonium re-cycle and deposition problem which had recurred since January probably resulted from acid and plutonium concentration conditions unique to the 1AP stream. Studies are being continued to confirm this explanation of the deposition and to find the most economical means to prevent recurrence.

The 2A Column flowsheet tests, made to determine whether inadequate plutonium oxidation in the 1AFS concentrator was a cause of 1A Column losses, were continued until the success of the LAX ratio increase was apparent. Stepwise reductions in the extractant flow were made until 2AW losses of about 0.2 percent were reached at an aqueous-to-organic volume ratio of 2.3 in the extraction section. After a demonstration period of approximately 36 hours at the 2.3 ratio, the ratio was reduced to 1.5 to diminish the hazards of unusual losses during 2AF acidity reductions.

The 1AFS concentrator tube bundle which had been installed in June, 1954, failed and was blanked off. Concentration is being effected with the alternate bundle, and the failed bundle will be replaced at a convenient time.

Waste Losses

Over-all recoveries were 99.82 percent for uranium and 99.48 percent for plutonium. The principal losses resulted from accidental undersalting of the HA Column on start-ups. Significant losses were incurred on discarding residues from the June acid flushes and as a consequence of a plug in the HAIS line. Some plutonium-bearing wastes worth reworking had to be discarded because of storage limitations or the presence of emulsifying materials.

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DECLASSIFIEDWaste Storage

The solvent-extraction waste volume averaged 1093 gallons per ton of uranium, a reduction of approximately 12 percent from the previous month, but still exceeded the flowsheet value by approximately 18 percent. Waste volumes were raised above flowsheet values by the extensive rework operations. Coating waste volumes for the period averaged 143 gallons per ton of uranium dissolved, representing a reduction of approximately 16 percent from the figure for the previous month.

FINISHED PRODUCTS TECHNOLOGY OPERATIONURANIUM CONVERSION OPERATIONProcess Performance

A total of 9 carloads were shipped during the month. One carload shipped failed to meet particle size specifications. The large particle size was attributed to a failure of a hammermill screen, the formation of a bridge in the cyclone, with subsequent carry-over of large particles in the overheads, and possible overloading of the hammermill. The total metallic impurity content (TMI) averaged 102 parts per million parts of uranium, and the gamma radioactivity ranged from less than one to 31 percent of that of aged natural uranium. The reactivity ratio (925°C reduction and 600°C hydrofluorination) averaged 0.81.

Nine hundred twenty-nine pounds of nitric acid per ton of uranium processed (90% of theoretical) were recovered. The average acid concentration was 46 percent. Operation of the lucky pots and water addition to the H-Cell off-gas wet separator accounted for the low acid concentration.

Continuous Calciners

Agitator damage occurred in only one calciner (L-Cell) during the month. The first failure was due to tramp steel in the calciner and occurred immediately after a start-up. A second failure at the number four feed injection point, in the same calciner, occurred after three days of operation and is unexplained. After removal of the number four feed injector and thermowell, and repair of the agitator paddle, operation of the L-Cell unit was continued satisfactorily with only three feed injection points functioning. Excessive shell temperatures at the missing feed point location, however, limit maximum production rates.

Modification of the K-Cell unit to prevent agitator blade interference is complete and the calciner is ready for start-up. These modifications provide for maximum clearances between agitator blades and feed points, the installation of guide rings on blades adjacent to feed points, and removal of thermowells from the paddle rotation radius.

The wet separator for off-gas clean-up has operated successfully in H-Cell. Although entrainment with a baffle submergence of six inches was sufficiently high to carry all the separated uranium into the off-gas line as a solution, inspection after ten days of operation revealed the vent pipes to be clean. The baffle submergence is being changed to three inches and additional cooling capacity for the recycled acid is being installed to decrease both entrainment and evaporation losses. Scoping of a permanent installation to replace the present Adams dry filters is in progress.

The powder conveying system is being modified to achieve proper air velocities at all pick-up points and one pick-up bin is being modified, on a test basis, to minimize the frequency of pluggage at this point.

DECLASSIFIEDMETAL FINISHING OPERATIONTask I and II

Equipment shakedown and acceptance testing of the new continuous processing facility was completed. Shift coverage for the operation is being provided during the start-up period.

Recuplex

A total of 39 runs were processed through the Slag and Crucible Hood, including 14 Task III fragment runs, 4 cleanout runs, 2 Task IV crucible runs and 19 combination Task III fragment and powder runs. Slurry losses averaged 2.2 percent of the recovered plutonium (1.3 percent cribbed). Eleven of the Task III fragment and eight of the combination Task III fragment and powder runs contained ten crucibles per charge. These runs were the first to test a new dissolver flowsheet using 2.5 mols of aluminum (vice 3.5 mols) to complex each fluoride ion following dissolution. The runs were processed without a coagulation period except for the length of time provided by transfer and hold-up in the filter feed tank. Filter operation and subsequent solvent extraction processing of this feed appears to be normal. The test will be continued.

The solvent extraction hood averaged 1410 liters of feed per day to the columns at an operating efficiency of 80 percent, giving an instantaneous rate of 1760 liters per day. The waste losses averaged 0.0060 grams per liter or 0.89 percent of the feed. The high waste losses and low volume throughput were caused by the presence of large quantities of decomposed solvent dissolved in the feed. A procedure was issued which provides for solvent washing of these solutions to remove the decomposition products MBP and DBP before reprocessing.

PROCESS CHEMISTRY OPERATIONPROCESS ASSISTANCEPurex Process Studies

The recovery problem which arose when approximately 64 liters of organic containing 10 kg of plutonium were accumulated following inadvertent concentration of solvent in the plutonium concentrator has received laboratory attention directed toward the development of a process for recovering the plutonium in Recuplex. Since the bulk of the organic was assumed to be dibutyl phosphate (DBP), which strongly complexes plutonium(IV) and (VI) but does not complex plutonium(III), it was tentatively planned to blend the organic with solvent and strip the plutonium out as plutonium(III) with a reducing agent.

Laboratory experiments with this organic (diluted 10 to 100-fold with 15% TBP in CCl_4) indicated that exhaustively stripping it with a reducing agent alone will recover only 80 to 90 per cent of the plutonium. The recovery was limited by plutonium extraction coefficients (E_a^O) of greater than 10 after the first few stripping stages, and varied only slightly with different reducing agents. Apparently, the large excess of DBP over the plutonium prevented further reduction to plutonium(III). In a variation of this procedure, it was found that addition of zirconium(IV) to the reducing agent in an amount slightly in excess of that required to complex the DBP permitted the remainder of the plutonium to be reduced. In this instance, the measured plutonium E_a^O , with 3 M HNO_3 , 0.05 M Fe^{+3} , and 0.3 M Zr^{+4} in the stripping solution was less than 0.1 and remained constant through several successive contacts of the organic with fresh stripping solution. Greater than 99.9 per cent plutonium recovery was demonstrated by this procedure. Though direct analyses were not made, it was inferred from the results of the tests that the DBP concentration in the organic was 3 to 5 M and the oxidizing normality was 1.5 to 2.

This procedure for recovering plutonium complexed with DBP by reducing the plutonium in the presence of zirconium ion may be applicable to the Purex HC or LBX Columns when processing backcycled 2WW, which frequently contains DBP.

Additional work was done to characterize the effect, on plutonium loss to the HCW, of H_2SO_4 addition to the HCX. By means of the plutonium retention test, whereby a fixed amount of plutonium is extracted into the solvent and then removed by three successive stripping contacts, it was shown that the plutonium retained in IOO with 0.005 M H_2SO_4 as the strip was 20 to 30 per cent of that retained using 0.01 M HNO_3 , with or without uranium present. With 30% TBP spiked with 0.05 g/l DBP, the plutonium retention with the H_2SO_4 strip was 0.5% of that with 0.01 M HNO_3 ; with a chemically-degraded diluent spike, the plutonium retention with H_2SO_4 was 30% of that with HNO_3 .

Mercuric ion has been reported to catalyze the degradation of Amsco 125-82 in contact with 10 M HNO_3 (ORNL-1610). 5×10^{-4} molar mercuric ion is currently added to Purex dissolver solution to inhibit iodine evolution. In a laboratory check of the effect of mercury under Purex conditions, no degradation of 30% TBP in Shell E-2342 diluent could be attributed to mercuric ion concentrations as high as 0.1 M in 95 hour contacts of the solvent with 2 M HNO_3 at 40 C

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(roughly HA Column acidity and temperature). Dilute uranium E_a^0 's were used to detect the degradation. They indicated that about 0.03 g/l DBP was formed, independent of mercury concentration.

Redox Process Studies

Recent observations made in studying the problem of the deposition of plutonium in the scrub section of the Redox 1A column have indicated that the deposition is a function of the organic phase plutonium concentration. The data supporting this conclusion were obtained in a study of the stability of synthetic LAP of varying plutonium concentration in contact with LAA (scrub) solution at 55 C. In these studies, an L/V of 1.3/20 was used. The organic phase (LAP) contained 0.8 M uranium and the LAA contained 1.3 M $Al(NO_3)_3$, 0.4 M UO_2^{++} , -0.2 M HNO_3 , 0.01 M $Cr_2O_7^{=}$, and 0.11 g/l plutonium. Solution stability was determined by measurement of changes of soluble plutonium content and plutonium distribution with time.

In these experiments, it was found that when the plutonium concentration was less than 0.08 g/l, both the plutonium distribution (E_a^0) and the LAP concentration remained constant for four hours. When the concentration was increased to 0.10 g/l, the E_a^0 decreased from an initial value of 1.3 to 0.1 after two hours and to 0.07 after four hours. The plutonium concentration in the LAP dropped to 45 per cent of its initial value in two hours and 40 per cent in four hours. The following table illustrates more fully the effect of plutonium concentration on deposition.

Plutonium in LAP before contact, g/l	Plutonium E_a^0			Plutonium lost from LAP, %	
	0 hr, 25C	2 hr, 55C	4 hr, 55C	2 hrs.	4 hrs.
0.02	1.2	0.8	0.8	0	0
0.05	1.2	0.8	0.8	4	1
0.07	1.2	0.9	0.8	3	0
0.08	1.2	1.2	0.6	0	4
0.10	1.3	0.1	0.07	55	60
0.13	1.4	0.07	0.04	66	67
0.14	1.5	0.07	0.03	73	76

In the experiments at the higher plutonium concentrations, the appearance of the aqueous phase indicated the formation of plutonium(IV) polymer. Increasing the acidity of the LAA from -0.2 M to 0.05 M HNO_3 prevented the plutonium deposition and gave an E_a^0 after four hours of 0.6, rather than the previously measured 0.08. Changes in sodium dichromate concentration in the LAA had little effect on deposition.

Uranium(IV) was investigated for use as an alternate reducing agent in the LB Column. In a batch countercurrent run using LBX containing 0.03 M U(IV), 1.3 M $\text{Al}(\text{NO}_3)_3$, 0.05 M HNO_3 , and 0.1 M sulfamic acid, the plutonium loss after two stages of extraction was 0.4 per cent, with a constant E_a^0 of 0.003. The uranium concentration in the LBP after three scrub stages was 0.3 per cent of the plutonium. The uranium E_a^0 in the scrub section was between 4 and 6, indicating that almost all of the uranium in the scrub section was uranium(VI). The uranium(IV) E_a^0 under scrub conditions has been measured at about 0.7. The flow ratio used in the run was $\text{LBF}:\text{LBX}:\text{LBS} = 330:23:70.4$. The uranium(IV) was prepared by adding a 1.5-fold stoichiometric excess of aluminum powder to LBX made with UNH and refluxing for one hour at 65C with occasional stirring. The solution was clear and green.

Waste Scavenging Studies

A scavenging procedure was recommended for Tanks 101-B and 103-B designed to reduce the Cs-137 to less than 0.04 uc/ml, the Sr-90 to less than 0.03 uc/ml, and the Co-60 to less than 3×10^{-4} uc/ml.

ANALYTICAL ASSISTANCE

Evaluation of Alpha Scintillation Counter

An evaluation of the alpha scintillation type counter as a possible replacement for the alpha Simpson proportional counter was conducted during the month. Comparative control data indicated that the scintillation counter could operate within the limits previously designated for the ASP. The deviation around the daily geometry controls for the scintillation counter at the 95% confidence level was ± 0.093 geometry units while the deviation around the mean geometry of 41.26 was ± 0.053 . Comparable figures for the ASP were ± 0.218 and 50.19 ± 0.042 .

QUALITY CONTROL AND STANDARDS

During the month the Quality Control program for the Chemical Processing Department analytical laboratories was maintained as usual, and the Standards Laboratory continued the production of calibrated glassware and standard solutions. The calibration and checking of geometry discs for the alpha counters was in good control at month end.

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DECLASSIFIED234-5 DEVELOPMENT OPERATIONContinuous Ion Exchange

A week-long run made in the laboratory-scale continuous ion exchanger during the past month provided further confidence in the Purex anion exchange process. Operation was chemically satisfactory in all respects over the temperature range of 50 C - 70 C and over the feed acidity range of 5 M - 7.2 M HNO_3 . The equipment is operable in excess of desired Purex flow rates. Difficulties may be anticipated in the operation of inlet and outlet stream filters.

The exchanger was operated with Dowex 1-X4 resin. The columns were reduced from 1" diameter to 1/2" diameter to permit prolonged operation, were provided with heated water jackets to permit closer temperature control, and the product outlet was raised above the slip-water outlet to permit effective separation of these streams. Operation was on a 10-minute cycle consisting of 9.5 minutes of solution flow and 0.5 minute of resin flow.

Flow rates were based on the desired specific feed rate of 54 mg Pu/min/cm². Operation was maintained at rates from this minimum to as much as 30 percent greater. The resin flow rate was varied to maintain a fixed color line position in the XA column. This resulted in quite low resin loading, 50 - 70 g Pu/l. The elutant (0.35 M HNO_3) flow rate was varied to maintain a fixed color line position in the XC column. The product from this operation is consistently near to its equilibrium value of about 58 g Pu/l. No attempt was made to keep waste losses low in the short columns of the laboratory-scale unit. The longer Purex unit columns will provide satisfactorily low waste losses.

Separation of slip water (XSW) from product was accomplished by a timer giving a ratio of XSW/XCP of about 3/1 - 3.5/1. The XSW concentration was allowed to reach 1 - 2 g Pu/l to minimize product dilution.

Some important findings of this run are summarized:

1. The ratio of slip-water flow to resin flow appears to depend on the volume of resin pushed for this equipment:

$$(\text{ml resin per cycle})(\text{XSW/XAX flow ratio}) = \text{constant (about 24)}$$

A similar relationship should be valid for the Purex equipment.

2. A pressure of 10#/in² has been found satisfactory to move the resin under most conditions, though pressures to 25#/in² have been necessary at times. In general, higher pressures tend to compact the resin, making it more difficult to flow. Higher pressures will also cause plugging of outlet filters more rapidly.
3. A stainless twill filter cloth was used as the XAW outlet filter. This behaved well for most of the run, but eventually plugged. The same problems will exist in the Purex equipment. The filters should be arranged for easy replacement.

4. Accidental shorting of the pressure chamber probe caused ejection of the resin from the exchange equipment. The same possibility exists in the Purex equipment and suitable precautions should be taken. This phenomenon could be made use of for column emptying, provided a suitable receiver and piping are provided. Nuclear safety of such a receiver would need investigation.
5. Gassing occurred in the XA column on several occasions due to inadequate temperature control. Gassing in the XC column occurred upon heating to 80 C, with deposition of plutonium polymer on the resin. A run at 70 C was satisfactory in all respects.
6. Low acidity of the feed (5 M HNO_3 or lower) seriously decreases XA column capacity and increases waste losses. In event of lower acidity feeds, the operating temperature should be increased to improve kinetics of the absorption.
7. The product may be decontaminated from Zr-Nb activity (DF = 250 or better) with moderate XAS flow (XAS/XAX = 2.5 or better). Ru-Rh activity is less effectively removed (DF = 30 or better at above scrub rates). Inadequate scrub flow lessens decontamination effectiveness.
8. Resin accumulates appreciable fission product activity on continued usage. Scrubbing removes this activity only slowly. The available data are as follows:

<u>Approximate Hours of Operation</u>	<u>Activity, γ/min/ml</u>	
	<u>Zr-Nb</u>	<u>Ru-Rh</u>
26	2.2×10^5	1.6×10^5
38	1.0×10^6	9.0×10^5
After 8 hours elution and scrubbing	4.4×10^5	5.6×10^5

9. Removal of metallic impurities was effective to the extent of 5 - 100-fold reduction. Improvement should be expected with more effective scrubbing.

Ceramic Development

Slip casting tests with calcium fluoride were continued. Ball milling periods of 24, 18, 12, and 8 hours were tried using -48 mesh calcium fluoride calcined at 1200 C, deflocculated with Daxad. Twelve hours seems to be most satisfactory. Tests to eliminate blister formation by adjusting the firing conditions are now in progress.

In support of continuous Task III, a pattern for a ceramic reduction cell was designed, and plaster molds were being made at the end of the month. Earlier in the month LS-5 magnesia thistle tubes (small bore diameter 0.3 inch) were successfully made for use in the reduction cell.

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Work was continued on the fabrication of aluminum buttons for testing the guillotine button cutter. After preliminary work, aluminum castings were made in copper molds fabricated jointly with 234-5 Maintenance. An oversize aluminum button, about 1-1/8 inches thick, was successfully cut. It cracked into two parts upon application of about 20 tons to the cutter blade.

Continuous Task I

Two continuous plutonium oxalate precipitations were made in the Task I prototype, using Redox feed. The filtrate from both runs was continuously killed with permanganate at 45 C in the laboratory prototype unit. The permanganate leg worked satisfactorily, but reaction in the peroxide leg was too violent when 10 percent peroxide was used. Even 2-1/2 percent peroxide reacted vigorously and continuous operation could be maintained only by operating with the peroxide addition just a few inches below the takeoff line. The production unit may not encounter this trouble since it has a much larger cross section (four-inch diameter) than the laboratory unit (one-inch diameter).

Reduction of Plutonium Trifluoride

Nine-hundred grams of off-standard (colorwise) blue plutonium fluoride was received from process. This was split into two equal batches and reduced in magnesia and calcium fluoride crucibles. Yields of 98 percent were obtained on each button, assuming the powder to be the plus three fluoride. Yields would be 104 percent if the powder were assumed to be the plus four fluoride. The mole ratio of I_2/Pu was 0.8. An excess of 0.6 calcium was used. Buttons were well formed. Metallic impurities totaled <454 ppm and <550 ppm in the first and second reductions respectively.

The above reductions indicate that the poor reduction yields obtained in the reduction of wet precipitated fluorides were probably due to oxide formation on the surface of the powders.

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 July, 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.

Inventor(s)Title

None

None

BUSINESS TRIPS AND VISITORS

H. H. Hopkins, Jr., Manager 234-5 Development Operation and R. A. Schneider of Process Chemistry Operation visited Mr. W. K. Eister and Dr. F. R. Bruce of the Oak Ridge National Laboratory on July 1, 1957 to exchange technical information. Mr. Hopkins also visited Drs. F. G. Foote, B. Blumenthal and S. Lawroski on July 2 and 3, 1957 to exchange technical information.

K. M. Harmon, Manager Process Chemistry Operation visited Mr. L. O. Binder at the Montana State College, Bozeman, Montana on July 26, 1957 to present a talk before members of the Fourth Chemistry Institute, Rocky Mt. Session.

Edward Schmidt of Schenectady visited Messrs. Richards and Irish on July 2 and 3, 1957 to obtain information for the Chemical Engineering Achievement Award.

F. T. Selleck and E. F. Edwards of the Fluor Company, and Ray Walton and J. I. Stevens of the AEC-Idaho Falls and Phillips Petroleum Co., respectively, visited Messrs. R. E. Tomlinson, A. M. Platt, B. F. Judson, M. J. Szulinski and R. G. Barnes on July 22, 1957 to discuss problems associated with calcination of radioactive waste.

Dr. G. A. Burney and E. L. Field visited Messrs. H. H. Hopkins, Jr., L. I. Brecke and R. E. Smith on July 29, 30 and 31, 1957 to exchange technical information; also visited E. R. Irish on July 31, 1957 to discuss Purex process and Ion Exchange.

RB Richards
Manager, Research and Engineering
CHEMICAL PROCESSING DEPARTMENT

RB Richards:jap

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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 fire responses during the month, one CPD and one AEC Geological Survey. Both were of a minor nature with no fire loss.

B. Fire Extinguisher Service, 200-E, 200-W, Batch Plant, BY Phone Exchange and Yakima Barricade

During the month 435 fire extinguishers were inspected, 15 installed, 11 delivered to new location, 15 seals broken and not reported, 28 serviced and 415 weighed.

Seven gas masks were serviced and 32 inspected. There were 22 hand lines inspected.

C. Operation Alert - July 12, 1957 - 8:30 A.M.

All employees of CPD participated in the National Civilian Defense, by leaving their work locations and reporting to the evacuation busses and then returning to their work. One bus load of employees went along with the busses that made the trip to the staging area. CPD participation was successful, with only minor errors noted.

D. Training of Personnel in other Operations

There were 42 employees of other operations who attended meetings held by Fire Protection Operation covering artificial respiration, Chemox mask, and industrial gas mask.

E. Services to other Operations.

On July 5, 1957, Fire Protection personnel washed down around Badge House and street in front of 202 A Area at 200 East for contamination.

F. Fire Apparatus

One new Ward LaFrance 750 G.P.M. pumper was received from the vendor during the month. The new truck passed all tests satisfactorily and was placed in service.

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UNION RELATIONS OPERATION

Ten sessions of the Labor Relations Conference series were held during the month. Attendance and interest in those participating was considerably improved.

A situation developed within C.P.D. which was somewhat comparable to the 200-West Laundry case which the Company lost at the arbitration level. The HAMTC was asked for its concurrence in the establishment of a PQ shift in the Finished Products Operation in order to expedite the repair and maintenance of equipment. The HAMTC refused to give their O.K., the result being that the Company put into effect an XYZ shift arrangement which did not require negotiation with the Union.

The HAMTC has evidenced a widening scope of activity on two counts: (1) they have directed a letter to the Company questioning why a suggestion award was not made to an employee, and (2) they wrote a letter to the Company protesting the fact that the Metropolitan Life Insurance Company had turned down the claim of an employee whose dependent wife was hospitalized for complications incidental to pregnancy. Union Relations participated in an investigation of this case and payment by Metropolitan was subsequently made.

Due to layoffs that are taking place within certain crafts the HAMTC has expressed new and greater concern over matters of jurisdiction. They are aggressively making the Company aware of its contractual responsibilities as far as recognizing jurisdictional lines is concerned.

Several discussions and meetings have taken place with HAMTC representatives regarding Davis-Bacon problems. The Union's position is not entirely clear, but in view of current layoffs, Davis-Bacon considerations are receiving close scrutiny by union representatives.

Objective effort has been made in an attempt to place on jobs for which they are qualified, the employees who are handicapped by severe medical restrictions. One or more grievances on this subject have been processed by the Union, but the HAMTC has given informal recognition and concurrence with the Company's objectives and action taken.

	<u>July</u>	<u>June</u>
Bargaining unit employees in C.P.D.	949	967
Bargaining unit employees utilizing check-off	621	644
Percentage of total bargaining unit employees using check-off	65.4%	67.0%

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

	<u>Unit</u>	<u>Nonunit</u>
Grievances received year to date	88*	1
Grievances pending at Step II on 6-30-57	9	0

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	<u>Unit</u>	<u>Nonunit</u>
Grievances received during the month	6	0
Satisfactorily answered at Step I	2	0
Settled at Step I through expiration of 90-day time limit	3	0
Processed at Step II	2	0
Pending at Step II on 7-31-57	8	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.

HEALTH AND SAFETY OPERATION

<u>Chemical Processing Department</u>	<u>July</u>	<u>June</u>	<u>Year to Date</u>
Disabling Injuries	0	0	1
Serious Accidents	0	5	6
Medical Treatment Injuries	60	47	396
Overexposure Incidents	0	1	3
Potential Overexposure Incidents	1	0	3
Radiation Occurrences	28	24	184
Fires	1	4	13
Security Violations	2	1	20

Comments on Statistics

A fall-out of contamination from the Purex 291-A Stack was investigated as Potential Overexposure Incident CPD 57-3. Actual exposure to personnel was not significant.

Although the numerical increase in radiation occurrences was slight there were five cases with significant potential for whole body gamma overexposure as compared to four such cases during the first six months of the year.

Safety Programs

Lillie S. Meyers, Lab Assistant in Redox Operation, was selected as Who's Who in Safety for June. She was nominated by Dorothy A. Ricketts. Both ladies were presented certificates by the Acting General Manager. Appropriate publicity within the Department and in the G. E. News featured the announcement.

The third quarter safety program will stress individual participation in Department Safety Meetings.

The Chemical Processing Department was the recipient of the National Safety Council's Award of Merit for achieving over one million man-hours without a Disabling Injury. From September 1, 1956 through March 8, 1957 the Department total man-hours worked was 1,915,302. The award was publicized in the G. E. News and in a Health and Safety Program Flyer.

One As We See It reminded all employees of the 4th of July highway traffic hazards. Vehicle bumper and dash stickers emphasizing safe driving habits were available in all badge houses.

Six messages were posted on the marquee boards.

The Accident Prevention Council was featured in a G. E. News story.

A safety Flash was issued regarding an employee who was hospitalized when a painful back condition occurred at work. There was no accident so the condition was not a disabling injury. The purpose of the Flash was to improve understanding of injury classification and to prevent rumors about the severity of the employees condition.

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A color cartoon type pamphlet, "Do We Still Need Safety", was procured from the National Safety Council and distributed to all Department personnel.

Training and Instruction

A third talk was presented on Current Radiation Protection Problems.

About 40 hours were spent with AEC Radiological Physics fellows visiting the Department; tours and talks were given.

Advice and Counsel

202-A - Access and repair of sulfuric acid tank and piping - procedure
222-S - Improve fire protection of building roof - recommended
234-5 Development Lab - Disposal of waste materials - information
222-S and HLO - Temporary installation of 150 pound anhydrous ammonia cylinder
in 222-S - approved
HLO - National Bureau of Standards Handbook 24, "Safe Handling of Radio-isotopes",
review and comment
234-5 Recuplex - Removal of eye protection requirement - approved
276-S - Method of inspection and testing fire detector and fog system - recommended
202-S - Handling and storage of dry chemical drums - fork lift attachment recommended
293-S - Ladder and platform requirements - recommended
P & GM - Request to use metal hard hats - not approved
P & GM - Request to substitute air test for hydrostatic test of jumpers - not approved

Inspection, Investigation and Audit

The Redox audit was completed. Report of the Uranium Reduction follow-up audit was issued.

Three delayed injury reports were investigated. Two were reclassified as personal. The third is pending additional information from supervision.

Reports Issued

Potential Overexposure Incident - CPD 57-3
Progress Report - CPD 1957 CY Radiation Protection Goal

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PERSONNEL PRACTICES OPERATION

	<u>Exempt</u>	<u>Non-exempt</u>	<u>Total</u>
<u>Additions to Payroll</u>	1	13	14
New Hires	0	0	0
Reactivates	0	5	5
Rehires	0	0	0
Re-engages	0	0	0
Transfers into C.P.D.	1	8	9
Promotions from nonexempt to exempt	0	0	0
<u>Removals from Payroll</u>	1	31	32
R.O.F.	0	2	2
Retired	0	1	1
Deceased	0	0	0
Illness	0	3	3
Leave of Absence	0	0	0
Transfers out of C.P.D.	1	18	19
Promotions from nonexempt to exempt	0	0	0
Resigned	0	7	7
E-7-U To be married	0	2	2
E-9-C Another job	0	1	1
E-24-C To seek another job	0	2	2
E-1-C Going into business	0	1	1
E-12-U To return to former home	0	1	1

Requisitions for Personnel (Non-Exempt)

Number on Hand 7/1/57	7
Number Received	10
Number filled	13
Number on Hand 7/31/57	4

Transfer Requests (Non-Exempt)

Number on Hand 7/1/57	168
Number Received	8
Number Transferred	0
Number on Hand 7/31/57	176

Service Pins

A total of 24 pins were issued as follows:

10 Yrs. Service	19 Male	1 Female
5 Yrs. Service	4 Male	0 Female

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Attendance Awards

Pass folders were issued to 28 persons for perfect attendance as follows:

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

Twenty-three 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 month of July, eight employees in the Power Operator seniority group were declared excess and transferred in accordance with Bargaining Unit procedures. No ROFs or downgrades were given to CPD employees as a result of this excess. Three Jr. Power Operators were downgraded to miscellaneous operators in IPD. One FPD employee was downgraded to miscellaneous operator and transferred to CPD. The remainder transferred in classification.

Also during July it was necessary to reduce CPD's craft force by five. Here again, Bargaining Unit procedures were followed and no CPD employees were downgraded or received ROFs; all transferred in classification to available openings in other HAPO components.

CPD also has three more excess Jr. Power Operators who will be transferred to other components. As a result of these transfers, three Jr. Operators on the bottom of the seniority list will receive ROFs.

Requests for Transfer (Exempt)

Number on Hand 7/1/57	29
Number Received	1
Number Transferred	0
Number Closed Out	1
Number on Hand 7/31/57	29
Number of Interview Trips	0

Applications for Employment (Exempt)

Applications received during July	2
Hired	0
Closed Out	1
Invited for Interviews	1
Open Requisitions	2

A meeting was held July 18 with the managers of Employee Relations, the three operating plants, and Power and General Maintenance to arrive at a plan of action for completing the cases of exempt personnel now considered available and to determine specific names of personnel affected. While efforts will be continued to find suitable assignments for these people, if nothing can be developed in this direction they will be removed from the payroll or, where applicable, be offered a non-exempt job.

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Suggestion Plan

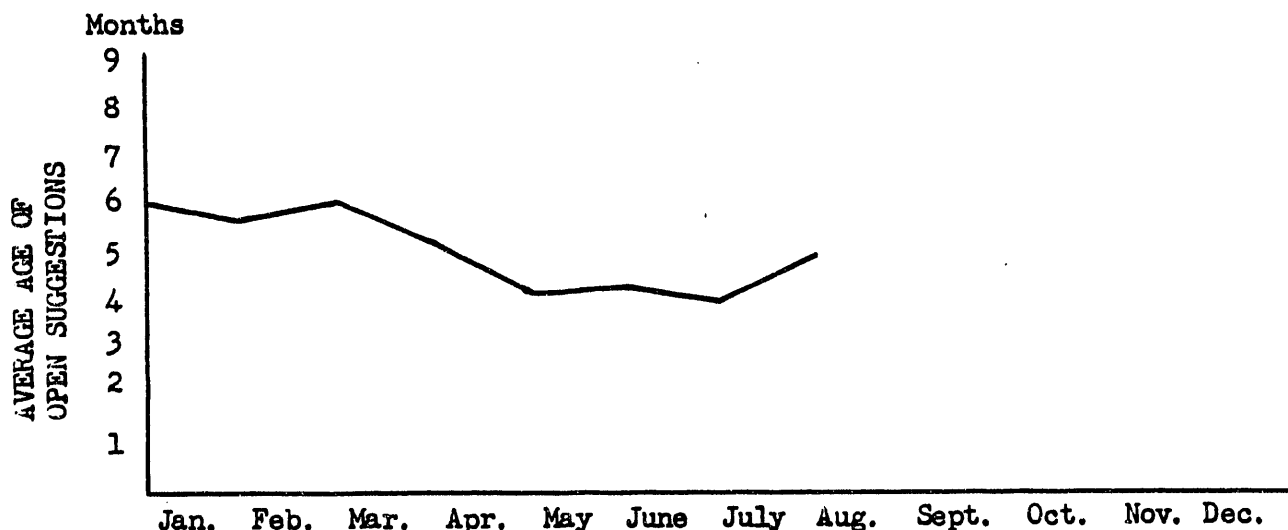
	<u>June</u>	<u>July</u>
Suggestions Received	82	68
Acknowledgments to Suggestors	77	78
Suggestions Pending Acknowledgment	16	6
Suggestions Referred to Operation for Investigation	77	78
Suggestions Pending Referral to Operation	16	6
Investigations Completed and Closed	66	62
Adopted Suggestions Approved by Board	1*	1*
Adopted Suggestions Pending Approval by Board	37	68
Total Net Tangible Savings	None	None
Total Cash Awards Paid during Month	None	None

* Adopted with no award

In addition to the above suggestions there are 49 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	265	232
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During the month of July the second suggestion plan status report was distributed to all 3rd level managers reflecting the number of outstanding suggestions in each operation. In addition to this it showed the number of suggestions received from each operation with evaluation completed, the number of suggestions adopted, and the total amount of awards and tangible savings for the month of July as well as for the year to date.



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Participation in Benefit Plans

Insurance Plan
Pension Plan
Stock Bonus Plan
Good Neighbor Fund

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	June	July
Insurance Plan	99.7%	99.7%
Pension Plan	99.1%	99.2%
Stock Bonus Plan	58.4%	57.7%
Good Neighbor Fund	63.6%	65.1%

During the month of July one employee was retired on optional retirement effective August 1, 1957. All matters pertaining to his retirement with regards to Insurance, Pension Plan, Savings and Stock Bonus Plan, as well as Social Security and Unemployment Compensation were discussed with the subject employee.

Two General Manager's Information Meetings were held during the month of July with a total in attendance of 32 supervisory and exempt personnel, and 4 Technical Graduates, Business Graduates, and Chief Operators.

Our records now reveal that C.P.D. has a total of 132 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	12	13
Standby Reserve	13	8
Non Veterans	14	59
1A	(0)	(14)
2C	(1)	(0)
3A	(6)	(42)
4F	(7)	(3)
Selective Service	13	0
1A	(2)	(0)
2A	(11)	(0)
TOTAL	52	80

Deferments

Deferments Requested (July)	0
Deferments Granted	3
Deferment Requests Pending	2
Routine	1
Appeal	1

Standby Reservists Category 2R Requests

2R Requests	0
2R Requests Granted	1
2R Requests Pending	0

Personnel Development Program

	<u>Appraisal Notices Sent</u>	<u>No. Yet to be Returned</u>
Appraisal Notices for April	114	1
Appraisal Notices for May	110	4
Appraisal Notices for June	132	20
Appraisal Notices for July	76	52

Number scheduled for appraisal for the month of August - 108

Duplicating

Orders on Hand 7/1/57	52
Orders Received	835
Orders Completed	847
Orders on Hand 7/31/57	40
Total Copies Produced	158,194
Embosograf Signs Made	336
Verifax Copies Produced	811
Ozamatatic Copies Produced	15,418

Mail

Total pieces of Mail Handled	56,735
Registered Deliveries	372
Library Mail, Pounds	806

Addressograph

Instrument Charts Imprinted	8,108
Newsletters	2,947
"Do We still need Safety?"	421
Overtime Lunch Authorization Letter	421
CPD Training - July 1957	421

The results of the recent study of vehicle utilization has been placed in the hands of Level 3 managers for consideration. Along with the study a proposal has been made to establish automotive pools at the various buildings and facilities in C.P.D. utilizing all vehicles assigned to these locations into common pools.

At the regular Safety and Security Meeting for members of the Office Services Operation a six-year attendance award presentation was made by D. S. Roberts, Manager, Employee Relations, to one of the motor messengers, Mina K. Crume.

Improvements to the ventilation system in the 222-B Building are in progress; the work being about 40% completed. This work consists of installing extension air ducts into all offices for better air distribution. This is the first phase toward improving working conditions in this building.

A larger addressograph unit has been procured and will be placed in operation about the middle of August. This larger unit will provide complete addressograph service for C.P.D. and will eliminate the necessity of utilizing R&U equipment for this work. The unit will be installed in the 2705-Z Building, 200-West in the Mail Room and will be operated by personnel in the Mail Unit.

Due to a motor messenger resigning, it was decided to attempt to operate the 200-E Mail Room with the one remaining messenger. Schedules have been revised to provide the maximum service with this reduced force.

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DECLASSIFIEDSALARY & WAGE ADMINISTRATION

Investigation of the qualifications of the Radiographer position at 234-5 to meet exempt status requirements under FLSA conditions was completed and the facts placed in the hands of the legal counsel.

The decision was made to change the classification of all chemist positions to "professional" status under FLSA since the type of work involved requires advanced knowledge in a field of science and acquired by specialized instruction at a college or university.

Revaluation of the position "Supervisor, Analytical Landlord and Waste" was completed.

The Quarterly Salary Distribution Report was completed for the period April 1 - July 1, 1957. An analysis of CPD's position and comparison with Company and other department data was made and reported in separate letter to the General Manager.

A proposed modification to Section VI of the Salary Manual was sent out to other departments for comment. The intent is to more clearly define the philosophies which should be followed in the proper administration of salaries in connection with promotions and demotions.

A proposed reorganization for Employee Relations Operation was developed and associated charts and position guides prepared.

A 1.77 adder adjustment was authorized for application to nonexempt rates effective July 29, 1957 and to "fixed" exempt salary rates effective August 1, 1957. As of the end of the month all of the wage records have been revised to reflect the adjustment. Isolation was increased from \$9.42 per week to \$9.57 per week, effective July 29, 1957.

A meeting for the purpose of explaining the application of the January 28, 1957 Secretarial Plan was held with secretarial and clerical personnel in the Purex Operation.

A revision of proposed new definitions for Truck Driver, Heavy and Truck Driver, Light classifications has been received from J. J. Tegen and reviewed with CPD supervision directly concerned. The revision incorporates changes to the original proposal as suggested by CPD, hence is now acceptable to CPD.

A study was made by CPD Salary and Wage Union Relations and Personnel Practices to determine the need for establishing a 27 months rate as a hiring step for craft trainees. It was concluded that this should be established as a hiring rate step. Counterparts of these groups in other HAPCO components have reached similar conclusions. Further action on definite establishment is still pending.

Rate information for certain CPD classifications is in process of compilation for use by J. J. Tegen in connection with the pending Annual Northwest Area Wage Survey.

A revised job listing of all CPD non-unit, nonexempt jobs has been prepared and issued to CPD supervision concerned.

A compilation of the changes in rates pertinent to CPD was prepared and issued to supervision concerned, based on a new Davis-Bacon minimum wage rate predetermination effective May 10, 1957.

In connection with the reduction of force in the Ventilation Balancing crew in Power and General Maintenance, a meeting was held to determine whether a Power Operator, Journeyman should be laid off or a Junior Power Operator. From a Wage Administration standpoint it was determined that there is work warranting both classifications in the organization, hence it would be logical to lay off the journeyman, however a precedent was established in this crew for over a period of two years when only journeymen were assigned to the work. It was therefore concluded that because of this it would be necessary to lay off the one Junior Power Operator.

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

ADDITION TO ROLL

	<u>Exempt</u>	<u>Nonexempt</u>
New Hires and Rehires		0
Reactivations	0	4
Transfers From Other Departments	1	0
Reassignments from Exempt to Nonexempt	0	
Reassignments from Nonexempt to Exempt		0

REDUCTIONS FROM ROLL

Terminations	0	
R. O. F.		0
Deactivates and Leaves	0	0
Transfers to Other Departments or Divisions	1	17
Reassignments from Nonexempt to Exempt		0
Reassignments from Exempt to Nonexempt	0	

CHANGES IN STATUS (NO SALARY CHANGE)

Intra-Departmental Transfers	6	47
Reassignments - Title Change	1	
Level Changes - Increase		
Level Changes - Decrease		
Location Change		

CHANGE IN SALARY

Promotions		11
Demotions		2
Merits (Salary Review)	28	
Merits - Interim	1	
Automatics		35
Temporary Reclassification		10
Salary Adjustments		

REQUISITIONS

11

PERSONNEL DEVELOPMENT AND COMMUNICATIONS

A. Measurement Statistics

Participation in Training Courses		
Monthly Personnel		110
Non-Exempt Personnel Development	2	
Process and Equipment Orientation	6	
Craft Training	7	
Projectionist Training	2	
Radiation Protection Problems	8	
Data Processing	6	
Labor Relations	72	
Report Writing	7	
Weekly Personnel		42
Non-Exempt Personnel Development	10	
Process and Equipment Orientation	10	
Craft Training	15	
Projectionist Training	2	
Labor Relations	5	
G.E. Supervisory Selection Program - Number completed		3
Technical Graduates on Rotation		6
Summer Juniors Assigned		6
Summer Professors Assigned		1
Technicians in Training		5
Management News Bulletins		6
GE NEWS Items		8
Priority Messages		2
General Manager's Meetings with Exempt Employees		2
Films Shown		7
CPG's issued (Three new, nine revisions)		12

B. Comments on Statistics

The Chief Operators (Separations) are being included in the Labor Relations Conferences.

The two priority messages concerned the laundry shift schedule case and the cost-of-living increase.

C. Employee Communications

Eight items were published in the GE NEWS during the month. These included: An item about CPD firemen painting the Richland Red Cross Building; a front-page feature article and picture concerning a CPD family and the benefits they realized through the GE Insurance Plan; a picture and cut-line of a CPD retirement; an attendance award story; a picture, cut-line and story of the final "Who's Who" safety award winner; a picture and cut-line of the Technical Graduate Tour; a picture and cut-line of CPD's Accident Prevention Council and Award of Merit Plaque; and a picture and cut-line of a CPD patent award.

[REDACTED]

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The final revised letter of approval and plan for the 100-200 Area Circle Tour was submitted to Contract Administration for transmittal to the AEC. A tour guide, to be distributed to those employees attending the Circle Tour, has been submitted to HAPC Public Relations for GE PR approval and AEC approval.

Questions which are received on Round Table Evaluation Forms are being sent to the appropriate authority within the Department. During the month six letters were sent out.

The Round Table publication for August-September was prepared, approved, and distributed during the month.

D. Public Communications

Information concerning the fallout at Purex was furnished Press Relations, R & U, for their use in preparing a news release for the local papers. Additional information on the fallout was provided the AEC information officer on a Saturday at the request of the Tri-City Herald.

Final arrangements were made with Public Relations, R & U, concerning a tour of CPD facilities by the Military Liaison Committee. The Committee toured the UO₃ facilities and the Purex facilities on Wednesday, July 24th.

E. Personnel Development

Conference #1 of the Labor Relations series was continued. Thirty-seven percent of the exempt roll, and 20% of the Separations Chief Operators have attended these meetings during the past two months.

Eighty-eight Technical Graduates and summer juniors spent a full day touring the Chemical Processing Department. A lecture describing the work of the department preceded guided tours through Purex, Redox, Shops, and general facilities.

Preliminary investigations were made for courses in Value Analysis, Economics Discussion series, Safety Leadership, and New Supervisor Training.

Outlines were completed for pre-supervisory training for Chief Operators, Group Leaders, Supervisors-in-Training and key non-exempt specialists. It is designed to accommodate shift personnel.

Some revision and improvement of existing visual aids has been continued. Help was extended to one component personnel in organization and preparation of charts for training purposes within the component.

On two occasions, counseling in behalf of personnel self-development was offered as a part of the regular Non-Exempt Personnel Development Program. The employees are exploring opportunities and courses offered in Columbia Basin College.

Training Attendance Records of CPD personnel for October, 1956 through May, 1957 have been circulated. The records permit personnel measurement and/or supply other related statistics desired by the respective operations.

III.

ORGANIZATION AND PERSONNEL

A. Meetings

The Manager, Health and Safety and the Specialist, Radiation Investigation and Audit met with the Director of Industrial Relations of Dow Chemical's Rocky Flat Plant and other HAPO people to discuss problems of employees with tolerance of deposition of plutonium.

A total of 19 meetings were attended by Salary and Wage Administration personnel. Most important of these were:

1. Secretarial Plan discussion with Purex personnel
2. Meetings with other HAPO Salary and Wage Administrators.
3. Reduction of Power Operators with Power & General Maintenance management.
4. Meetings on Redox reorganization.

A meeting was held with representatives from FEO, Redox Maintenance and GE News in connection with a full page feature story on CPD's Integrated Maintenance Management program.

Five regular grievance meetings were held, four with the HAMTC and one with the Hanford Guards Union. Six meetings were held with HAMTC representatives concerning overtime and jurisdictional problems.

Twenty-eight meetings (Information, Safety, Security and Round Table) were held in Fire Protection Operation which were attended by all personnel in the operation.

Fire Protection personnel participated in 72 outside drills, 36 inside drills for a total of 418 man hours spent in training. There was 8,181 feet of hose and 379 feet of ladders used in these drills.

Twelve meetings involving the activities of Personnel Practices were attended during July by Personnel Practices personnel.

B. Safety and Security

There were no fires or security violations. Two medical treatment injuries were reported in Employee Relations Operation, one by Personnel Practices and one by Fire Protection Operation.

D. S. Roberts
D. S. Roberts, Manager
Employee Relations

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