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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

MAY, 1958

GENERAL SUMMARY

PRODUCTION

Operation of the separations plants was in accordance with the established schedules. Output of plutonium was slightly under the monthly commitment as a result of high production during the previous month.

The four remaining containers of waste material received from the Argonne National Laboratory were processed in Redox Plant during the month. All 16 containers of waste material have now been processed.

The production of UO_3 met the monthly schedule and commitment. Shipments of UO_3 were 65 tons ahead of the established shipping schedule at the end of the shipping period on May 20, 1958.

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ENGINEERING

A test of the Purex Plant dual-pass silver reactor with 75 day "cooled" uranium disclosed an efficiency for iodine removal of 99.95 percent. An additional three-fold reduction in emitted iodine resulted from passage through the nitric acid absorber recovery system.

Replacement of ferrous iron with hydrazine as the reductant for the 2nd U cycle feed was attempted in Purex Plant. Shortly after initiation of the test the decontamination performance declined as exhibited by sharp increases in the gamma activity in 2AF and 2DF streams. It is believed that the hydrazine re-entered the system with the backcycle stream. Laboratory study to determine the cause for the loss of decontamination has not disclosed the cause.

The solvent system operation under the Purex pseudo two-cycle flowsheet showed a reduction in solvent consumption to 0.20 percent of throughput. This is equivalent to a saving of \$4,000 per month in solvent costs compared to the three-cycle flowsheet.

An investigation of pressure surging phenomena in underground storage tanks (boiling waste) disclosed no significant difference between quiescent periods of 15 days or 4 days. The pressure surges upon agitation with air sparge units were 1.9 and 1.8 psig corresponding to 14.8 and 14.0 percent of the hydrostatic head. The total heat release beyond normal boiloff was 25×10^6 BTU in the ensuing 24-hour period. The results suggest that maximum overheat accumulation is about that which could be accumulated in one day. Pressure

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surges of greater magnitude than reported appear unlikely unless some mechanism for grossly unequal sludge depth is postulated.

A new design air activated powder discharge system was installed and successfully demonstrated on the "E" calciner in the UO_3 Plant. Some periods of erratic operation were experienced. These are correctable, and a more reliable and more efficient system is expected to result from this device.

Temperature control within the UO_3 Plant calciners during weekend shut-down periods was demonstrated to be practicable from an automatic control system activating the operation of the agitators for three minutes each 30 minutes.

Testing of DBRP (dibutyl butyl phosphonate) as a replacement solvent for TBP in the Product Recovery Operation disclosed problems in plant operation that necessitated discontinuance of the test. Further laboratory study of the process will be made.

Batch reduction of $PuCl_3$ with Ca requires iodine boosting to give a metal yield of 94 percent. Densities are satisfactory. Adhesion of the slag to the crucible continues to be a troublesome problem.

Studies of the continuous reduction process ($PuCl_3$ to Pu metal) demonstrate a need for more suitable materials of construction. An alumina crucible faced with thoria shows promise.

A report summarizing the various proposals for process development of krypton-xenon recovery facility at Purex was completed.

The study to estimate the gamma exposure received by personnel operating the RM-line in Finished Products Operation has been completed, and the final report is being prepared. The radiation study has shown that dispersed radioactive residues within the process hood interiors provide a principal source of radioactive exposure. To determine this contribution more accurately, the radiation study will include the startup of Hood 9A.

CG-717 - Transfer Facilities for Redox Non-Boiling Wastes was physically completed on May 5, 1958. The estimated final cost is \$291,000.

Installation of the facilities on Project CG-691, Improved Task I and Task II Facilities, is essentially complete, and the Physical Completion Notice is being prepared.

CG-770 - Feed System and Powder Pick-up Modifications, UO_3 Plant was completed and the Physical Completion Notice issued as of May 14, 1958. Final cost of the project was \$113,110, which is a \$21,900 underrun of authorized funds.

The first hot plutonium fuel element under the MTR project was completed during the month except for identification engraving.

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GENERAL

The HAPO General Manager's review of the plant operating budget for FY 1959, resulted in a decrease in the CFD submission of approximately \$1,000,000. The incurred cost portion of this reduction has been broken down to third level operations and the appropriate managers advised.

A revision of CFD's Advice on overtime is being prepared. This revision became necessary with the receipt of G. E. OPG 1.3 instructing that "planned" overtime worked by exempt employees required the same approval as that necessary for adjustment of salary rates.

Four grievances were discussed at Step II during May. One grievance concerned the right of the Company to make a payroll correction in the form of a deduction from a check representing 40 hours work without the employees permission. The HAMTC indicates informally that they will take the case to court. Similar circumstances exist in the Walker arbitration case now pending.

Herbert Wyckoff, attorney from Watsonville, California, has been appointed by the FMCS to hear the Graham arbitration case involving machinists and tool and die makers protesting their assignment to straight swing shift for a one month period.

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 Product 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 V. R. Cooper
Manager, Employee Relations Operation D. S. Roberts

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CHEMICAL PROCESSING DEPARTMENT
NUMBER OF EMPLOYEES
MAY 31, 1958

<u>OPERATION</u>	<u>EXEMPT</u>		<u>OTHER</u>		<u>TOTAL</u>	
	<u>4-30-58</u>	<u>5-31-58</u>	<u>4-30-58</u>	<u>5-31-58</u>	<u>4-30-58</u>	<u>5-31-58</u>
GENERAL MANAGER'S GROUP	10	10	1	1	11	11
PRODUCTION	7	7	3	3	10	10
PUREX	53	53	223	223	276	276
REDOX	63	63	264	261	327	324
FINISHED PRODUCTS	61	59	263	256	324	315
POWER AND GENERAL MAINTENANCE	43	43	224	225	267	268
FINANCIAL	19	20	47	46	66	66
FACILITIES ENGINEERING	74	73	21	23	95	96
RESEARCH AND ENGINEERING	64	65	23	23	87	88
EMPLOYEE RELATIONS	<u>30</u>	<u>30</u>	<u>55</u>	<u>54</u>	<u>85</u>	<u>84</u>
	424	423	1124	1115	1548	1538

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CHEMICAL PROCESSING DEPARTMENT

PATENT SUMMARY
FOR
MONTH OF MAY, 1958

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

T. R. McKenzie

TITLE

Method for Recovering Radiocerium
from Purex Process Acidic Wastes

J. H. Warden

ACTING GENERAL MANAGER
CHEMICAL PROCESSING DEPARTMENT

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CHEMICAL PROCESSING DEPARTMENT
PRODUCTION OPERATION

MAY, 1958

I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Production Statistics and Reports

1. Purex Operation

	<u>May</u>	<u>April</u>
Tons uranium processed	358.0	450.22
Average production rate during operation (T/D)	16.7	18.5
Total waste loss (%)		
Uranium	0.05	0.14
Plutonium	0.24	0.25
Average cooling time (days)	89	93
Minimum cooling time (days)	73	81
On-line efficiency (%)	69.3	81.5

2. Redox Operation

	<u>May</u>	<u>April</u>
Tons uranium processed	161.06	106.8
Average production rate during operation (T/D)	519.06 9.06	7.6
Total waste loss (%)		
Uranium	0.24	0.31
Plutonium	0.44	0.33
Average cooling time (days)	95	93
Minimum cooling time (days)	84	87
On-line efficiency (%)	57.5	47.2

3. 234-5 Operation

	<u>May</u>	<u>April</u>
Batches input to Task I	331	269
Runs completed through Task III	235	184

Waste disposal (units) 685.61 672.54

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4. UO₃ Operations

	<u>May</u>	<u>April</u>	<u>To Date</u>
UO ₃ loaded (tons)	570.35	474.12	
UO ₃ approved for shipment (tons)	507.92	559.14	27,392.62
UO ₃ shipped (tons)	506.78	513.75	26,970.05
UNH backlog (tons)	100	209	

5. Power

	<u>200 East</u>	<u>200 West</u>
Raw water pumped (gpm)	7,453	3,913
Filtered water pumped (gpm)	812	942
Maximum steam generated (lbs/hr)	151,000	117,000
Average steam generated (lbs/hr)	102,650	75,911
Total steam generated (M lbs)	76,371	56,478
Coal consumed, est. (tons)	5,151	3,803

6. Waste Storage

	<u>Equivalent Tons U</u>	
	<u>May</u>	<u>April</u>
Salt waste reserve storage capacity-Redox	2,888	3,049
Salt waste reserve storage capacity-Purex	13,944	14,303
Coating waste reserve storage capacity-Redox	41,018	41,179
Coating waste reserve storage capacity-Purex	42,641	43,000

B. Production Planning and Scheduling Operation

In addition to preparing several forecasts of tank farm needs for the CPD Five Year Programs, information was compiled for presentation to HOO-AEC concerning the same subject. Based on the assumptions used and accepting the concept that new salt waste facilities should be available prior to using the last tank in the current farm, the calculated need dates were:

	<u>Tank Farm Need Dates</u>	
	<u>Coating Waste</u>	<u>Salt Waste</u>
Purex	March, 1966	August, 1963
Redox	1974	1964

Factors which might influence the above predictions were also enumerated.

There has been no change in the liquid level of Tank 105-SX since the vapor system was blanked off on March 7, 1958. The test will be continued until June 15, 1958 and if no change in the liquid level is noted by that time, the seals will be removed.

Analysis of the static waste tank inventories taken during the past five months showed that the average precision for a single measurement was $\pm 2,545$ gallons (95% confidence level). The study involved 90 tanks and 450 measurements. A similar analysis last November showed a precision of $\pm 2,993$ gallons for a single measurement. In view of the excellent precision demonstrated over the past nine months, the feasibility of an alternate leak detection device for static waste tanks appears to be less justified.

A special equipment request was issued to obtain 3 flat cars offered at no cost except for transportation charges. These cars were made available by Spokane Naval Depot and offered through the General Services Administration.

C. Finished Products and Customer Liaison

The Fission Products Market Survey is progressing satisfactorily, with Phase 1, which includes the preliminary study and review of the over-all market growth pattern for fission products and other types of irradiation sources, nearing completion, and Phase 2, which includes detailed investigations of the various potential markets categorized by end uses, being started. At this time there is insufficient information developed and analyzed to make any forecast or assumptions of the potential market for fission products. It still appears, though, that the development of a military market will probably precede the commercial-industrial market. A meeting to review progress of the survey and make preliminary analysis for direction of future efforts, is scheduled for the first week in June.

D. Essential Materials

Liquid sodium dichromate received in late April was pumped into Redox storage tanks in early May. By receiving liquid material it is no longer necessary to store dry dichromate in the 275-EA warehouse and transfer it to the Redox plant in 20,000 lb. deliveries. The handling savings per year by using liquid dichromate is estimated at \$2,100.

Redox and Purex plants were contacted about receiving 28,200 lbs. of excessed potassium permanganate in 600 lb. (net) steel drums. The potential savings are significant and arrangements have been made to accept the material pending sample analyses.

E. Reports and Documents

1. Prepared and Issued

HW-55932 RD Redox Plant Production Schedule, May, 1958
B. F. Campbell

HW-55933 RD Purex Plant Production Schedule, May, 1958
B. F. Campbell

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HW-55934 RD UO₂ Plant Production Schedule, May, 1958
B. F. Campbell

HW-55935 RD 234-5 Plant Production Schedule, May, 1958
B. F. Campbell

HW-55970 Essential Material Consumption - Purex - Chemical
Processing Department, for April, 1958
M. A. Thress

HW-55997 Chemical Processing Department Waste Status
Summary - April 1 Through April 30, 1958,
R. E. Roberts

HW-56036 Essential Material Area Report to Cost and
Purchasing - Production Operation - Chemical
Processing Department, April, 1958, M. A. Thress

HW-56110 Purex Plant Shutdown, R. E. Tomlinson

2. Prepared for Signature and Issuance

HW-55915 Production - April, 1958, W. E. Johnson

III. ORGANIZATION AND PERSONNEL

A. Force Summary

	<u>Beginning of Month</u>	<u>End of Month</u>
Exempt	7	7
Non-exempt	<u>3</u>	<u>3</u>
Total	10	10

As a phase of the personnel development program, an exchange of personnel with Research and Engineering Operation took place on May 1, 1958. B. F. Campbell, Specialist Production Planning and Scheduling was transferred to Research and Engineering Operation, while D. McDonald of Research and Engineering Operation was transferred to the Production Operation as Specialist, Planning and Scheduling.

B. Safety

There were no plant injuries incurred by Production Operation personnel during May, 1958.

C. Security

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

R. E. Tomlinson
Acting Manager
Production Operation

CHEMICAL PROCESSING DEPARTMENT
PUREX OPERATION

May, 1958

I. RESPONSIBILITY

There were no changes in the scope of responsibility of the Purex Operation.

II. ACHIEVEMENT

A. Processing Experience

1. Production Statistics

a. Production - Percent of Monthly Commitment

Uranium	96.8 Percent
Plutonium	87.8 Percent

b. Production Rates

May 1 through May 21	2.16 CF
May 21 through May 31	Shutdown

c. Operating Continuity 69.2 Percent

d. Waste Losses

1. Processing Period Only

Uranium	.03 Percent
Plutonium	.16 Percent

2. Including flushes of the No. 2 organic system and the partition columns.

Uranium	.05 Percent
Plutonium	.25 Percent

e. Product Recovered from Waste Streams by Reprocessing

Uranium	18,520 Lbs.
Plutonium	250 Units

f. Product Recovered from UO₃ Plant Wastes

Uranium	9.25 Tons
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g. Product Re-treated in Silica Gel

Uranium	36 Tons
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h. Recovered UO_3 Acid Used (100%)

392,500 Lbs.

2. Normal Processing

Processing continued from the April production period at a 2.16 CF rate until the scheduled shutdown on May 21. During the processing period HC and 1A columns were bypassed and the No. 2 acid waste was recycled to the HA column as the 3WB stream. Performance was excellent until May 17 when a severe loss of decontamination efficiency occurred in the HA column. Both product streams ultimately exceeded the gamma specifications. At the time of this occurrence the plutonium stream was being routed through the L-Cell package because of a plug in the N6 ion exchange product concentrator. Both streams were initially recycled but when it became evident that this would materially delay the shutdown date, the uranium was transferred out for silica gel treatment and the out-of-specification plutonium was isolated for future processing through the ion exchange facilities. Some high activity material was carried out and was eventually processed through Z Plant.

The cause of the decontamination failure is uncertain, but the substitution of hydrazine for ferrous sulfamate as a reductant in the final uranium cycle is the most likely explanation. Rework of off-standard waste from F8, causing a time-delayed reaction, is the next most probable cause.

Prior to the plugging of the ion exchange product concentrator, the performance of the ion exchange facilities was satisfactory. Product quality was excellent but mechanical difficulties marred the performance. An excessive amount of "fines" caused sluggish movement of the resin bed, and resulted in frequent plugging of the overflow line and product piping before the unit was shut down. Efforts to put the unit back into operation after the plug was dissolved failed because of the sluggish resin movement.

During this processing period waste losses reached an all-time low of 0.03 percent for uranium and 0.16 percent for plutonium. Flushes of the No. 2 organic system and the partition columns increased the waste loss for the period to 0.05 percent for uranium and 0.25 percent for plutonium.

Self-concentration in the underground waste storage tanks 241-A-101, 102, and 103 continued at rates of 9.2, 6.5, and 2.6 gallons per minute, respectively.

3. Special Processing

The remainder of UO_3 Plant's sump waste material (9.25T) was processed through the final uranium cycle by increasing the rate by 2 T/D.

The off-standard wastes from No. 2 solvent system, containing about 250 units of plutonium, were composited in the F-8 rework vessel and three consecutive runs were processed with addition of this rework

material to them. Processing of these batches appeared to be normal; however, the loss of decontamination in the HA column took place approximately three days later and may have been the result of a delayed action. Further rework of the material remaining in F-8 will be undertaken after startup of the facility on the two-cycle flowsheet.

Nine cans of out-of-specification plutonium and large quantities of flush material from the final plutonium concentrator equipment were reprocessed through the head-end.

Prior to the shutdown several batches of uranium were recycled to reduce their activity and to accommodate the recycled plutonium.

Following the shutdown, the HA, HC, and LA columns were stripped and given a thorough flush. The ion exchange columns were thoroughly stripped and the resin removed and discarded. An extensive flush of the No. 2 solvent system was completed.

B. Radiation Experience

The total monthly emission of radioiodine was 15.5 curies. The weekly Purex limit of six curies was exceeded once when 11.2 curies were emitted during the seven-day period ending May 8.

The B-2 silver reactor broke through quite suddenly on May 1 to discharge 2.6 curies in a 24-hour period. After regeneration of the B-2 reactor the daily emissions remained at 1.6 curies. On May 6 the addition of mercuric nitrate to the metal solution was resumed. Since this date the average daily emission rate was 0.5 curies.

Five personnel were exposed briefly to plutonium air contamination in excess of assault mask limits without respiratory protection when a box of waste burned in the Hot Shop lobby. Bio-assay results indicated that no body deposition occurred.

Nine cases of skin contamination were incurred. All were readily decontaminated. An employee who received a contaminated puncture wound in N Cell was treated by Industrial Medical and the Hanford Laboratory Operation for the removal of contaminated skin tissues. Final surveys indicate minor body deposition.

Maximum dose rates encountered by Maintenance personnel during the month were: 2.5 rads/hr to repair process jumpers; 3 rads/hr to repair valves in the F-16 sampler valve pit; and 5 r/hr to repair the A Cell heater.

The radiation intensities from process equipment removed from the cells in conjunction with the two-cycle conversion have been low. For example; the LA column in the burial box measured 40 mr/hr at three feet. This burial box and another containing miscellaneous failed jumpers and waste were buried with excellent contamination control and maximum personnel dose rates of 100 mr/hr.

Two fires caused by spontaneous combustion of contaminated waste occurred during the month and resulted in spreads of plutonium contamination. The first incident resulted in contamination of

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the Hot Shop lobby to levels above 40,000 d/m and contamination of 40,000 d/m was spread to the Regulated Shop, PR Corridor, and the West Stairwell. Decontamination was completed in all areas except for portions of the Hot Shop Lobby. The second incident resulted in spread of contamination to the waste carton burial trench and the ground area in the immediate vicinity. The area was restored to normal by backfilling.

Plutonium contamination spreads in excess of 40,000 d/m occurred twice each in the PR Room and in N Cell at the XAS and XAF pumps. No personnel contamination occurred from these incidents.

The emission of radioisotopes from the 291-A stack remained low during the period.

C. Mechanical Experience

A scheduled replacement of the south drive wheel on the main crane was satisfactorily performed during a six-hour period on May 14. This change was made as a precautionary measure to prevent crane misalignment and/or wheel flanging as a result of the emergency replacement of the north drive wheel during April. The drive wheels need to be matched in periphery dimension.

Gear boxes were installed between the 200 HP motor and the compressor on each of the two Nash Hytor instrument air compressors. The gear boxes are designed to raise the compressor speed from 1750 RPM to 2050 RPM and supply an additional 20 CFM at 80 psig. With this added capacity one unit should be adequate to carry the load, whereas at present the alternate unit is continually cutting on and off. This change allows one unit to be held as a spare unit for maintenance repairs and/or increased demands.

The malfunction of the six-inch butterfly valve in the C Cell donut jumper required removal of the jumper from service on May 20. Replacement of the lower bonnet seal (neoprene and felt) was completed on the canyon deck following decontamination of the valve and shielding of the jumper.

The replacement of the leaking three-inch transfer line between the L-3 plutonium stripper and the L-4 No. 1 plutonium concentrator was completed on May 12. The leak occurred in a weldment at the point where a one-inch pipe was welded to a three-inch line.

The PJ-1 pump, which feeds 1A column, failed on May 3, 1956 due to a defective vapor seal. It was repaired and is being stored as a hot spare.

D. Analytical Experience.

During the past month a number of special requests have been made for analysis in addition to the normal flowsheet. Samples were received and analyzed for thorium to determine the effect of two-cycle operation on this element; for neptunium to determine its concentration and probable methods of recovery from the process; and for hydrazine as a replacement

for ferrous sulfamate. These analyses have been handled with no upset or holdup to process. The integration of 100 Area analytical work on reactor effluent samples and the Radiation Monitoring air sample counting is also continuing.

E. Improvement Experience

1. Process Tests and Revisions

A test was conducted using hydrazine as a replacement for ferrous sulfamate as a plutonium reductant in the final uranium cycle. Immediately the activity in the cycle jumped approximately three-fold. Four days later the decontamination performance of the HA column dropped suddenly and the use of hydrazine was suspended.

The acidity of the 2AS stream was increased from 0.75 to 1.0 M as a means of reducing the 2AX and 2BX streams and thus reduce the flow to the ion exchange. Shortly after the increase the 2BW losses increased and the acidity was returned to normal.

2. Inventions and Discoveries

No inventions or discoveries were reported by Purex personnel during May.

F. Events Influencing Costs

The ceramic berl saddle coating unit treated twenty-four cubic feet of saddles during the period. This represents a saving of \$2,760 to CPD below the best vendor bid estimate.

III. ORGANIZATION AND PERSONNEL

A. Safety

There were no disabling injuries or serious accidents at Purex during May. Six medical treatment injuries were reported during the month.

B. Security

There were no security violations reported during May.

C. Personnel Activities

L. F. Wirfs, R. DeJong, F. E. Owen, and K. L. Fowler completed PBM-I during the month.

F. J. Soback, Supervisor B Shift, Analytical Control Operation, was released for special assignment offsite. He was replaced temporarily by S. E. Wray.

SG Smolen:EAF:gt

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S. H. Smolen
Acting Manager
PUREX OPERATION

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CHEMICAL PROCESSING DEPARTMENT
REDOX OPERATION

MAY, 1958

I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Processing Operation

1. Production Rates and Operating Continuity

Processing operations were maintained as per schedule throughout the month. Operations were started at 0930 on 5-12-58 and production rates were maintained at 100% of nominal except for short periods prior to and following three shutdown periods encountered during the May production run. On 5-19-58 and 5-26-58, the silo operation was shut down for approximately 22 and 15 hours, respectively, for flushing of the 2D column to relieve flooding conditions. On 5-30-58 processing operations were interrupted for approximately 6 1/2 hours to replace the O-1 to O-2 organic pump which failed due to a cracked bearing during routine operation.

The monthly production commitment was exceeded by 0.7% while operating at 58% of the total hours in the month. The mechanical efficiency for the period was 98%.

All UNH produced during the month was within shipping specifications; however, 32, E-12 batches with excessive gamma activity were ozonated and processed through silica gel to meet shipping specifications.

During April the process encountered excessive organic losses from the condenser vent system, the losses originating from column flooding. To improve control in this area, a dilute HF-HNO₃ flush of the 1A, 1S, and 2D columns was completed during the May shutdown period. Subsequent operation of the 1A and 1S columns has been very satisfactory. However, the anticipated improvement in 2D column operation was not achieved and additional control techniques are currently being sought.

Product waste losses for the month were satisfactory, averaging 0.44% and 0.24% for plutonium and uranium respectively. Because of high gamma activity and the probability of other undesirable contaminants, two batches of D-9 waste accumulated from the HF-HNO₃ flush mentioned above, and containing a total of 28 units of plutonium and 34 units of uranium, were discarded to underground storage.

in the determination of optimum column interface positions. Future use is planned in evaluating fission product partitioning in the 1B column.

C. Waste Handling and Decontamination Operation

1. Waste Handling

Redox Coating Waste Received (S Farm)	26,855 gallon
Redox Salt Waste Received (SX Farm)	149,439 gallon
Total Gallons Boil-Off Salt Waste	143,376 gallon
Salt Waste from SX Farm to U ^W Farm	38,500 gallon
Waste Received at TX (221-U)	8,250 gallon

2. Equipment Decontamination and Repair

a. Regulated Steam Pit

A total of eleven vehicles, five pieces of heavy equipment, and four miscellaneous items were decontaminated during the month.

b. Railroad Equipment

A total of 2¹/₆ manhours was charged to this operation. The work included the decontamination of five locomotives, four well cars, two spacer cars, and one agitator flat car. Repairs were made to three cask lids and six flatcars were papered for various customers.

c. 221-U Building

Two spent silver reactors were flushed and recharged for the Redox Operation during the month. However, when the first unit was removed from the canyon cell base-plate prior to shipment, the bottom screen failed and released the Berl saddles from the unit. The cause of the failure has not been determined and plans are now being made to cut into the reactor in an effort to determine the cause. No difficulties were encountered with recharging the second unit and at month end this unit was ready for shipment. Other work included decontamination of the Purex E-1 agitator, decontamination and rewiring of the electrical head on the Redox D-2 agitator, and decontamination of one Redox F-1 pump and two rotometers.

3. Special Activities

Facilities provided under project CG-717, "Transfer Facilities for Redox Non-Boiling Wastes", were activated during the month and the transfer of supernatant liquid from the 103-SX tank to 101-U was started on 5-23-58. A total of 38,500 gallons was pumped during the report period at flow rates up to 50 gpm. Radiation levels at the pump pit and transfer box during pumping

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Iodine-131 emission to the 291-S stack was well under control throughout the month averaging 0.48 curies per day. No uncontrolled high emissions occurred. During the processing of metal with cooling periods less than 90 days, emission quantities of 1.2 to 1.6 curies per day were noted.

The four remaining containers of waste material received from the Argonne National Laboratory were processed this month. Since these containers contained alkaline wastes, in contrast to the acidic wastes previously processed, additional precautions to assure recovery and complete dissolution of the solids present were taken. All 16 containers of waste material have now been processed through the Redox Plant without incident.

B. Maintenance Operation

During the latter part of April a suspected leak in the F-5 evaporator coil was confirmed by hydrostatic testing. A new unit was installed on 5-1-58 without incident. The failed unit was moved to the 221-U Canyon Building for decontamination and repair.

A new L-17 tank was installed in the 233-S Building Greenhouse this month to receive the L-16 sump waste. The new tank is designed to be critically safe, thus providing a safe method of handling product bearing sump waste.

The experimental direct drive agitator, which was removed from the D-2 crib sampling tank during April and sent to the 221-U Building for decontamination, inspection and repair, was reinstalled this month. Although no electrical faults were found in the motor wiring or junction box, a new connector plate and new contact points were installed. The electrical troubles experienced with the experimental unit have therefore been attributed to a malfunctioning electrical wall connector. Pending further investigation, the power supply for the unit has been temporarily run through a wall service outlet. Operation of the experimental unit, since its installation on May 12, has been satisfactory. At this point it is not anticipated that the success or failure of this experimental agitator will have any immediate affect on the Redox agitator program. However, it may serve as a more immediate benefit to the Purex agitator program.

Considerable preventive maintenance was accomplished on the 60 Ton Canyon Crane during the May shutdown period. This included replacement of the bearings in the drive shaft gear box, the brake drum on the right hand side, the motor generator brushes, and the bearings on one of the main drive gears. The left hand optic head was also replaced during the month because of its failure to change optic powers.

Eighteen canyon jumper installations were made during the month. Nine of these were new jumpers installed under project CG-686, "In-Line Monitoring Instruments - Redox and Purex". Four continuous gamma monitors are now in active service and are being used

were unexpectedly low, a maximum reading of 5 mr/hr. being observed through the pump pit cover blocks.

On 5-28-58 a prototype air-lift circulator was installed in the 113-SX pump pit. However, the assembly lacked approximately three feet of seating on the riser flange, indicating either an obstruction in the tank or that the tank bottom has buckled. Further checks are being made at month end to determine the exact trouble. An extensive leak check of the 113-SX tank has been started and plans to route the salt waste to another tank are currently being made.

D. Analytical Control Operation

Specific activity and the Isotope Correction Factor for Chalk River material in shipment No. 6 were evaluated this month. A summary of the analytical results has been forwarded to the S.S. Accountability Operation for use in furnishing a statement of plutonium and uranium received to the AEC.

Programs conducted in the multicurie cells of the 222-S Laboratory Building by the Chemical Research and Development Operation, dealing with fission product recovery and Purex type solvent extraction improvements, went "hot" this month. These programs are expected to continue for six to twelve months and will add about 400 samples and 1200 determinations per month to the laboratory work load.

In preparation for taking over the soil testing program from the Chemical Effluent Technology Operation of HLO, four soil columns have been set up and are currently being operated by 222-S Laboratory personnel. During May, 146 Sr-90 analyses were made and it is expected that during June the work load will double.

Moisture absorption tests were conducted on two new types of silver reactor Berl saddles for the Facilities Engineering Operation. Results of the tests indicated a definite inferiority in absorption qualities.

E. Radiation Monitoring Operation

Radiation control in the Redox Operation was very good during the month with only three radiation occurrences recorded. One radiation occurrence involved a process operator who received a localized over-exposure of 1200 mrem to a skin area during cask car decontamination work.

One contaminated equipment transfer was made from the 202-S Building to the 221-U Canyon Building this month without incident. The equipment included an F-5 evaporator and miscellaneous cell jumpers which are to be decontaminated and repaired. A maximum dose rate of 1450 mrad/hr at six inches was measured through the transfer box.

Personnel dose rates to perform crane maintenance work for the most

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part remained unchanged from the previous month. Dose rates up to 2000 mrad/hour at six inches were encountered during the inspection and repair of the drive bearings and brakes on the 60 Ton Canyon Crane.

F. Improvement Experience

1. Process Tests and Revisions

Information related to this item is covered in the Research and Engineering portion of the Department Report.

2. Inventions or Discoveries

There were no inventions or discoveries of a patentable nature reported in the Redox Operation during the month of May, 1958.

G. Events Influencing Costs

The Redox manpower force was reduced by two with the transfer of a painter and the voluntary retirement of a millwright journeyman.

During April, the "Equipment Not In Construction" Budget increased from a monthly average of \$30,000 to \$46,140 mainly due to the arrival on-site of the D-4 condensate evaporator which was ordered over two years ago. This equipment piece accounted for \$28,441 and a centrifuge modification and mock-up accounted for \$10,274. At the end of April, 83% of the equipment budget has been spent or committed.

Spare parts reductions during the month totaled \$5,536. The net decrease to date for CY 1958 is \$13,260.

A bid was submitted this month to the Irradiation Processing Department for the decontamination of all dummy slugs used in the 100 Area reactors. If accepted, the slugs will be decontaminated by remote process in the 221-U Canyon Building.

H. Plant Development and Expansion

1. Preparatory Engineering

Decontamination Building - Waste Handling and Decontamination Operation

The project proposal for the construction of an Equipment Decontamination Building near the 211-U railroad spur has been prepared and will be circulated for approvals early in June. Funds requested total \$170,000.

Cask Car Contamination

Progress was made this month in the program for cask flushing to reduce car contamination. The prototype casks in car No. 41

have been loaded at 100-DR and 100-H with a 10 minute flush as part of the transfer procedure. Representatives from each reactor building have observed and commented on the proposed equipment change. Two reactor buildings are equipped with the necessary piping for the flush and others will be equipped as car No. 41 is moved from one area to another. Samples taken from the wells of this car have shown excellent results. The Contingency Maintenance Request has been re-phrased to incorporate the above information and has been submitted to the CPD General Manager for approval.

2. Design and Construction Liaison

CG-783, Additional Fire Protection, 222-S

The project proposal was approved by the AEC Review Board on May 22, 1958 and a directive is currently being prepared.

CG-718, Fission Products Isolation

The scope of the packaging portion of the project has been completed and approved. An estimate of the cost for this portion of the project is \$700,000. The Commission has not yet issued a directive for the design of the wet chemistry portion of the project.

CG-722, Utilization of 224-U Acid at Redox and Purex

A work authorization was issued this month to the CPFF contractor for installation of the Redox tank car unloading facility.

CG-772, "E" Metal Dissolvers - Redox

Revision I of the Project Proposal was transmitted to the AEC on May 9, 1958. Comments have been returned on six drawings. Chief concern of the Redox Operation on the design is the adequacy of the vacuum provided in the water seal of the vessel lid. The designers have since included a secondary seal and vacuum breaker as suggested by the Redox Technology Operation.

I. Reports Issued

No secret reports were issued by Redox Operation personnel during the month of May, 1958.

III. ORGANIZATION AND PERSONNEL

A. Safety

There were no disabling injuries, serious accidents or incidents in the Redox Operation during May, 1958. Nine medical treatment injuries were reported during the month.

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A. W. HildeBrandt, Foreman Redox Maintenance Operation, was appointed chairman of the Chemical Processing Department's Safety Program Council, succeeding R. L. Smith of the Power and General Maintenance Operation.

B. Security

There were no security violations in the Redox Operation during the month of May, 1958.

C. Personnel Activities

G. H. Winsor, Supervisor Analytical Control, visited the Mallinckrodt Chemical Company Plant at St. Louis, the Union Carbide Nuclear Company Plants at Paducah and Oak Ridge, and the National Lead Company of Ohio Plant at Cincinnati to discuss the analytical procedures used in control of uranium oxide production, and to define some differences of opinion on specification items.

The following Redox Operation exempt personnel completed PBM-I during May, 1958: P. E. Alley, G. A. Halseth, A. W. HildeBrandt, J. E. Lee, R. P. Ringle, J. D. Ryan, and M. L. Short.

Charles B. Groswith
Manager
Redox Operation

CT Groswith:HWM:rc

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CHEMICAL PROCESSING DEPARTMENT
FINISHED PRODUCTS OPERATION
MONTHLY REPORT

MAY 1958

I RESPONSIBILITY

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

II ACHIEVEMENTS

A. Metal Finishing Operation

Schedules for both the production and delivery of unfabricated plutonium were met in spite of considerable difficulties during the month.

Mechanical and process problems which were experienced late in April continued into May. It was necessary to resort to overtime both in the repair of equipment and in operations in order to assure departmental operating continuity. Mechanical problems were in most cases related to equipment leaks which made it impossible to maintain satisfactory hydrofluorinator vacuum. The quality of feed received during May was lower than normal. Twenty percent of the material received from Purex contained at least twice as much fission product as is usually received.

B. Product Recovery Operation

Recuplex Operation was rather erratic during May with total throughput down significantly over that of April. A total of 37.8 Kg of plutonium was produced from 29 slag and crucible dissolver runs, along with 47 charges from powder and metal dissolvers. The columns operated at 62.6% efficiency at 1642 liters/day instantaneous rate, with column losses measured at 0.63% of throughput. Current backlog stands at 145.

C. Uranium Reduction Operation

May production was routine through the Uranium Reduction Operation with schedules being met easily on a five-day work week basis. Shipping schedules were maintained with the inventory of finished powder on hand rising to almost 500 Tons at month end. A total of 456,341 pounds of 100% recovered nitric acid was sent to Purex during the month along with 92,234 pounds going to Redox. At month end there is only 96 Tons of uranium as UNH stored in all locations awaiting processing through Uranium Reduction Operation.

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D. Maintenance Operation

The maintenance problems in Z Plant consisted mainly of equipment failures in Hood 9B (wet chemistry through fluorination) and in Task IV (remelt furnaces). The difficulties in 9B involved the drum filter cloth, the calciner banjo valves, and considerable difficulty with the fluorinator offgas piping. In Task IV the difficulties involved low vacuum which was finally traced to the presence of oil in the briquetted turnings from the machining operation.

In Z Plant two serious problems became evident during the month when the D-6 drain system and the 26" vacuum header lines were found to contain contamination bearing solids and liquids respectively. These problems are under study at month end.

In the Uranium Reduction Plant there were no major equipment failures. The performance of the continuous calciners was outstanding. Improvement work aimed at safety, automation and more satisfactory shutdown and startup conditions, continues.

E. Analytical Control Operation

A total of 8704 determinations were performed on 1518 samples received during the month. An increase in the number of plutonium-aluminum alloy samples from the Plutonium Metallurgy Operation (HLO) was noted. Also some preliminary analysis were made on plutonium-uranium alloy samples which PMO will be sending next month on a frequent basis.

F. Radiation Monitoring Operation

Fourteen radiation occurrences were documented in May as compared to eight for the previous month. Accumulated exposure associated with plutonium reduction, fabrication and recovery continue the downward trend to an annual rate of 2.5 r presently. A distinct improvement has been noted in stack emission of Plutonium since the installation of the additional filter box from Hood 9B (Continuous Tasks I and II).

A maintenance employee was temporarily restricted from radiation zone work as a result of deposition of plutonium from a puncture wound. Initial tests indicate 20% of the maximum permissible limit.

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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

In the Uranium Reduction Operation personnel reductions (6 people) which resulted from the change over from a seven-day to a five-day work week, make a total reduction of ten employees from the rolls of that operation during the past two months. This should have a significant bearing on unit costs in the future.

I. Plant Development and Expansion

1. Projects: Study, Scoping or Approval Phase

Engineering or plant studies are being conducted in preparation for presentation of project proposals for the incineration of wastes, and for additional fire protection at the 234-5 Building.

Engineering studies and project scoping are being conducted for additional plutonium fabrication equipment. This work is budgeted in the FY59 Construction Budget.

Project CA-798, Cribs and test wells for 234-5; CG-800, RMA Barrier Shielding; and CG-767 Revision 1 and Revision 2, UO₃ Improvements, are being presented for General Electric and Commission approvals prior to the start of detailed design.

2. Projects: Design and Construction Phase

Projects CG-745, RMC Fabrication Equipment; CG-734, RMC Button Line; and CG-722, UO₃ Nitric Acid Program, are in the design and procurement phases. Construction funds are, or are to be, released during the next report period.

Projects CG-723, Conversion of Recuplex; and CG-756, Fireproof filter replacement, are progressing in a satisfactory manner with procurement complete and construction underway.

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I. Plant Development and Expansion (Cont'd)

3. Projects: Completed

Project CG-691, Continuous Task I and II, has been approved as constructed but is not operable until seven major exceptions have been satisfactorily completed.

Project CG-770, UO₃ Improvements, has been accepted without exceptions and is completely satisfactory.

III ORGANIZATION AND PERSONNEL

A. Organization Changes

During the month J. J. Courtney, Manager, Uranium Reduction Operation, assumed, in addition to his regular duties, the management of the Product Recovery Operation. Mr. Courtney will continue in this dual capacity until the return of L. M. Knights, Manager, Product Recovery Operation, who is temporarily on loan to the Atomic Energy Commission.

L. A. Berry, Manager, Analytical Control Operation, has assumed, in addition to his regular responsibilities, those of the Manager of the Radiation Monitoring Operation, while G. E. Backman is on special assignment within the Finished Products Operation.

A. G. Gilbert, Specialist, Processing, Uranium Reduction Operation, retired during the month. His duties will be absorbed by the other Specialists, Processing in the operation.

D. R. Morgan, Supervisor, Analytical Control, terminated to take a position outside the company. His duties will likewise be absorbed by other supervisors in the Analytical Control Operation.

B. Safety Experience

No disabling injuries or near-serious accidents occurred during the month. Eight medical treatment injuries were experienced as compared with ten in April. The frequency rate decreased from 1.92 to 1.35.

C. Radiation Experience

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

D. Security Experience

No security violations were experienced during the month.

E. Personnel Activities

Eight exempt roll employees completed the Professional Business Management course (PBM-1).

Approximately twenty employees, exempt and non-exempt attended the various training sessions offered by the Employee Relations Operation.

Twenty-two employees of the Analytical Control Operation attended a "Poppy Refresher" course presented by the Radiation Monitoring Operation.

F. Miscellaneous

A. H. Hinkson, Supervisor, Processing, Metal Finishing Operation, attended a "Shops Operation" course sponsored by Manufacturing Services, at Bear Mountain, New York.

R. E. Olson, Contact Engineer, Finished Products Operation, General, consulted with Engineering Services in Schenectady, New York, regarding remote handling of plutonium ("Hands-Off Program").

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

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CHEMICAL PROCESSING DEPARTMENT
POWER AND GENERAL MAINTENANCE OPERATION

MAY 1958

I. RESPONSIBILITY

The responsibilities assigned the Power and General Maintenance Operation remained unchanged during May.

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 plants during the period covered by this report.

B. Inspection, Maintenance, and Replacement

Fabrication, assembly, and run-in of the 200-BR machining hood, for the Finished Products Operation, were completed on schedule and the unit was delivered to the 234-5 Building on May 21st. Assistance was also furnished to FPO on installation and startup of this complex piece of equipment.

Machining of tools, gauges, and other precision items in support of Project Quail is proceeding on schedule as directed by the Hanford Laboratories Operation. Machine loading on the tracer lathe required operation of this equipment on a round-the-clock basis from May 19 through May 24th.

Final machining of the first hot plutonium fuel element under the MTR project was completed on May 28th and, except for identification engraving, is ready for shipment. This project is behind schedule due to technical difficulties at 231-Z. A dummy fuel element was also completed for display at the Geneva "Atoms for Peace" conference.

Fabrication of a prototype silver reactor and off-gas heater for Redox is progressing on schedule. All metal forming on the heater has been completed; installation of electrical heating elements is in process, with lagging to follow. Forming of the exterior reactor shell is complete, and fabrication of the removable cartridge is 75% complete. Total completion of these units is scheduled for June 30th.

Major modification of a centrifuge, designed for 221-U, for use at Redox is approximately 95% complete. Modification of four obsolete pumps, and revision of vessels (an F-5 and H-4) also for Redox were completed.

The HS pulse column, completed last month, was shipped to Purex for installation during the two-cycle conversion shutdown.

Repair of the steam off-gas heater, which was damaged during Purex operating difficulties in A-cell, continues. As radiation exposure time is the controlling factor, completion date is indeterminate.

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Fabrication and installation of stainless steel and lucite hoods to enclose the chemical feed pumps for the anion exchange at Purex was started on May 23rd, with completion scheduled for June 6th. Included in this project, also, are the installation of an exhaust duct from the new hood and revisions to the exhaust line from the hood enclosing the anion exchange unit.

A new type drive head was installed on a Purex E-4 centrifuge. This experiment, under direction of FEO, is in the interest of solving problems encountered in the gravity and centrifugal force lubrication system normally provided in this centrifuge.

A total of 16 process jumpers were fabricated this month - 5 for Redox and 11 for Purex.

Two replacement filter boxes of new design were fabricated for the 26" vacuum system at 234-5, one of which was installed on an emergency basis due to failure of the original installation. Work on installation of seven vendor-fabricated filter boxes in the low vacuum system at 234-5 is 25% complete.

Installation of hood panels and guards was completed on three hoods under Project CG-691.

Miscellaneous work completed for the Plutonium Metallurgy Operation at 231-Z includes: Modification and installation of lead shielding and leaded glass on a machining hood to be used in preparation of U-233 fuel elements; fabrication of a stand and conveyor for use in X-ray of fuel elements; and machining of 1300 aluminum and plutonium.

Four major burials - three for Purex and one for Finished Products - were completed under controlled SWP conditions. No unusual incidents occurred and personnel exposure was held to a minimum.

Emergency repairs were completed to the Purex railroad tunnel gate resulting from the railroad engine accidentally striking and demolishing one-half of the gate. The damaged unit was replaced by a gate from the "B" facility perimeter fence. A new gate is being procured for "B" facility.

Four diversion boxes were opened to permit changing of pipe jumpers to accommodate the redistribution of waste from Redox to tank farms.

Installation of instrumentation equipment, for measuring coal consumption, was completed on four out of five boilers in the 200 East Powerhouse. Calibration work continues on the fifth unit.

A fire developed in an open trench at the Purex dry waste burial garden early in the evening of May 26th. Personnel from General Maintenance Operation responded to an emergency call-out and assisted in extinguishing the smoldering fire by covering the trench with spoil from the excavation.

Repair work, consisting of removal of old paint and application of a coating of vinyl plyon plastic to a height of 21'6" from the base, was completed on the 200 West Area powerhouse stacks.

Boilers No. 3 and 5, 284-E Building, and No. 2 and 4, 284-W Building, were inspected by the Travelers Insurance Company and found to be in satisfactory working order.

The Power Engineering Operation completed installation of new dampers in the 105-DR ventilation system; balance and the new system in 222-U Building; conducted a survey of 105-H ventilation; and ran functional tests on newly installed equipment at the 165-KW Building. IPD Engineering was provided with recommended ventilation control changes for 1704-K Building and design for new type terminal diffuser for use in offices.

More effective control of the long laid-away 213 Area on the South side of Gable Mountain was achieved with the withdrawal of the U.S. Army. Access is now regulated by P&GM, and efforts to improve housekeeping and the overall appearance of the area are being vigorously initiated.

C. Improvement Experience

The weed control program continued with the spraying of 2-4,D on 30% of the ground area of the 200 East and West Areas, or approximately 1290 acres.

III. ORGANIZATION AND PERSONNEL

A. Safety and Security

The Operation incurred no disabling injuries during the month. The 13 medical treatment injuries reported reflect a frequency rate of 2.64.

There were no incidents reported in which a breach of security was evident.

B. Personnel Activities

Nine employee suggestions were submitted, however no awards were made.

Three sessions were held as scheduled for the P&GM 1958 Craft Training Program and were attended by a total of 44 Craft personnel.

Membership of P&GM in the CPD Million Man Hour-Club was achieved, and in recognition a celebration was held adjacent to 2713-E Building at which approximately 360 people were in attendance.

G.W. Stoker attended a conference held by American Water Works Association in Spokane, Washington, May 15, 16, and 17th.

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

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CHEMICAL PROCESSING DEPARTMENT
FINANCIAL OPERATION

May, 1958

I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Product Cost

The HAPO General Manager's review of the plant operating budget for FY 1959, resulted in a decrease in the CPD submission of approximately \$1 000 000. The incurred cost portion of this reduction has been broken down to third level operations and the appropriate managers advised.

The results of the Commission's review of the FY 1958 Financial Plan and FY 1959 and FY 1960 Operating Budget are expected shortly. Receipt of the results of this review are necessary prior to the detailing, adjustment and publishing, to CPD management, of the FY 1959 budget.

A procedure has been prepared and formalized for the elimination of all major non-controllable costs from the operating statements. This change will become effective July 1, 1958, and represents a major step toward the full responsibility accounting technique being advocated by the Company Comptroller. The reporting format will also be revised in order to encourage management concentration on controllable costs.

In order to free machine capacity for more economically feasible tabulations and to effect a CPD cost savings, the work order summary and weekly overrun tabulation, prepared by Computing Service, were discontinued. Preparation of these reports will be done manually, with a very slight increase in work load, while the cost of Computing Services will be reduced approximately \$3 600 annually.

At the request of the HAPO General Manager, through Contract Accounting, a special study on functional cost breakdown was prepared. For budgetary control purposes FY 1959 and FY 1960 budgeted costs were recast from a "cost by product" basis to a "cost by type of business" basis.

The Design Order Report has been redesigned in order to present additional information and publication on standard size paper. Material savings of approximately \$100 annually will result from the use of standard masters and paper.

At the suggestion of the Inventory Specialist the possibility of using a lower grade sulfuric acid as a substitute for the reagent grade

currently in use was investigated. This change was found to be feasible and a savings of about \$800 per year will be realized.

B. Personnel Accounting

The controversy caused by Metropolitan's refusal to pay Dr. B. A. White's claims for "bloodless surgery" has appeared again. Several very interesting letters from Services people in New York, have been received stressing their concern with the type of claim submitted and paid because the integrity of the Insurance Plan is under fire. Because of this situation, and while there is a good chance for litigation, all HAP0 components are urged to use their best judgment in order not to jeopardize Metropolitan's position.

A revision of CPD's Advice on overtime is being prepared. This revision became necessary with the receipt of G. E. OPG 1.3 instructing that "planned" overtime worked by exempt employees required the same approval as that necessary for adjustment of salary rates. In other words, the approving manager must be two levels above the level of the individual whose salary is being adjusted or for whom overtime is being approved.

Statistics

1. Overtime Payments During Month

	<u>May</u>	<u>April</u>
Nonexempt	\$17 014*	\$ 9 943**
Exempt	<u>2 517</u>	<u>2 815</u>
Total	<u>\$19 531</u>	<u>\$12 758</u>

*Payments to nonexempt employees cover a five week period.

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

2. Gross Payroll

	<u>May</u>	<u>April</u>
Nonexempt	\$ 752 755*	\$589 985**
Exempt	<u>327 248</u>	<u>325 295</u>
Total	<u>\$1 080 003</u>	<u>\$915 280</u>

*Payments to nonexempt employees cover a five week period.

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

C. General Accounting

CPD travel and living budget requests for FY 1959 are currently being prepared for submission to Contract Accounting.

Effective May 15, 1958, Traffic Operation resumed the responsibility for making transportation and hotel reservations for employees traveling on Company business.

One hundred and thirty-one voucher checks totaling \$243 664.90 were prepared by CPD during May, 1958. General Books issued eighty-three of these checks totaling \$11 086.88, which included one check for reimbursement of contaminated personal effects in the amount of \$1.50.

The April General Ledger Trial Balance and Reports of Travel and Living expense were delivered to Contract Accounting on schedule.

A memorandum concerning reporting of travel and living expenses incurred while on extended off-site assignments was prepared and distributed to the CPD employees directly concerned.

There were 24 active CPD projects with \$15 431 000 authorized funds as of April 30, 1958. Expenditures and commitments of \$10 074 000 and \$757 000, respectively, have been incurred against these projects. Cost of \$240 000 was incurred during April.

During the month preliminary cost closings were completed for CG-692 - Modifications to Redox 233-S Concentration Building - \$126 086 and CG-720 - Modifications to Redox SWP Facilities - \$97 088.

The AEC, through Contract Accounting, has requested a review of our Accrued Costs Closed Projects account as of May 31, 1958. This review is in progress.

The CWIP Plant and Equipment Changes in Progress Report and the Summary Cost Report and Estimate for April were delivered to Contract Accounting as scheduled.

During May the following projects were processed and forwarded to the Commission:

<u>Number</u>	<u>Title</u>	<u>Funds Requested</u>
CG-772	"E" Metal Dissolvers - Redox	\$570 000
CG-783	Additional Fire Projection - 222-S	27 000
CAC-798	Crib and Test Wells - 234-5	125 000*
CGC-800	Reduction Radiation Exposure - RMA-234-5	30 000

*AEC Directive #134, dated 5-14-58, authorized this project.

Twelve Appropriation Requests were processed and approved in May with an accumulated value of \$75 465. There were no Appropriation Requests in process at the month end.

Activity relative to physical inventories of plant and equipment was as follows:

P&GM. Administration - Report issued.
Purex Operation - Reconciliation and Report in progress.
Finished Products Operation - Reconciliation and Report in progress.

Research and Engineering Operation - 234-5 - Process Improvement, Reconciliation and Report in progress.
Research and Engineering Operation, Finished Products Technology - Reconciliation and Report in progress.
Research and Engineering Operation, Purex Technology - Physical count completed - Reconciliation and Report in progress.
Employee Relations Operation - Health and Safety Operation - Physical count completed - Reconciliation completed, Report issued.
Employee Relations Operation - Fire Protection Operation - Physical count completed - Reconciliation completed, Report issued.

The annual adequacy review of the Reserves for Depreciation was started in May and will be completed prior to June 30, 1958.

Project CG-742 - HA Column Replacement - Purex - \$130 000 was unitized and transferred to the Purex operating accounts.

D. Auditing

Internal audit effort for the month of May has been confined to assisting the Traveling auditors. Currently CPD auditors are assigned to audits of:

Relations and Utilities Operation
Irradiation Processing Department
Hanford Laboratories Operation.

E. Procedures

A meeting was held with the Data Processing Operation and formats were drawn up to punch cost distribution corrections and work order master cards. This key punching is expected to result in savings of a minimum of eighty hours, per month, in the Product Cost Operation.

A meeting of the Work Simplification Task Force was held to review progress being made on the CPD - Financial Operation work simplification program.

F. Measurements

The productivity reports for CY 1957 and first quarter CY 1958 were declassified and reissued to all level 2 managers.

Cost and production analysis reports for Redox, Purex and Finished Products, comparing actual costs and production with forecast, were prepared.

Manpower and material budget information for CY 1958 is being collected and reviewed in an effort to develop a realistic budget performance measure for CY 1958.

III. ORGANIZATION AND PERSONNEL

A. Safety and Security

A safety and security meeting for all Financial Operation personnel was held on May 23, 1958.

No medical treatment or disabling injuries were experienced during the month.

No security violations occurred in May.

B. Reports Issued

HW-55922	Purex Operation Productivity Report	G. H. Temple
HW-55923	Redox Operation Productivity Report	G. H. Temple
HW-55962	CPD Operating Report - April, 1958	M. M. Mc Donald
HW-55989	Essential Materials Inventory and Consumption Report - April, 1958	G. E. Dyreng
HW-56042	Redox Cost & Production Analysis - April, 1958	G. H. Temple
HW-56043	Purex Cost & Production Analysis - April, 1958	G. H. Temple
HW-56044	Finished Products Cost & Production Analysis - April, 1958	G. H. Temple
HW-56070	CPD Unit Cost Information - April, 1958	B. M. Dobbs
CLVI-371	CPD Cost and Production Analysis - April, 1958	K. G. Grimm
TS - RD	Product Cost Report - April, 1958	B. M. Dobbs

Manager - Finance

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June 6, 1958

CHEMICAL PROCESSING DEPARTMENT
FACILITIES ENGINEERING OPERATION

May, 1958

I. RESPONSIBILITY

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

II. ACHIEVEMENTS

PUREX OPERATION

A. Research and Development

Rare Gas Recovery

A specification document defining vendor responsibility was completed, following submittal of data on April 25 by Purex Technology on the composition of T-XB treated dissolver off-gas. This document, which is intended to define vendor responsibility throughout the Phase I, II and III work, would presumably be made a part of the proposed contacts.

A literature survey covering the Case III work, isotopic separation of both the krypton and xenon products, was completed preparatory to more specific discussions with qualified off-site personnel on the HAPO application.

B. Process Technology

Anion Exchange Priority I Improvement Items

Detail design of the Priority I prototype modification items, the cold pump enclosure and the N-Cell hood ventilation system, has been completed and approved prints forwarded to Project Engineering.

Shop fabrication of the cold pump enclosure is scheduled for completion June 2 and installation should be completed by June 6.

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Cutting of the hole in the wall between the regulated shop and R-Cell for installation of the 12 inch hood ventilation and exhaust duct is scheduled to start June 2.

C. Plant Engineering

Ammonia Scrubber Design

Detailed design for the Purex ammonia scrubber is being performed by CEO. Drawings for the scrubber section were issued for comment on May 26, 1958, and work is well under way on the jumper and cold side piping detail. Sufficient information has been given to the shops in order that they may proceed with their estimate and material expediting.

REDOX OPERATION

A. Research and Development

Open Discharge Head Pump

The discharge head for canyon pumps was redesigned in 1956 so greater seal leakage rates could be accommodated without process solution escaping from the tank. Due to procurement delays, these units did not become available at HAP0 until mid 1957. One of them was installed in F-1 tank at Redox in September 1957, and was removed after seven month's service because of seal leakage. This compares to an average life of slightly more than one month for pumps of the old design.

B. Process Technology

Failed Piping

Three pieces of Fluoroflex-T 1001 plastic tubing have been received for experimental trial as a repair lining for the failed piping in the Redox and Purex facilities. A duplicate of the bent piping in the building walls has been fabricated, and the first trial installation of the tubing was made on May 28, 1958. A preliminary visual examination of this tubing indicates that the method of repair has considerable promise. The electrically heated flaring tool obtained to develop flared ends on the tubing for flanged joints produces a good mechanical joint.

C. Plant Engineering

Hexone Essential Material Variance Study

Additional studies were made during the month with approximately 40 compilations and correlations attempted in order to connect Hexone

loss with some process variable. These were done using the concept previously established that losses were random and independent of the uranium throughput. Correlations were established between Hexone loss and the initial acid deficiency in the H-1 tank prior to addition of the caustic butt, and also between Hexone loss and the quantity of recycle material added to the H-4 tank. The first statistical correlation is significant at the 0.01 (3 sigma) level, while the latter is significant at the 0.10 (1.7 sigma) level.

D. Project Activities*

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

This project was physically completed on May 5, 1958. The estimated final cost is \$291,000 which is a \$2,000 underrun of the authorized funds of \$293,000. The Physical Completion Notice is in preparation.

FINISHED PRODUCTS OPERATION - Z PLANT

A. Research and Development

Improvements Task I and Task II

Process Technology effort aimed at improving the continuous Task I and Task II equipment is proceeding along the following lines:

1. A scheme has been developed whereby the fluorinator off-gas is filtered inside the multiple rotor valve in the fluorinator discharge. Under this scheme the upper rotor would continue to clean the filter and discharge the powder into the powder pan and thus eliminate the need for recycle and rework of this powder.
2. Experience with Lucite on Hood H9B has shown that a more suitable plastic panel is needed for these hoods. A panel made from Homalite CR-39 has been purchased and is presently being modified for installation on a testing basis into Hood H9A.
3. It is presently necessary for the operator to enter the Zone 3 area in order to closely observe the filter cake as it comes off the rotary drum filter and enters the calciner. The

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* For complete information on projects, refer to the following reports:

Semimonthly Status Report
AEC-HOO Monthly Progress Report of
Construction Jobs

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application of closed circuit television for this purpose is being studied, and work is underway to borrow one of these sets from the Redox Operation on a trial basis.

4. In order to provide a permanent and continuous record of the radiation at various points around the CG-691 equipment, recorders are being installed.

Radiation Studies

Personnel

The study to estimate the gamma exposure received by personnel operating the RM-line has been completed, and the final report is being prepared.

By work sampling the work performed and combining with radiation exposure data, it has been possible to develop a pattern of where exposure is being received. The same work sampling information can be utilized to develop a pattern for neutron exposure, when current studies to determine neutron exposure rates are completed.

Shielding

Bulk sample radiation measurements have been completed on the three series of samples taken to date.

The radiation study has shown that dispersed radioactive residues within the process hood interiors provide a principal source of radioactive exposure. To determine this contribution more accurately, the radiation study will include the startup of Hood 9A.

The Task III powders of all three sample series were massed for a single heavy shielding test using lead and iron plates. These samples representing approximately one kilogram of plutonium gave a gamma exposure of 160 mr/hr at 2 inches from the packages in air as measured with a GP with window open at contact.

The importance of equipment shielding is reflected by the following data from the study:

<u>Shield</u>	<u>Shield Thickness</u>	<u>Mr/hr at Shield Surface</u>	<u>Mr/hr at 12" from Sample</u>
Lead	1 inch	3.2	0.9
Iron	2 inches	4.0	1.5

The readings with lead shields are corrected to exclude secondary radiation produced at the outer surface of the shields.

Recuplex Neutron Instrumentation

Drawings are being prepared for that part of the prototype neutron instrument work which will become permanent equipment. A report is in preparation describing the development work to-date and the current status of the work. Product Recovery Operation is proceeding with permanent installations of neutron monitors on several points which have been investigated.

Radiation Monitors on New Hoods

An urgent need was expressed early in the month to provide several points of continuous radiation monitoring on the new hoods 7 and 9A in time for startup. Equipment for an experimental installation has been assembled which will provide a four-point strip chart record. Three points will be monitoring gamma radiation with scintillation detectors, and a fourth point will monitor neutron activity with a BF₃ tube and moderator. The selection and arrangement of components is not optimum for a permanent installation; however, it provides the needed function within the short time available for preparation. The principal criteria for this equipment are to provide means of following radiation levels from startup through first operating runs and subsequent operating procedures.

Prototype Casting Furnace

A major Research and Development activity has been undertaken in preparing installation drawings for the prototype casting furnace procured by the Research and Engineering Operation. Production schedules indicate that it may be necessary to rely on this unit for some production shortly after it is installed completely. For this reason, there has been some change in planning regarding the completeness and amount of mechanization required for the final installation in order to satisfy several needs regarding conversion to a production unit.

B. Project Activities

CG-691 - Improved Task I and Task II Facilities

Installation of the facilities on Project CG-691 is essentially completed, and the Physical Completion Notice is being prepared.

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Difficulties were encountered in operation of the agitators in Hood 7 and Hood 9A. Modification of one agitator is underway and the other two agitators have been replaced. Hood 9A is ready for acceptance test runs with stand-in materials. Test runs on Hood 7A will be completed upon installation of the modified agitator.

CG-734 - RMC Button Line

All detail design work on this project was reported to be 100% complete during the month. During the month all the architectural drawings were revised to show the Zone 1 - Zone 3 shielding barrier and a drawing was prepared to show the platform arrangements in the RMA line.

CG-689 - Additional Fire Protection, 234-5 Building

The report on the study, Additional Fire Protection, 234-5 Building, has been prepared for publication. Drawings to accompany the report are being prepared, and a project proposal estimate has been requested.

FINISHED PRODUCTS OPERATION - UO₃ PLANT

A. Research and Development

Solids Transfer Valve

The prototype installation of an air-activated powder transfer valve and control system has been in operation since April 21 and has functioned satisfactorily. Based on the performance of the prototype, Finished Products Operation is proceeding with plans to install similar valves under the remaining five calciners.

B. Process Technology

UO₃ Recovery from Filter Bags

A modified laundry tumbler has been installed in "E" Cell of the 224-U Building, to serve as a prototype installation for the recovery of UO₃ powder from used filter bags. The unit is being connected to the existing electrical and vacuum services in 224-U Building. It is anticipated that testing of the process will begin in June.

C. Plant Engineering

Powder Handling Modifications for Segregated Material

A scope study for handling E-Metal processed in one of the continuous calciners is being prepared. The recommended method of handling this

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material is by a mechanical conveyor from the calciner to the shipping container. The proposed design will incorporate the newly developed air-controlled valve and a screw-fed hammermill. Cost estimate for the installation of these facilities is \$22,000.

D. Project Activities

CG-767 - Miscellaneous UO₃ Plant Improvements

The process design of facilities needed in the UO₃ Plant for segregated processing of E-metal in the continuous calciners was approved within CPD as a basis under Project CG-767 to obtain early beneficial use of the continuous calciners in segregated E-metal production. The document was transmitted to the AEC on May 20, 1958, for approval.

CG-770 - Feed System and Powder Pick-Up Modifications, UO₃ Plant

Project CG-770 was completed and the Physical Completion Notice issued as of May 14, 1958. Final cost of the project was \$113,110 which is a \$21,900 underrun of authorized funds.

GENERAL ACTIVITIES

A. Research and Development

Power Reactor Fuels Reprocessing

A conceptual design of transportation equipment for irradiated power reactor fuels is being prepared, the design basis specifying that sufficient flexibility should exist in transportation equipment to handle all elements now scheduled for Hanford with the exception of CPPD. The Consumers Public Power District Reactor in Nebraska (North American design) employs fuel elements of excessive length in comparison with the other low enrichment reactors precluding transportation equipment standardization with the other reactors. Limiting nuclear safety parameters are being prepared to cover the transportation equipment.

Studies are continuing on the critical mass problems of dissolving 3-5 percent U²³⁵ enriched material. The lack of physical definition of the effect of poisons within the slab and annulus geometries prevents definitive accomplishments in this field at the present time.

Waste Disposal

A study of a proposed dam at Columbia River mile 348 with pool level of 385 feet showed that the effects on CPD would be approximately the

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same as previously reported for pool levels of 395 and 400 feet. The foreseeable effects are:

1. The ground water level would be increased 10 to 15 feet.
2. There would be some increase expected in the velocity of ground water flow toward the east and southeast.
3. Additional capital expenditures of approximately \$400,000 would be needed to provide new wells and soil sampling to investigate ground water contamination.
4. Annual operating expenses would be increased by \$50,000 to \$75,000 as a result of the shortened soil column and additional monitoring.

B. Process Technology

Pressure Surge - Waste Storage

Redox Technology initiated a 'bump' in tank 107-SX on May 12, 1958. Cold water was discharged through the air distributor on an air-lift circulator to activate the release of heat.

The pressure surge peaked at 2 psig (15% of the hydrostatic head pressure) and the maximum rate of pressure rise was 6 inches of water per second. Approximately 38 minutes were required to return the tank pressure to atmospheric. At the time of the pressure surge there were ten 'SX' tanks connected to the vapor manifold having a gas volume of 860,000 cubic feet. Maximum pressures recorded at other locations in the system were as follows: 108-SX, 0.87 psig; 109-SX, 0.90 psig; vapor header, 0.78 psig; vent header, 0.58 psig. A vibration instrument located on the concrete pump pit of tank 107-SX indicated a vibration frequency of 15 cycles per second and a static deflection of 0.0001 inches. The vibration continued at this magnitude for more than 160 seconds.

Approximately 7,320,000 BTU of heat was released during the first 30 minutes. After the 'bump' the circulators were flushed and a small pressure surge of eight inches of water was recorded. The circulators were operated for about two hours after the 'bump' and which caused a heat evolution rate of 11.5 x 10⁶ BTU/hr. The bottom temperature of the tank was approximately 310° F before and after the bump.

C. Plant Engineering

Maintenance Management Program

An evaluation has been initiated to determine the current status of CPD maintenance activities, and to develop a proposed program for measuring maintenance performance. Accurate information is being accumulated to determine the current cost of maintenance to CPD, and the potential savings from such a program. It is proposed to present the overall plan in a CPD Maintenance Management Seminar about the first of August.

Burial Boxes

Effort was continued toward making burial boxes of all-steel panel construction. Cost figures for boxes produced during the last year have been received from Power and General Maintenance personnel and will be used for comparison to estimated cost data that will be developed for various all-steel designs.

Mild Steel Welding Electrodes

Procurement of mild steel welding electrodes was reviewed at a meeting of IPD, CEO, Stores, and CPD representatives. The result of this meeting was preparation of an electrode preference list on which plant maintenance personnel could indicate their preference of electrodes by brand name, rather than by AWS classification as has been done in the past. All lists received from the various components will be used to formulate a master preference list for use in purchasing electrodes for HAPO-wide use.

Centralized Decontamination Facilities

Scope study for a centralized decontamination facility has been completed and will be issued as HW-56193. As the project is now scoped, the estimated cost for the facility is \$170,000.

D. Project Activities

Project Cost Information as of May 18, 1958:

Total authorized funds - Active Projects	\$15,183,000
Total cost-to-date	9,953,000
Commitments and Open Work Releases	1,241,000
Unencumbered Balance	3,989,000

Costs charged to above projects 4-20-58	210,000
to 5-18-58	

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Projects dropped from active status during this period ending May 18, 1958 are:

<u>Project Number</u>	<u>Authorized Funds</u>	<u>Total Cost</u>
CG-692	\$120,000	\$125,554
CG-720	107,000	89,914

CG-718 - Fission Products Recovery

Scope design for the isolation and packaging part of the Cesium Recovery Pilot Plant was completed. The work is summarized in the scope design report HW-56108, which has been approved by the contact engineers for the concerned organizations.

III. ORGANIZATION AND PERSONNEL

A. Personnel

Reed Overson, Engineer I, terminated May 16, 1958 to accept a position with the U.S. Army Corps of Engineers at Glasgow, Montana.

B. Safety

Among the topics discussed in the regular monthly safety meetings were, "What Dangerous Weapons do you Own?" Power lawn mowers, firearms, automobiles, and power tools were suggested as belonging in the category of dangerous weapons.

C. Inventions

None

D. Reports Issued

HWS-6334	Specification for Rare Gas Recovery Equipment, by L. R. Michels, dated April 30, 1958.
HW-55984 RD	Replacement Reactor Study, Chemical Separations Cost, by W. A. Graf, dated May 8, 1958.
HW-56097	Expansion of RMC Fabrication Facilities, by E. O. Swain, dated May 15, 1958.
HW-55176	Parts IV and V, Index of CPD Building Numbers - Designs of CPD Radioactive Liquid Waste Disposal Sites, by V. W. Wood, dated April 29, 1958.

- HW-55943 Effects on Hanford Works of a Proposed Dam at Columbia River Mile 384, by R. T. Jaske, V. W. Wood, et al, dated May 29, 1958.
- HW-53641 Hazards Study - Self-Boiling Radioactive Waste Storage Facilities - Process Technology - Recommendation Report, by H. W. Stivers, dated December 1, 1957.
- HW-56102 Z Plant Radiation Study Interim Report #3, by H. A. Moulthrop and C. L. Brown, dated May 21, 1958.
- HW-55627 Project Proposal, Revision 2, RMC Fabrication Line, 234-5 Building (Project CG-745), by D. A. Snyder, dated April 23, 1958.
- HW-55840 Project Proposal, Revision 1, Additional Fire Protection, 222-S (Project CG-783), by R. C. Baker, dated April 24, 1958.
- HW-55857 Plant and Equipment Analysis Report, RMC Fabrication Line, 234-5 Building (Project CG-745), by D. A. Snyder, dated April 25, 1958.

E. Trips

None

F. Visitors

Mr. T. G. Cullen of the Carboline Company visited the Purex facility on May 29, 1958, for the purpose of consultation on painting of the 104 tank.

Mr. R. E. Mayers of Betz Laboratories, Inc. visited the plant on May 29, 1958, to discuss the filming amines steam treatment.

F. P. Robinson, General Electric Company, Pasco, was issued a clearance for the period May 7 through May 30, 1958, to assist in the start-up and testing of the electrical equipment for the Purex second remote crane.

F. Radel, Manning, Maxwell, and Moore, was on-site May 12 through May 23, 1958, to assist in final check-up of the Purex second remote crane.

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Mr. James P. Scholtes of the Rockwell Manufacturing Company visited HAPD on May 6 and 7, 1958, to investigate the failure of the Rockwell Rotocycle in the UO₃ Plant.

Manager
Facilities Engineering Operation

HP Shaw:FC:mh

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CHEMICAL PROCESSING DEPARTMENT
RESEARCH AND ENGINEERING OPERATION

MAY 1958

PUREX PROCESS TECHNOLOGY

Feed Preparation

Irradiated uranium with an average cooling time of 91 days was dissolved to form solvent extraction feed. Control of the radioiodine release to the atmosphere was excellent (≤ 0.3 curie/day) except for one week when the emission rate averaged 1.6 curies/day. The high discharge rate was reduced by regeneration of one silver reactor and the addition of 5×10^{-4} M mercuric nitrate to the dissolver solution for suppression of iodine from the vessel vent system.

After the plant was shutdown, nine tons of 75 day "cooled" uranium containing 2000 curies of radioiodine were dissolved in two cuts. When the scintillation monitor indicated some iodine was being discharged in the first cut off-gases, which were routed through the prototype, dual-pass, silver reactor and by-passed around the Backup Facility, routing the gases through the Backup Facility produced a factor of three reduction in the discharge rate. The test indicated an efficiency of 99.95 percent for the dual-pass silver reactor which has processed the off-gases from the dissolution of 765 tons of uranium since its second regeneration.

Sampling tests indicate a 15 to 25 percent increase in the absorption efficiency of oxides of nitrogen from dissolver off-gases can be realized in the Backup Facility by the following steps: (a) eliminate the recirculation of bottoms acid to the top absorber plate, (b) increase the absorber reflux water rate from 3 to 10 gpm, and (c) reduce and program the air in-bleed during the dissolving cycle. Inauguration of items (a) and (b) will decrease the concentration of recovered acid from 22 to about 15 percent, but operation of the acid fractionator will not be affected.

Solvent Extraction

Typical performance of the solvent extraction system which operated 67 percent of the month on a two cycle flowsheet is tabulated below:

Cycle	Log Decontamination Factor, dF		Instantaneous Loss, Per Cent Plutonium	Recycle, Per Cent	
	Uranium	Plutonium		Uranium	Plutonium
First	4.5	3.9	0.08	-	-
Final	2.3	3.9	0.006	3.5	0.43
Ion Exchange	-	≥ 0.5	-	-	20.0
Overall	6.8	≥ 8.3	0.086	3.5	20.43

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Operation of the plant on a two-cycle flowsheet (the three-cycle process without the HC and IA Columns plus a 2DW, 2AW and ion exchange waste backcycle) was excellent with the uranium product averaging 1.5 gamma ratio (a 60:40 Zr-Nb:Ru split) and the plutonium gamma activity less than detectable limits ($\leq 2 \times 10^{-11}$ G/AT). However, a process upset occurred on May 17 which increased the gamma activities of the intercycle streams and the final products. Simultaneous mechanical failure of the ion exchange unit forced concentration of the plutonium in the L-Cell package; consequently, the plutonium product exceeded gamma specifications until the scheduled plant shutdown.

The process upset occurred four days after the start of a test to determine the feasibility of using hydrazine as the 2DF reductant. The aqueous hydrazine solution (11.1 M) was added directly to the ICU Concentrator in order to increase the contact time, and shortly after the start of the test, both the gamma activity and the plutonium content of the uranium product increased slightly. When the gamma activity of the 2AF and 2DF increased sharply (30- and 10-fold, respectively), the addition of hydrazine was terminated, and an immediate increase in the Final Uranium Cycle decontamination was noted. At the present time the most likely cause of the upset has been attributed to the recycle of hydrazine in the backcycled waste. Laboratory studies are in progress to determine methods of minimizing the amount of or the subsequent effect of backcycled hydrazine.

Other items of interest which occurred during the month are listed below:

- (a) Overall waste losses during the operating period were 0.15 and 0.03 percent, respectively, for plutonium and uranium. Although subsequent flushing increased the losses, new record lows were established.
- (b) A test of increased nitric acid concentration in the 2AS (0.75 to 1.0 M) was discontinued when the 2A Column decontamination failed to improve, and the 2BW plutonium loss increased from 0.005 to 0.03 percent.
- (c) Since the advent of two cycle operation with waste backcycle, about 600 grams of neptunium-237 have been accumulated in the backcycle system. This represents a 70 percent retention of the neptunium processed in the HAF.

During the present plant shutdown the necessary equipment modifications are being made for plant operation on the two-cycle flowsheet with the HS Column and IBSU backcycle to the HA Column.

Plutonium Concentration

Operation of the Plutonium Anion Exchange Unit continued until May 15 when the XCP Concentrator plugged, and the 2BP was routed to the L-Cell Package. After the concentrator was unplugged by an acid flush, failure of the XAF pump coupled with poor resin pushing kept the unit shutdown. A sample of the solid which plugged the concentrator is being analyzed in the laboratory to determine its source.

Because of the excessive amount of resin fines in the system after more than 100 days of mechanical operation, the resin was stripped to 0.04 g/l plutonium and removed from the unit. Nitration of the new resin was accomplished with 0.75 M instead of 2.0 M HNO_3 to reduce the cracks in the resin beads caused by chemical stress, consequently, better mechanical stability is expected from the new resin. In addition to replacement of the resin, other modifications are being made during the shutdown to increase the mechanical reliability and ease of operation of the unit.

Solvent Treatment

Both solvent treatment systems performed excellently during the month. The overall solvent loss for the plant was 0.20 percent of the solvent throughput, which represents approximately a \$4000 per month solvent saving for the two-cycle over the three-cycle flowsheet. An attempt to reduce the gamma activity of the 100 (averaged 1590 uc/gal) by increasing the speed of the turbomixer from 300 to 350 rpm was unsuccessful because undersized motor heaters prevented operation of the unit at the higher speed. Since start of the two cycle operation, the gamma activity of the 200 has increased from 16 to 39 uc/gal.

Waste Treatment and Acid Recovery

Solvent extraction wastes were processed satisfactorily in the Waste Treatment and Acid Recovery equipment during the month. Close control of concentrator operating conditions resulted in a reduction of the concentrated IWW flow from ten to seven (two-cycle flowsheet = five flows). Waste volumes sent to the underground storage tanks during the month averaged 139, 460, 19 and 208 gallons per ton of uranium for neutralized IWW and equipment flushes, solvent washes, centrifuge cleanouts, and cell drainage, respectively. The coating waste volume sent to storage was 190 gallons per ton of uranium. Overall plutonium and uranium losses for the month were increased from the record low figures established during the processing period of 0.15 and 0.03 to 0.22 and 0.04 percent, respectively, by flushing after shutdown.

After three consecutive HAF batches containing four percent refluxed rework solution (2WW, 20W and R-Cell flushes) were processed through the solvent extraction system, further rework was cancelled when high gamma activity which has tentatively been attributed to the hydrazine test was experienced throughout the plant. Laboratory tests indicated the rework solution, refluxed from 12 to 25 days, had no adverse effect on the process.

Self-concentration continues in Tanks 241-A-101, 102, and 103 at boiloff rates of 10.7, 7.9, and 2.7 gal/min., respectively. Based on terminal conditions of 8 M Na^+ concentration at the hydrostatic head limit, Tanks 101, 102, and 103 are currently 89, 23, and 98 percent of capacity, respectively, after two years of operation on a three-cycle flowsheet.

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REDOX TECHNOLOGY OPERATION

The efficiency of the acid recovery system averaged approximately 79 percent at an acid concentration of 51 percent. Control of the absorber specific gravity continues to be excellent, with cyclic variations and resultant acid losses reduced to a minimum. Manual bleed-in of air to the absorber during the incremental acid additions to the dissolvers, to maintain the oxygen concentration of the absorber off-gas above 5 volume percent, has virtually eliminated loss of acid due to lack of oxygen in the absorber. The absence of significant improvement in acid recovery following these changes may be attributed to a considerable extent to the seasonal increase in the 293-S cooling water temperature which averaged 48, 55 and 62 F during March, April and May, respectively.

Investigation of acid loss via condensation in the dissolver off-gas lines (to the stack drain tank) is incomplete due to faulty operation of the temporarily installed weight factor recorder for the stack drain tank. The data available, however, indicate very slight acid losses at this point and little likelihood of a safety hazard resulting from the combination of strong nitric acid with hexone in this tank.

Nitric acid material balances across the entire acid recovery and iodine removal system have averaged 87.8, 93.9 and 99.8 percent of the acid available for the periods of March, April and May, respectively. These recent improvements in nitric acid balances coincide quite closely with the increase in the minimum oxygen concentration, pointing to the possibility that earlier losses were caused by undetected escape of NO via the stack plus that dissolved in the spent caustic.

The emission of iodine-131 to the stack averaged 0.62 curie per day during dissolver operation compared to 0.08 curie per day when the dissolvers were not in operation. The over-all efficiency of iodine removal averaged 99.85 percent for metal with an average cooling period of 94.7 days. The improvements in sampling technique made during April have revealed that, although the B dissolver diversion valve still permits significant leakage, as much as 50 percent of the iodine being emitted may be coming from the canyon and vessel ventilation system. The individual streams comprising this system will be sampled to determine where mercuric nitrate could be employed most effectively in minimizing this source of iodine-131.

Extraction

Uranium decontamination in the extraction system was improved approximately 200 percent during May as compared to the first quarter of the year. Most of this gain is attributed to lowering of the interfaces in the uranium extraction columns to the following points:

- (a) HA(HS) Column - Halfway down the 20-foot scrub section.

(b) 1A Column - Two feet above the LAFS introduction point.

(c) 2D Column - Mid-point of the scrub section.

The greatest improvement was obtained in the 1A Column which had the lowest interface. A brief attempt to evaluate the effects of maintaining the 1A Column interface below the feed introduction point was terminated due to column flooding and subsequent indications of plutonium deposition. The effects, on decontamination and plutonium stability, of maintaining the HA Column and 1A Column interfaces in the extraction section will be investigated in the immediate future.

Flooding of the 1A Column, which has been experienced frequently since October, 1957, was encountered while operating at 120 percent of the Phase II rate approximately 4.5 days following the 3 percent HF-20 percent HNO₃ flushes. Flooding was subsequently experienced at this rate 3 days and again 5 days after successive 10 percent nitric acid flushes. In an effort to minimize potential contributors to the flooding problem, the recycle of LAW to the LAFS concentrator, in effect since February, 1958, was temporarily halted. The remainder of the operating period was too short to permit adequate evaluation of this change. Investigation of the relationship of Fe(III) + Cr(VI) to Al ratio on LAW stability is being reviewed since the LAW samples appear cloudy a very short time after sampling.

The effectiveness of uranium in stabilizing the HAIS (concentrated LAW and LOW) stream raised the possibility of adopting a similar approach toward preventing precipitation in the LAW stream. The salting strength in the 1A Column was reduced gradually to 0.97 M aluminum nitrate, at an L/V of 0.37, to permit plant evaluation of the relative recycle of U and Pu. Losses were slight with the LAW salt strength at 1.01 M aluminum nitrate; however, when the concentration reached 0.97 M aluminum nitrate the plutonium recycle amounted to 4 percent compared to only 0.6 percent for uranium. Although unsuccessful in permitting uranium recycle, the test did delineate more clearly the minimum LAW salt concentration, which had previously been set at 1.10 M aluminum nitrate.

The new, vented IOF jumpers, installed in March, 1958, as the last step in the Phase III capacity increase project, stopped aspiration of air through the IO Column but failed to prevent air-locking of the stripping column organic effluent lines, since the liquid level in the IOF header was too high to permit adequate venting of the header via the IOF jumpers. Blanking the IO Column vent permitted the aspiration by the IOO (organic effluent) stream to produce a vacuum of 100 inches w.g., thus lowering the liquid level in the IOF header to a point where satisfactory venting was attained.

Four continuous gamma monitors, installed under project CG-686, are now in active service on the HCU, LCU, 2BP and 3BP streams, and are being used in the determination of optimum interface positions. Future use is planned in

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evaluating fission product partitioning in the 1B Column. Glass-lined flow-cells are being employed temporarily, and only the HCU monitor gives indication of significant problems due to build-up of background activity. Since one glass-lined cell has required replacement in this position, after only a few days service, it is planned to install a fluorothene flow-cell as soon as it is available.

Instrumentation to permit continuous determination of the HSW specific gravity, installed during May, has proved very valuable in determining the proper split of the HAIS (HSIS) stream between the HA and HS Columns. Absolute values for the HSW specific gravity can be determined within 0.005 specific gravity units, while relative changes as small as 0.002 units are readily observed. Use of this instrument will permit control of the HSW aluminum nitrate concentration within 0.03 M.

Product Recovery

Over-all uranium and plutonium recoveries for the report period averaged 99.76 and 99.56 percent, respectively. The only significant losses encountered during operation resulted from improper balancing of the HAIS and HSIS flows prior to activation of the HSW specific gravity instrument.

Waste Storage

Pressure surges, initiated by water injection into the unagitated 107-SX tank at intervals of 15 and 4 days, were measured at a rate of pressure rise of 20 inches of water in 11 seconds. The time required to reach the peak pressure was 17 seconds, much too slow to apply significant impact loading on the tank structure. The maximum pressures developed were 1.91 and 1.80 psig corresponding to 14.3 and 14.0 percent of the hydrostatic head in the tank. The heat release during the surges amounted to 7,300,000 and 6,800,000 Btu. Operation of the circulators for two hours following the surges brought the total heat release to approximately 19,000,000 and 21,000,000 Btu, respectively. Additional heat release in excess of the normal boil-off, over the ensuing 24-hour period brought the net heat released to approximately 25,000,000 Btu. The nearly identical heat releases, despite the considerable difference in induction period, viewed in light of the absence of spontaneous bumping in 107-SX, point to the existence of convection currents which limit the total accumulation of available heat to approximately that which could be accumulated in one day. Thus it appears unlikely that a spontaneous pressure surge will occur in the 107-SX tank unless some means can be employed to redistribute the sludge more evenly over the bottom of the tank.

Facilities provided under Project CG-717 were activated during the month to start the transfer of supernatant liquid from the 103-SX tank to 101-U. A total of 37,000 gallons was pumped, intermittently, during the report periods at flow rates up to 50 gpm. A maximum radiation reading of 5 mr/hr. was obtained through the pump pit cover blocks.

FINISHED PRODUCTS TECHNOLOGY OPERATIONURANIUM CONVERSION OPERATIONProcess Performance

All UO_3 shipped met product specifications.

Nine hundred ninety eight (998) pounds of nitric acid per ton of uranium processed (95% of theoretical) were recovered at an average concentration of 52%.

The average operating rate of the calciners was 6.9 tons uranium per calciner for each day on the line. This is the fifth consecutive month that rates have been 6.8 tons per day or greater.

Process Improvement

Operation of the ED-2 100% UNH concentrator with automated start-up and shut-down was very satisfactory.

One calciner thermowell failure was experienced during the month, but no agitator damage was sustained.

Operation of the air activated powder discharge valve installed by Facilities Engineering under the H calciner was excellent except for a short period late in the month. Erratic functioning of the control instrumentation was responsible for the period of poor operation.

Timers have been installed on all calciner agitators to improve shell temperature control during periods of down time. Automatic agitation for three minutes out of every 30 minutes has proved very satisfactory during the weekend shut-down periods.

The feed points on the G calciner were moved two inches further away from the agitator shaft and were spaced three feet apart with one point placed in the finishing section of the calciner. Operation under this condition was generally satisfactory. A rate of 8 tons uranium per day has been achieved on G calciner.

A test was completed on the UA powder handling system using an empty primary bag filter housing as a stilling chamber. Three runs were made using different inlet arrangements. The first two consisted of discharging the UO_3 and air through the top access plate tangential to the circumference of the container. The stream was directed downward at angles of 5° and 45° from horizontal for runs one and two respectively. The inlet point of the third run was the lower access port with the stream directed horizontally across the chamber. Results show the UO_3 separating efficiency to be

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superior in every case to that of the separator cyclones. UO_2 carryover to a second primary bag filter was as low as 30% of the normal carryover from the cyclones.

METAL FINISHING OPERATION

Recuplex

Twenty-nine runs, consisting of crucibles, fragments, powders, and clean-outs, were processed through the SC Hood. Slurry losses averaged 0.09% of the recovered Pu.

The SE columns processed 1030 liters per day at 63% operating efficiency for an average instantaneous rate of 1640 liters per day. Waste losses to crib averaged 0.0094 g/L or 0.63% of the Pu processed.

Low rates and efficiencies throughout the month were caused by an unusual amount of solids in the solvent extraction system, especially the H-3 stripping column. Study of the problem revealed the following sources of solids:

1. Solids in the ANN.
2. Solids originating from too much SO_4^{2-} ion in the CCX.
3. Solids from unfiltered CAFA (concentrated feeds).
4. The usual solids getting past the SC filter (relatively small).

By month's end, almost all of these sources had been minimized and the columns were operating successfully.

The first week of the month was devoted to testing a new solvent in the Recuplex process, 12.5% DBBP (dibutyl butyl phosphonate), 4% TBE (tetra-bromo ethane, a densifying agent), and 83.5% CCl_4 . The new solvent gave good extraction performance until gross amounts of solids accumulated in the H-3 stripping column and reduced the overall flooding capacity and increased both the stripping and extraction waste losses.

Distribution coefficients in the extraction section ranged from 45 to 150 and the extraction capacity under "no solids" conditions was estimated to be double that using the TBP- CCl_4 solvent. Stripping performance was inadequate. A distribution coefficient taken at the dilute end of the column was as high as 0.3 (10 to 100-fold higher than for TBP- CCl_4 system). Gross amount of reddish-brown solids accumulated in the H-3 column. These were believed caused by (1) trace amounts of a caustic flush remaining in the system prior to the new solvent start-up, (2) solids in the ANN, and (3) a possible Pu-DBBP- SO_4^{2-} complex, or Pu-hydroxy-sulfate complex due to the large amount of sulfate in the CCX.

Work is being continued in an effort to define optimum stripping column flowsheet conditions.

PROCESS CHEMISTRY OPERATIONPROCESS ASSISTANCEPurex Process Studies

A laboratory study of the effect of hydrazine upon fission product decontamination in the Purex process has been started. The study was initiated as a result of the reduction in Zr, Nb DF which occurred during the recent plant test of the use of hydrazine as a plutonium reductant in the final uranium cycle. The results thus far show that the use of 0.05 M hydrazine in 2DF should, if anything, improve decontamination. For example, samples of standard plant 2DF were a) refluxed for 18 hours after the addition of 0.05 M hydrazine and b) put through a solvent extraction system simulating the 2D column. The arithmetic decontamination factors measured across the column were greater than those for 2DF without hydrazine by about a factor of two.

Laboratory studies on the electrolytic reduction of uranium were continued. It was found that in the cell in which there was no divider between the anode and cathode, the concentration of the holding reductant, hydrazine, decreased proportionally with the formation of uranium(IV), and that consequently the uranium(IV) yield was limited. Keeping the hydrazine concentration constant by continually adding fresh hydrazine during the electrolysis or by isolating the oxidizing anode from the hydrazine with a semi-permeable membrane, 80 per cent reduction yields were obtained. The rate of reduction and the current efficiency dropped off considerably after the uranium was 50 per cent reduced. Use of uranium(IV) as a partitioning agent in the Purex process, with the IBX containing equal concentrations of uranium(IV) and uranium(VI), would require that about 0.6 per cent of the total Purex uranium production be recycled as IBX.

Redox Process Studies

Batch, counter-current solvent extraction runs have been made to investigate the relative effects of single scrub (HABS mixed with the HAF) and dual scrub (HABS introduced above the feed point) operation of the Redox HA columns. In the course of the work, which was done in the dark, the following profiles were measured across the column: plutonium and uranium concentrations; gross gamma and individual fission product levels; specific gravities; and nitric acid concentrations. It was found that the acidity in the top stages of the scrub section was higher with the dual scrub than with the single scrub system. The effect is probably great enough to explain the onset of plutonium deposition in the Redox HA columns when they were converted from dual scrub to single scrub operation.

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ANALYTICAL ASSISTANCE**DECLASSIFIED**Alpha Scintillation Counting

Evaluation of the alpha scintillation counter (ASC) as a possible replacement for the gas-flow proportional counters (ASP) now in use in the CPD laboratories was continued. Because of the critical dependence of the ASC physical geometry on the source-detector vertical distance (a 1 mil change in vertical distance changes the counting rate $\sim 0.1\%$), the variation in the thickness of present laboratory counting discs was studied. From the large variations observed in the thickness of the present stainless steel discs, due mainly to stamping burrs, ASC counting rate variations as large as $\pm 1.0\%$ can be expected from this source alone. Consequently, the practical use of the ASC will require counting discs of more uniform thickness than those required by the ASP, which is relatively unaffected by small variations in disc thickness.

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.

234-5 DEVELOPMENT OPERATIONPreparation of Plutonium Trichloride

Approximately 4.4 kilograms of plutonium trichloride were prepared as part of the study of replacing plutonium tetrafluoride with plutonium trichloride as the reducible compound,

Most of the trichloride was prepared at temperatures in the range 450 - 500 C by use of carbon tetrachloride carried in a stream of argon gas-- a procedure which had been used last month. A second furnace was installed and operated with phosgene as the chlorinating agent. Based on three batch chlorinations by phosgene, it appears that (1) chlorination was complete with about 2 to 3.5 moles of COCl_2 per mole of PuO_2 , whereas 4 to 7 moles of CCl_4 per mole of PuO_2 had been used; (2) by-products from phosgene are significantly less and they are more water-soluble than by-products from carbon tetrachloride; and (3) a reaction temperature 50 to 100 degrees lower than with carbon tetrachloride is possible.

Laboratory analyses of powder prepared this month showed an average of 97 percent conversion, corresponding to a plutonium trichloride formula of $\text{PuCl}_{2.9}$. Analytical accuracy has been roughly estimated at ± 10 percent for each Cl/Pu determination.

A small Pyrex vibratory tube chlorinator has been assembled for testing the continuous chlorination of plutonium oxide. The unit is equipped with a rotary feed valve.

Plutonium Trichloride Reduction

Seven reductions ranging from 600 grams to one kilogram in size were made during the month. An iodine booster was added to most of these larger scale reductions for additional heat. Five of the reductions resulted in well-shaped buttons with densities from 19.17 to 19.46; the best yield obtained was 94 percent.

Crucible sticking is a problem when large scale reductions are made. It has been necessary thus far to use a double crucible with sand packed between the two crucibles and outside of the outer crucible. In every reduction made, both crucibles were cracked and some slag had penetrated beyond the second crucible.

Two reductions (100 gram and 200 gram scale) were made in 1/4" thick pressed crucibles. These thicker crucibles still did not contain the chloride slag.

Continuous Task III

Crucible materials planned for use in the electrolysis of plutonium trichloride were tested with an NaCl-KCl-BaCl_2 melt last month. These tests were repeated with melt in a hydrogen-hydrogen chloride atmosphere for

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3-1/2 hours at 800 C. The atmosphere had no noticeable effect on stabilized zirconia, high density alumina, and zircon. The silicon carbide bonded with silicon nitride crucible was stained near the bottom. Magnesium oxide exposed to this atmosphere shows some signs of attack. It absorbs large quantities of moisture on exposure to air--which, in turn, causes further disintegration of the magnesium oxide. The melt did not adhere to the silicon carbide and silicon nitride crucibles as it did without this atmosphere. This could have been caused by some high temperature cloth that was used for padding around the crucibles in the atmosphere tests. An alumina crucible lined on the inside with thoria was tried with and without the atmosphere. The melt wet the thoria in both cases. The crucible showed no evidence of attack in either case. In all instances the center of the melt was yellow.

Homalite Hood Panels

Use of Homalite for hood panels has previously required that Lucite glove rings be screwed on. Recent tests have shown that an excellent bond can be made between Lucite and Homalite using Eastman 910 adhesive. Samples have been suspended over 16 M HNO_3 and over 48 percent HF. After several days' exposure, neither bond showed any signs of deteriorating. This adhesive would be suitable for fastening Lucite glove rings to Homalite hood panels without screws. A panel made in this manner is presently in use on one of the Development Laboratory hoods.

Ceramic Development

Product Recovery Operation has been experiencing long dissolution periods in dissolving certain plutonium buttons. A casting mold was provided which would permit puddling the massive button into a thin plutonium "pancake", which would presumably dissolve more rapidly. A significant time reduction was noted.

A second casting mold was jacketed with nickel using the Metco wire gun to a nickel thickness a little below 1/16". With the added strength, this mold will be available when needed as a reusable mold.

ORGANIZATION AND PERSONNEL

Personnel

<u>Date</u>	<u>Name</u>	<u>Transferred From</u>	<u>Transferred To</u>
5/1/58	J. P. Duckworth	Employee Relations, IPD	Purex Tech. Operation, CPD
5/1/58	B. F. Campbell	Production Operation, CPD	Advance Process Development Operation, CPD
5/1/58	W. P. McCue	Finished Products Operation, CPD	Research and Engineering Operation, CPD
5/1/58	E. F. Kurtz	Research and Engineering Operation, CPD	Finished Products Technology Operation, CPD
5/1/58	R. E. Ewing	Advance Process Development Operation, CPD	Chemical Research Operation, HLO
5/1/58	D. McDonald	Advance Process Development Operation, CPD	Production Operation, CPD
5/1/58	G. L. O'Neill	Purex Technology Operation, CPD	Advance Process Development Operation, CPD

Trips

V. R. Cooper, Manager Research and Engineering Operation visited Mr. C. F. Savage, General Electric Company, New York City on May 20 and 21 to discuss personnel relationships; visited Mr. R. K. Abbott, International General Electric Company in conjunction with the projected trip to the Geneva Conference. Mr. Cooper also visited Mr. Frank Kerze, Atomic Energy Commission, Washington D.C. on May 22 regarding papers for the Geneva Conference; visited Mr. Ed Miller, Division of Production regarding SS Accountability.

M. K. Harmon and R. G. Barnes of Redox Technology Operation visited Mr. L. C. Peery and Mr. R. I. Martens of duPont Savannah River Plant, Aiken, S.C. on May 12, 13 and 14 for technical consultation on Pu ion exchange, gaseous waste disposal, nuclear criticality control; visited Mr. D. E. Ferguson of Carbide Nuclear Corp., ORNL, Oak Ridge, Tennessee on May 15 for technical consultation on technology of effluent gas from Homogeneous Reactor and Thorex dissolving studies. (Mr. Barnes was also at Carbide Nuclear Corp., ORNL on May 16.) Mr. Harmon visited Mr. H. T. Green, General Electric Company, Lamp Division, Cleveland, Ohio on May 16 to hold discussion on methods for isolation and purification of tungsten.

E. R. Irish, Manager Purex Technology Operation visited Mr. Clifford Beck and Mr. G. R. McCullough, Atomic Energy Commission Advisory Committee on Reactor Safeguards, Washington, D.C. on May 8 to discuss Wahluke Slope.

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A. E. Smith of Finished Products Technology Operation visited Mr. Frank Foley of the General Electric Company, Schenectady, New York on May 15 for consultation on "Hands-Off" Program.

M. J. Szulinski of Finished Products Technology Operation and R. A. Schneider of Process Chemistry Operation visited R. M. Edwards of Mallinckrodt Chemical Works, Weldon Springs Plant, St. Louis, Missouri on May 5 for discussions on Uranium Process Technology; visited C. A. Powell and R. W. Levin of Union Carbide Nuclear Company, Paducah, Kentucky on May 6 and 7 for customer liaison and specifications discussions; visited D. Brater and S. Smiley of Union Carbide Nuclear Company, K-25 Plant on May 8 for discussions on Uranium Process Technology; visited M. Fortenberry of Union Carbide Nuclear Company, Y-12 Plant on May 8 for discussion on trough calciner; visited D. Arnold of National Lead of Ohio, Mt. Healthy Station, Ohio, Fernald Plant on May 9 for discussions on Uranium Process Technology.

L. A. Bray and J. W. Handshuh of Process Chemistry Operation presented papers at the Atomic Energy Commission Contractors' Meeting, Washington, D.C. on May 19 - 21; visited C. H. Ice and A. L. Barsten of Savannah River Laboratory Augusta, Georgia on May 22 and 23 to discuss analytical methods, quality control and standards; visited M. T. Kelly and L. T. Corbin of Oak Ridge National Laboratory, Oak Ridge, Tennessee on May 26 to discuss analytical methods, quality control and standards; visited J. T. Byrne and R. H. Roberts of Dow Chemical Company, Rocky Flats Plant, Denver, Colorado on May 28 to discuss analytical methods, quality control and standards.

L. A. Bray also visited C. W. Keller of Argonne National Laboratory, Lemont, Illinois on May 16 to discuss analytical techniques and methods, quality control and standards.

Visitors

E. J. Frederick and W. Stockdale of Oak Ridge National Laboratory, Oak Ridge, Tennessee visited R. G. Geier and W. G. Browne on May 1 for discussion on non-production fuels reprocessing and other development problems of mutual interest; visited R. E. Smith on May 2 for discussions on plutonium chemistry and reduction to metal.

William B. Tarpley of Aeroprojects Inc., West Chester, Penn. visited R. E. Smith on May 22 for discussions on ultrasonic welding.

Henry Boppel and Norman Jeglum of Sheffield Corp., Dayton, Ohio visited A. E. Smith and R. E. Smith on May 26 and 27 for discussions on gaging.

H. F. Solderling of H. F. Solderling Co., Seattle, Washington visited A. E. Smith on May 27 for discussions on gaging.

Jack Galt of GE West Coast Chem. Materials Dept., Anaheim, Calif. visited E. R. Irish and W. H. Swift on May 6 for discussions on Ion Exchange and Resins.

Visitors (Cont)

Sid Cohn and Bud Hickman of Phillips Petroleum, Idaho Falls, Idaho visited J. P. Duckworth on May 6 to tour Purex Control.

E. L. Pahl of the Government Auditing Office, Washington, D.C. visited J. P. Duckworth on May 6 to tour Purex Plant.

Bob Pearson, Ed VanDusen, Sam Milligan and R. A. Kaye of the Atomic Energy Commission, Construction & Supply Division, Washington, D.C. visited E. R. Irish on May 27 to tour Purex Plant.

F. G. Boyle, R. K. Bets and C. D. Williams of Aircraft Nuclear Propulsion, Cincinnati, Ohio visited H. H. Hopkins, Jr. and H. W. Crocker on May 20 to discuss glove box design.

Inventions

<u>Name</u>	<u>Title</u>
T. R. McKenzie	Method for Recovering Radiocerium From Purex Process Acidic Wastes.

V. R. Cooper, Manager
Research and Engineering Operation

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EMPLOYEE RELATIONS OPERATION
MONTHLY REPORT -- MAY 1958

I. RESPONSIBILITY

There were no changes in responsibility during the month of January.

II. ACHIEVEMENT

FIRE PROTECTION OPERATION

A. Fire Responses

1. Fire in air lock of basement of 202-A building. Involved sealed cardboard container of contaminated waste that was awaiting removal to burial grounds. Loss: \$210.00 from spread of contamination, and \$263.00 from loss of fire equipment due to contamination.
2. A fire response was made to a fire in the Purex burial grounds at 200 E. Probable causes were either spontaneous ignition or sun rays through glass sample bottles igniting combustible. Loss of fire equipment due to contamination \$61.35.

B. Fire Extinguisher Service 200-East, 200 West, Batch Plant, BY Telephone Exchange, and Yakima Barricade

1. Fire Extinguishers

Inspected	345
Installed	3
Delivered to New Location . . .	7
Seals Broken and Not Reported .	12
Serviced	38
Weighed.	285

2. Gas Masks

Inspected	28
Serviced	5

3. Hand Lines

Inspected	12
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4. Sprinkler Systems

Readings were taken on sprinkler systems of 272 W and 277 W & S and 272 E of pressures of air and water and inspected valves of each.

C. Training of Personnel in Other Operations

1. Six men were given training in evacuation bus driving. Three buses went to staging area No. 3 with two men in each bus.
2. Nine people from 222-S laboratory were given a class on construction and operation of the Chemox mask.
3. Nine people attended fire extinguisher demonstrations from 222-S building. All of these people extinguished fires with the different types of extinguishers.

D. Services Performed for other Operations

1. Burned down three small buildings in 200 West Area, thus saving removal costs.
2. Stood by while all weeds and grass was burned from 241-A Tank farm.
3. Two men and tank truck went to Yakima Barricade to fill water supply tank for barricade air conditioner.

E. Training for Fire Protection Personnel

1. One exempt employee attended Demonstration on Inflammable Liquids given at Employee Relations Safety Meeting.
2. One exempt employee attended Dr. Conant's course "Understanding People."
3. One non-exempt employee attended self development training school.
4. The annual testing and washing of hose was started this month and will be completed sometime in June. The annual testing of pumpers also started this month.

F. Civil Defense Rescue Squad Training

Rescue training classes will be given each Friday, excluding holidays, until Basic and Technical training is complete. These classes started during the month of May. Eleven members were instructed this month in first aid practices.

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<u>A. Employment</u>	<u>Exempt</u>	<u>Non-Exempt</u>	<u>Total</u>
<u>Additions</u>	2	6	8
New Hires	0	0	0
Reactivates	0	2	2
Re-Hires	0	0	0
Re-Engages	0	0	0
Transfers from other components	2	4	6
Changes from Exempt to Non-Exempt	0	0	0
<u>Removals</u>	3	9	12
Retired	1	1	2
ROF	0	1	1
Illness	0	1	1
Deceased	0	0	0
Leave of Absence	0	0	0
Transfer to other components	0	6	6
Resigned	2	0	2
Changes from Exempt to Non-Exempt	0	0	0
<u>Requisitions (Non-Exempt)</u>			
Number on Hand at beginning of Month		3	
Number Received during Month		12	
Number Filled		6	
Number on Hand at Close of Month		9*	
<p>*While there are nine requisitions to be filled - there are actually 13 openings because of the fact that one requisition called for six boilermakers of which two have been hired and one requisition was for three welders of which one has been hired.</p>			
<u>Request for Transfer (Exempt)</u>			
Number on Hand at beginning of Month	20		
Number Received during Month	0		
Number Transferred	0		
Number Closed Out	0		
Number on Hand at Close of Month	20		
<u>Applications for Employment (Exempt)</u>			
Applications Received during Month	0		
Hired	0		
Close Out	0		
Applications on Hand at Close of Month	0		
Open Requisitions	3		

Service Pins

A total of 16 pins were issued as follows:

15 yrs. service	0 Male	0 Female
10 yrs. service	10 Male	0 Female
5 yrs. service	6 Male	0 Female

May 16, CPD declared five craftsmen available which coincided with four excess craftsmen in Relations and Utilities Operation. Prior to the May 16th date we withdrew two of the declared excess. Of the remaining three excess craftsmen, one was placed in an opening in Relations and Utilities Operation, and the other two exercised their seniority bumping rights and displaced junior employees in FPD.

There are nine openings for craft people in CPD at the present time. They are three boilermaker welders, and six boilermaker journeymen. To date we have added to our roll two boilermakers and one boilermaker welder. There are three other boilermakers being processed for consideration and two other welders have completed their qualifying tests.

Five Separation Utility Operators were declared excess and were to have been ROF'd effective May 29th. Four of the five were placed in HLO as Engineering Assistants. The fifth was considered for a Field Clerk C opening in IPD but did not qualify. He was also offered a job in FPD as a janitor but refused the offer. The end result was that one Separation Utility Operator was ROF'd May 29th.

Candidates were submitted to IPD for one open position and three anticipated open positions.

Status - Personnel Development Program for Non-Exempt Employees

<u>Month</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>Total</u>
Number of appraisals scheduled	106	102	71	485
Number of appraisals delinquent as of 5-31-58	1	12	53	69

Correspondence

During May a total of 88 inquiries regarding CPD personnel were answered. They consisted of:

- 0 letter regarding record of employment
- 1 letter of inquiry regarding credit
- 87 letters regarding housing loans

Military Service Records

Records show that CPD has a total of 128 employees who are subject to military training through Selective Service or Armed Forces Reserve action.

	<u>Exempt</u>	<u>Non-Exempt</u>
Ready Reserve	14	13
Standby Reserve	15	6
Deferments Requested		1
Deferments Granted		0
Deferment Requests Pending		4

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B. Personnel Training and Development**DECLASSIFIED**Participation in Training Courses

Exempt	148
Non-Exempt	122
C. E. Supervisory Selection Program - No. Completed	3
C. E. Supervisory Selection Program - Revaluation	2
Technical Graduates on Rotation	5
Employees counseled in self-development	2
Films shown	6
OPG's Issued (3 new, 11 revised)	14

Three groups completed PEM-I and graduation ceremonies were held at the Desert Inn for 54 participants on May 27.

A special follow-up security training session was held in May for 15 exempt CPD personnel. Emphasis was given security violations and precaution techniques to be employed for maximum control in handling security documents.

C. Office ServicesDuplicating

Total Multilith Copies Produced	151,679
Verifax Copies Produced	879
Ozomatic Copies Produced	13,641
Xerox Masters Made	334

Mail

Total Pieces of Mail Handled	89,658
Registered Deliveries	466
Library Mail, Pounds	610
Blueprints, Pounds	580

Addressograph

Instrument Charts Imprinted	8,832
Bulletins, OPG's, etc.	10,243

As a result of a noise survey made in the 200 East Duplicating facilities, work orders have been issued to extend the side walls to above the ventilation ducts and an acoustical board ceiling to be installed covering the entire duplicating work area.

No further developments have resulted from an Industrial Hygiene study, but the work area has been rearranged and further experimentation will be made for additional exhausting facilities if found necessary when the results are known of the working conditions resulting from the relocated equipment.

At the request of Transportation, a complete check has been completed of all personnel-carrying vehicles assigned to CPD and corrected justification questionnaires have been submitted covering 66 vehicles on which revisions of codes and/or responsible parties have occurred.

COMMUNICATIONA. Statistics

GE NEWS items	11
General Manager's meetings with exempt employees	2
Management News Bulletins	6
Employee Headliners	3
Employee Location Records mailed out	10
Priority Messages	1

B. Comments on Statistics

Eleven items were carried in the GE NEWS during the month. These included a picture and cutline in connection with a National Secretaries' Week feature; a picture and cutline of CPD's Accident Prevention Council for inclusion in a feature on HAPO safety councils; a feature originated by CPD on IBM equipment used in CPD and IPD for transmitting payroll information; four pictures, cutlines, and a feature story on the Million Man Hour Club (P&GM); a feature story on an FPO retiree; a service award story; a picture and cutline of a Purex training program; two pictures and cutlines of cost-saving ideas used in an OPERATION UPTURN feature; a picture, cutline, and story on Purex winning the Million Man Hour Club plaque; a retirement picture and cutline about a P&GM employee; and a promotion story and picture.

A priority message on R&U's disabling injury was initiated during the month.

C. Other Employee Communication Activities

The Upward Communication Report was prepared for the Manager - Employee Relations during the month.

A letter signed by the Department Acting General Manager to accompany the packet "Your Personal Share in General Electric Employee Benefit Plans" was prepared and approved during the month.

A letter concerning OPERATION UPTURN was prepared for the Acting General Manager's signature and distributed to all Department management.

Posters showing the summer schedule for the General Electric Theater were distributed throughout the Department during the week.

A Round Table survey is being conducted by Communication to determine the effectiveness of the Round Table program within CPD, and also in order to determine the number of Round Table meetings that are being held. Survey questionnaires were sent out to approximately 130 first-line supervisors, managers, and specialists, and by month's end 68 forms had been returned.

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D. Public Communication

A letter was received from the Associate Editor, CHEMICAL AND ENGINEERING NEWS indicating that he would visit Hanford sometime during June or July to discuss the possibilities of a signed article on chemical processing. This information was provided the Manager - Facilities Engineering Operation.

Information regarding a small fire in Purex was provided the HAPO Press Relations people for their information in case they received a query from the local papers.

Arrangements were made to provide HLO with an up-to-date biography of R. E. Tomlinson. This biography will be included in material sent to the Senate Committee conducting the waste disposal hearings.

The final draft of GPD's portion of the HAPO TV program has been typed and copies sent to the Acting General Manager and to Public Communication, R&U.

A letter written by a GPD engineer to FACTORY MANAGEMENT & MAINTENANCE regarding a signed article on contact maintenance was reviewed and revised at the author's request.

Public Communication, R&U, was provided a copy of a talk given by a doctor at a recent American Medical Society Meeting in which he devoted much time to the General Electric Insurance Plan. Public Communication has accepted the suggestion that the talk be reprinted and distributed to all doctors in the Tri-City Area.

As a result of an item in the Management News Bulletin regarding the talk, "The Hanford Adventure", approximately 20 copies were sent out by month's end.

DECLASSIFIEDHEALTH AND SAFETY OPERATION

<u>Chemical Processing Department</u>	<u>May</u>	<u>April</u>	<u>Year to Date</u>
Disabling Injuries	0	0	0
Serious Accidents	0	0	1
Medical Treatment Injuries	41	54	245
Overexposure Incidents	1	1	2
Potential Overexposure Incidents	0	0	1
Radiation Occurrences	23	23	114
Fires	3	1	7
Security Violations	2	0	6

The Overexposure Incident consisted of a localized skin overexposure to a process operator from coverall contamination picked up during cask car decontamination.

Total Medical Treatment Injuries for May indicate the best monthly performance since March 1957.

Total loss for the three fires was \$534.35; details were publicized by investigation reports.

Programs

Preparation of CPD Radiation Control Standards is being continued.

Pictures were taken of 9 CPD people demonstrating types and proper use of respiratory equipment for posting, as a part of the Second Quarter Safety Program. A May safety topic on "Respiratory Protection" was issued by the Safety Program Council.

Power and General Maintenance and Purex Operations achieved one million man hours without a disabling injury. An excellent outdoor safety meeting attended by 400 Department people was held by Power and General Maintenance.

Emphasis was placed on Job Hazard Breakdown as a Department program of training and re-training.

Eleven Safety messages were posted on the marquee boards.

A flier on Vacation Safety, "Have Fun", was prepared and distributed to all CPD exempt personnel.

An information bulletin on safe operation of power mowers was issued.

A National Safety Council Booklet, "We Know Better", was procured and distributed to all CPD people.

Training and Education

Four sessions of Safety Problem Solving were conducted as a part of the Management Principles and Skills program.

The Specialist, Radiation Investigation and Audit, completed PBM-I.

Advice and Counsel

- Redox - 202-S - proper use of face shields and acid goggles, and provision of paint and oil storage facilities; 222-S - proper installation of 440 V circuit to power hack saw; 276-S - checking of flame arrestors in the tank vent system; 271-U - fire extinguishment equipment for the canyon, and respiratory equipment in fire fighting; improved methods of waste disposal; use of metal containers for waste material subject to spontaneous heating and fiber drums for dry waste disposal.
- Purex - Sandblasting the interior of the Sodium Nitrate 104 tank; specifications for fire resistant ventilation filters; 291-A - replacement of cable for measurement of stack liner radiation level; 241-A - controlled burning of weeds; Million Man Hour Club program.
- P & GM - Information was developed for selection of a method to inspect and repair, if necessary, the T and B plant stacks; 275-EA - additional water supply and flow rate test; improved fire protection in 272-E and 272-W and 277-W Buildings; significance of Radiation Occurrences; Million Man Hour Club program; fire breaks 200-East and West perimeter fences, roads, and buildings.
- Production - Exposure trends and standards.
- Facilities
- Engineering - 241-A - fire resistant vapor-proof roof construction for proposed condenser building; removal and burning of waste by contractors; 222-S - standard installation of sprinkler systems; 202-S - provision of oil and paint storage facility; construction of 2-hour fire resistant wall and ceiling for an equipment storage facility in the No. 2 blower room; 234-5 - additional fire protection; installation of automatic dry chemical fire extinguishment equipment for new hydraulic pump installation; exposure standards pertinent to 234-5 shielding projects; 271-B - installation of orbit duplicating machine in drafting room.
- HLO - Review of glossary on waste disposal for use before Joint Committee on Atomic Energy; summary of pertinent material from AEC "Fire Hazards of Atomic Industry" course.

Inspection, Investigation and Audit

Inspection of Purex Plant in preparation for the audit. Conditions in general were found to be good.

In company with a representative of property management, the 200 north areas and the 213-J and K areas were inspected. Both of these areas are unoccupied. Recommendations were made for a minimum of clean up, particularly the weeds from the fences around the 200 north areas.

Accompanied Sanitarian from Relations and Utilities Public Health on a tour of 200-East and 200-West Areas to survey swamps and drainage areas for mosquito larvae infestation.

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Investigated fires which occurred in 202-A Hot Shop, Purex Burial Pit and 202-S Building.

The follow up audit for Finished Products Operation is underway.

Reports Issued

Accident Prevention Council Meeting Minutes
Monthly Health, Safety and Security Statistical Report
AS We See It monthly summary of CPD Medical Treatment Injuries and HAPO
Serious Accidents
Summary of Radiation Occurrences for March and April
Overexposure Incident Report CPD 58-3
Fire Investigation - Purex Operation

EMPLOYEE COMPENSATION OPERATION

A trip to the Atomic Power Equipment Department in San Jose, California was completed for the purpose of exempt positions reconciliation and discussion of organization and employee compensation philosophy with the Salary Administration component there. Sixteen position reconciliations were effected along with numerous additional positions worth comparisons. Exchanged information on non-exempt wage plans and pay practices that was also accomplished will be useful to both APED and CPD.

Auditing, reconciliation, and research work necessary to the revaluation of two financial positions was completed.

Fire Protection Captain and Lieutenant positions were removed from a Fixed Rate status and established as normal exempt positions under the Salary Plan effective 6-1-58. Recommendations were made as necessary to management for accomplishment of the transition.

Lists of all HAPO positions and their levels that are counterpart to positions or functions found in CPD were prepared and provided third level managers. The purpose of communication of organizational information to this degree was to promote greater integration between departments in the valuation of their positions.

Seven non-exempt jobs were reviewed during the month. Of these, one was a secretarial promotional review. Warranted promotional action was accomplished. A new classification was established for one of the others and no change recommended for four. Further review relative to the remaining job will be necessary prior to final determination of the appropriate classification.

Several meetings were held during the month both with respect to classification determinations for jobs reviewed and also with members of our own management as well as some in other departments relative to certain promotional action of Laboratory Assistants proposed by CPD Laboratory Management. To date no final conclusion has been reached as to appropriate action on this matter.

A job history since 1956 reorganization was compiled on the combination clerical-secretarial job in Facilities Engineering in connection with a recent controversy concerned with this particular job.

Administratively 116 papers were processed in regard to additions to roll, reductions from roll, change in status, and change in salaries.

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SUGGESTION PLAN

	<u>APRIL</u>	<u>MAY</u>
Suggestions Received	77	70
Acknowledgements to Suggestions	65	89
Suggestions Pending Acknowledgement	21	2
Suggestions Referred to Oper. for Investigation	65	89
Suggestions Pending referred to Operations	21	2
Suggestions Completed and Closed	82	46
Adopted Suggestions approved by Board	1	36
Adopted Suggestions pending approval by Board	27	23
Total Net Tangible Savings	\$4,400.96	
Total Cash Awards Paid During Month	502.50	

As of the end of May there were a total of 33 suggestions which have been approved, audited, and are ready for payment, totaling \$420.00 in awards.

Award checks will be distributed on June 5th for \$380.00

Total number of suggestions outstanding to Operation at the end of the month	<u>APRIL</u> 111	<u>MAY</u> 126
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AVERAGE AGE OF "OFEN" SUGGESTIONS

PARTICIPATION IN BENEFIT PLANS

	<u>APRIL</u>	<u>MAY</u>
Insurance Plan	99.7	99.9
Pension Plan	99.4	99.4
Stock Bonus Plan	60.4	60.9
Good Neighbor Fund	67.3	61.4

Two employees retired during the month. All matters pertaining to their retirements regarding insurance, pension, stock bonus, social security, and unemployment compensation were discussed with them.

The Specialist-Employee Benefits talked at two safety meetings during May about the hazards of lawn mowers. There were approximately 75 employees in attendance at the two meetings.

The Sensitivity Survey Report was completed and distributed during May to all participants and level 3 managers.

During May 3 first contact pre-retirement group meetings were held at the Community House in Richland with approximately 120 HAPO employees, of this number 10 were CPD employees.

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Following the usual pattern, the majority of grievances continue to be concerned primarily with matters of jurisdiction. In May, ten out of the thirteen grievances submitted at Step I were jurisdictional in nature.

Four grievances were discussed at Step II during the month, the least number discussed during any month this year to date.

In demanding arbitration on the Massong case, the Council identified three issues: (A) They contend that the Company may not legally make a deduction from an employee's check without the employee's approval. (B) They contend that the employee was entitled to holiday pay even though he worked only a part of the day before the holiday. (C) They contend that the employee is entitled to pay for all hours worked during the payroll period without any unauthorized deductions.

The Company is corresponding with the HAMTC in an effort to restrict the arbitration proceeding to only issue (A).

A Step II Answer on the Massong case has been prepared and is being held pending Council request for discussion.

Herbert Wyckoff, Attorney of Watsonville, California, has been appointed by the Federal Mediation and Conciliation Service to hear the J. Graham arbitration case. This case involves Machinists and Tool and Die Makers who have protested their assignment to straight swing shift for a one-month's period.

An arbitration hearing was held on May 3, 1958 in connection with the Claude Thompson case. This involved a recurring situation in which a Junior Power Operator is relieving a Chief Power Operator during lunch periods. The Union contended that this was a violation of the "detailing procedure". There has been no decision rendered at month end.

	<u>May</u>	<u>April</u>
Bargaining Unit Employees in CPD	823	832
Bargaining Unit Employees Utilizing Check-off	556	577
Percentage of Total Bargaining Unit Employees Utilizing Check-off	67.6	69.4

UNION RELATIONS OPERATION

Following is the grievance statistics summary for the month of May, 1958:

	<u>Unit</u>	<u>Nonunit</u>
Grievances received year to date:	79	1
Grievances pending at Step II on 4-30-58	14	0
Grievances received during the month	13	0
Satisfactorily answered at Step I	4	0
Settled at Step I through expiration of 90-day time limit	4	0
Processed at Step II	4	0
Pending at Step II on 5-31-58	15	0
Pending at arbitration		
Active	8	0
Inactive	4	0

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III. ORGANIZATION AND PERSONNEL

A. Meetings

Personnel in the Employee Relations Operation attended 95 meetings during the month. These included:

Reconciliation meetings with Salary Administration of APED in San Jose, California.

Meetings with plant managers relative to a study of laboratory positions.

Four Step II grievance meetings were attended during the month.

The Industrial Relations Council met once.

HAPD Radiation Protection personnel information meeting.

Tri-City Construction Safety Council. Paul W. Clymer, Safety Supervisor, Washington State Department of Labor and Industries was the principal speaker.

Meetings to formulate plans for OPERATION UPTURN.

B. Personnel Activities

Fire Protection Operation had a total of 65 inside classes, and 80 outside drills, in which 13,115 feet of hose were used, and 866 feet of ladders. There was a total of 747 hours spent in training which is 12.51 per cent of the time worked.

Health and Safety personnel conducted safety meetings for Finished Products Operation, Redox Operation, and Facilities Engineering Operation.

The Specialist, Training was Master of Ceremonies at a banquet honoring fifty-nine Columbia High graduating seniors. The parents and teachers were invited.

The Specialist, Personnel Development, acted as a judge in an essay contest for the Diocese of Yakima. 170 grade and high school children entered the contest.

D. S. Roberts

D. S. Roberts, Manager
Employee Relations

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END

**DATE
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8 / 31 / 92**