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**HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON**

Work performed under Contract No. W-31-109-Eng-52 between
the Atomic Energy Commission and General Electric Company

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21, 22 & 23	Atomic Energy Commission, Hanford Operations Office Attention: J. E. Travis, Manager
24 & 25	Atomic Energy Commission, Washington 25, D. C. Attn: E. J. Bloch, Director, Division of Production
26	Atomic Energy Commission, Washington 25, D. C. Attn: F. P. Baranowski, Chemical Processing Branch
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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

OCTOBER, 1957

GENERAL SUMMARY

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PRODUCTION

A new record high output for plutonium was established in the separations plants in October while Purex Plant established a new high for the amount of uranium processed. During the month Purex also demonstrated the ability to operate at a sustained instantaneous rate of 20 tons per day.

The production of UO_3 exceeded the monthly commitment by 28% and shipments of UO_3 are ahead of the shipping schedule.

The fabrication of 200 and 250 Model assemblies from Savannah River plutonium met commitments.

The fabrication of 200 Model assemblies from War Reserve plutonium was short of commitment by 50%, due primarily to interference caused by the 250 model fabrication, which was done on a special request dated 10-2-57 from the AEC.

Over-all fabrication was 15% under schedule.

Production of unfabricated plutonium was 8.5% short of commitment, due primarily to startup difficulties with the new continuous Task I and II equipment.

ENGINEERING

The system for nitric acid recovery from dissolver off-gas in Purex Plant continued to operate under test conditions. It is indicated that the control of the air in-bleed to off-gas ratio will improve efficiency, which varied between 60 to 80 percent recovery.

Initial operation of the acid recovery and caustic absorber system on the dissolver off-gas stream in Redox Plant was very satisfactory. A nitric acid concentration of 55 percent was achieved over the short period of operation.

Operability testing of the prototype anion exchange system for plutonium concentration and purification continued in Purex Plant. Temperature control was found satisfactory. A difficulty in resin circulation was traced to fines in the material. After classification, circulation was normal.

The new hinged agitator arms with shear pin feature were installed in the "H" calciner in the UO_3 Plant. It is anticipated that a period of three or more months will be needed to appraise the effectiveness of the design.

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The operation of the continuous type Task I, II facility improved. Difficulties developed with the precipitation system that resulted in a recycle of 6.2 percent. The problems are mechanical in nature with defined plans for correction in hand. A secondary result of the non-standard precipitation conditions was wet cake, and reduced purity as well as metal density.

A new solvent DBBP (dibutyl-butyl-phosphanate) has been investigated for application of the Recuplex recovery system. It gives promise of increasing the system capacity without major equipment changes.

A careful investigation of the analytical methods for determining plutonium in product solutions (Purex L-9, Redox L-6) disclosed agreement between referee and control methods to within 0.10 percent.

The Project IR-218, Purex Recycle Dock Shelter, is complete. Final inspection was held October 24, 1957.

A directive has been received from the HOO-AEC, dated October 11, 1957, authorizing expenditure of \$2,348,667 on the Project CA-513-E, Purex Facility, Expansion of 200 Area Facilities, and extending the completion date to February 15, 1959.

The drawings and specifications necessary for Project CA-773, Interim Waste Crib were reviewed and approved during the month. The AEC has called for bids on the crib construction. Bid openings are scheduled for the end of the month.

A project proposal requesting funds to provide an interim segregation facility for E-metal processing at the UO₃ Plant is being prepared. This facility is needed by June, 1958, according to the production forecasts.

A study of radiation intensities and shielding requirements in the "Z" Plant has been concluded, and data obtained by measurements taken with specialized shielding arrangements is now being evaluated.

The project proposal revision of CG-691, Improved Task I and II Facilities, requesting an additional \$245,000, has been approved by the Commission. A directive, dated October 16, 1957, has been received authorizing the expenditure of \$945,000 on this project.

A study is being made of the potential engineering data that can be obtained from model waste storage tanks and the possible correlation or extrapolation of such data to plant structures.

GENERAL

The total reduction in the essential materials inventory, fiscal year to date, is \$31,000. Since decentralization in August, 1956, the essential materials inventory has been reduced \$578,000 or 37%.

The Midyear Budget review call was received during the month. Schedules requesting manpower and other expense estimates were forwarded to the Level 3 Managers.

The sixth cost-of-living increase, marking a high of 121.1 on the Labor Department's monthly consumer price index, became effective for most CPD nonexempt employees on October 28, 1957. Since July 30, 1956, the cost-of-living increases have totaled 5.90%. Coupled with the two three percent Better Living Program increases, the adjustment to date applicable to most nonexempt employees totals 11.90%.

The CPD-IPD Family Tour was held on the weekends of October 19-20 and 26-27. Over 55 percent of CPD employees participated in the tour.

The attitude Survey raw score data was distributed to managers of CPD. The report to employees was completed and printed during October.

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STAFF

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

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CHEMICAL PROCESSING DEPARTMENT
NUMBER OF EMPLOYEES
OCTOBER 31, 1957

OPERATION	EXEMPT		OTHER		TOTAL	
	9-30-57	10-31-57	9-30-57	10-31-57	9-30-57	10-31-57
GENERAL MANAGER'S GROUP	10	10	1	1	11	11
PRODUCTION	7	7	4	3	11	10
PUREX	44	43	247	242	291	285
REDOX	53	54	294	291	347	345
FINISHED PRODUCTS	56	52	319	303	375	355
POWER AND GENERAL MAINTENANCE	46	46	249	243	295	289
FINANCIAL	22	22	48	48	70	70
FACILITIES ENGINEERING	79	79	25	25	104	104
RESEARCH AND ENGINEERING	64	62	24	24	88	86
EMPLOYEE RELATIONS	31	31	55	55	86	86
	412	406	1266	1235	1678	1641

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CHEMICAL PROCESSING DEPARTMENT

PATENT SUMMARY FOR MONTH OF OCTOBER, 1957

All persons engaged in work that might reasonably be expected to result in inventions or discoveries advise that, to the best of their knowledge and belief, no inventions or discoveries were made in the course of their work during the period covered by this report except as listed below. Such persons further advise that, for the period therein covered by this report, notebook records, if any, kept in the course of their work have been examined for possible inventions or discoveries.

<u>INVENTOR</u>	<u>TITLE</u>
J. M. Gerhart and H. G. Johnson	A valve for the control of streams composed of powdered or granular solids.
J. W. Kolb	A rotary valve that contains multiple rotors that are timed in such a manner as to assure passage of even the finest and stickiest of dry powders.
J. W. Kolb	A mechanism which will make it impossible for a craftsman to assemble two timing gears in such a manner that they would be out of synchronization.

ACTING GENERAL MANAGER
CHEMICAL PROCESSING DEPARTMENT

CHEMICAL PROCESSING DEPARTMENT
PRODUCTION OPERATION

OCTOBER, 1957

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I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Production Statistics

The production of plutonium in the separations plants exceeded the commitment and established a new record high. Purex Plant established a new record high for uranium processed as a result of reducing the age of the metal dissolved to less than 105 days and by deferring one week of scheduled outage time until November. The processing of younger material was made possible by placing in operation the Purex dissolver off-gas treatment facility. During the month the Purex Plant demonstrated the ability to operate at 20 tons per day instantaneous rate for sustained periods.

Improved performance of the continuous UO_3 calciners resulted in the October commitment for UO_3 being exceeded by 27%. Shipments of UO_3 were approximately 40 tons ahead of the shipping schedule at the end of the shipping period, October 20, 1957.

Mechanical difficulties associated with the new Task I-II facilities affected output, limiting the production of unfabricated plutonium to 92% of the commitment. The production requirement for a special request lot of model 250 shapes was met; however, the October production commitment for high ngs 200 model shapes was adjusted downward to permit this accomplishment. The production of high ngs shapes was 50% of the new commitment, and the commitment for low ngs shapes was met.

Experience in recent months has indicated an above-normal variance between book inventory and physical inventory of SS materials. As a result, the problem is under active study to determine what steps are necessary to correct the situation. Preliminary steps include extending the existing Quality Control Program to include sampling and measuring SS materials, revising inventory procedures to assure accuracy and completeness, and the appointing of a study group to resolve what appear to be differences in CPD-IPD measurements.

1. Purex Operation

	<u>October</u>	<u>September</u>
Tons uranium delivered to storage	477.17	263.54
Average production rate per operating day (tons)	16.45	13.5

1. Purex Operation (Continued)

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	<u>October</u>	<u>September</u>
Average yield, %		
Uranium	96.95	96.2
Plutonium	95.43	96.4
Total waste loss, %		
Uranium	0.20	0.31
Plutonium	0.54	0.69
Average cooling time (days)	107	112
Minimum cooling time (days)	97	105
Percent operating time	93.6	65.0

2. Redox Operation

	<u>October</u>	<u>September</u>
Tons uranium delivered to storage	181.6	219.5
Average production rate per operating day (tons)	7.9	9.0
Average yield, %		
Uranium	99.9	100.7
Plutonium	89.6	108.3
Total waste loss, %		
Uranium	0.24	0.10
Plutonium	0.85	0.42
Average cooling time (days)	110	114
Minimum cooling time (days)	96	105
Percent operating time	74.3	80.9

3. 234-5 Operation

	<u>October</u>	<u>September</u>
Batches completed through Task I	393	476
Batches completed through Task II	391	470
Runs completed through Task III	199	214
Reduction yield, %	98.00	98.34
Waste disposal (units)	859.22	536.62

4. UO₃ Operations

	<u>October</u>	<u>September</u>	<u>To Date</u>
Uranium accepted (tons)	703.8	543.86	23,207.4
Uranium shipped (tons)	649.3	544.92	22,999.6
Average cooling time (days)	116	120	
Minimum cooling time (days)	102	111	

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DECLASSIFIED5. Power

	<u>200 East</u>	<u>200 West</u>
Raw water pumped, gpm	9,124	3,841
Filtered water pumped, gpm	1,124	714
Maximum steam generated, lbs/hr.	214,595	148,000
Average steam generated, lbs/hr.	174,896	98,928
Total steam generated, M lbs.	129,527	73,602
Coal consumed, est. (tons)	8,234	4,769

6. Waste Storage

	<u>Equivalent Tons U</u>	
	<u>Oct.</u>	<u>Sept.</u>
Salt waste reserve storage capacity-Redox	7,769	7,873
Salt waste reserve storage capacity-Purex	7,088	7,161
Coating waste reserve storage capacity-Redox	15,761	15,943
Coating waste reserve storage capacity-Purex	16,300	16,787

B. Production Planning and Scheduling Operation

A new quarterly official forecast was prepared and issued during October. Significant features of the new forecast which extends through fiscal year 1959, are as follows:

1. The I and E program was accelerated, resulting in full central zone I and E loading in all reactors by the end of FY 1959. This permitted an increase in the average exposure concentration of discharges of about 100 MWD/T greater than previously forecast for the latter part of FY 1959. As a result, the primary plant processing load was reduced about 800 tons during the forecast period.
2. Rescheduling of reactor power level increases and recent rupture problems resulted in an over-all decrease in plutonium output from the primary plants. This amounted to approximately 300 Kgs over the forecast period. A portion of this decrease in plutonium output is also due to an increase in reactor plutonium inventories (associated with higher concentration levels) during the forecast period.
3. The enriched metal processing load remained essentially unchanged, except that initial processing of this material was timed to coincide with completion of the first critically safe dissolver installation in July, 1957.

A new Albuquerque Schedule, listing button and shape production requirements of the 234-5 facility was received during the month. Of major significance is the incompatibility of the new schedule with HAPO capability in regards to alpha plutonium production during the second quarter of FY 1958. The basic alpha button

B. Production Planning and Scheduling Operation (Continued)

requirement for this period was increased over the previous schedule, and in addition, during this period HAPO is expected to make-up an existing HAPO-Albuquerque Schedule deficit. Prior to the new schedule, HAPO forecasts showed that the existing deficit would be made up by the end of the second quarter FY 1958, this necessitating conversion of essentially all primary plant plutonium nitrate to alpha buttons. Now, with the advent of an increase in the basic requirement for this period, deficit make-up must necessarily be postponed until the last half of FY 1958.

Historical forecast information was compiled for use in analyzing future E metal processing requirements in relation to the total separations plant load.

Information was developed and transmitted to HOO-AEC concerning HAPO low ngs feed requirements necessary to meet the present schedules of low ngs shape production.

Scavenging continued during the month with feed supplied from B Farm. Reclaimed storage since scavenging was resumed in March, 1957, has now reached 5,663,550 gallons, of which 384,000 gallons have been recovered thus far in October. September production was the highest ever attained (1,176,000 gallons and 137% of schedule) and to date 45% of October production has been achieved.

The significant contribution of the scavenging program is reflected in the following table:

STORED WASTE INVENTORY

	<u>5-1-57</u>	<u>6-1-57</u>	<u>7-1-57</u>	<u>8-1-57</u>	<u>9-1-57</u>	<u>10-1-57</u>
Gallons X 10 ³	57,824	56,415	55,987	54,989	54,238	53,311
% of Design	64.2	62.6	62.1	61.0	60.2	59.2
(90,107,000 gals.)						

During September the boil-off of Purex salt waste in Tanks 101-A and 103-A continued at a fast rate, resulting in a net decrease in storage of 19,000 gallons. Liquid level was maintained above the bottom circulators in Tank 103-A by adding 259,000 gallons of water. Total water additions since last February have been 1,631,000 gallons. Self-concentration in Tank 101-A increased to 211,000 gallons which discounted 110% of the waste received during September. Total self-concentration in A Farm since inception during July, 1956, amounts to 2,883,000 gallons (70.5% of total Purex waste currently stored in A Farm) as compared to 4,154,000 gallons (33.5%) reclaimed at SX Farm where self-concentration started in November, 1954. Water additions amounting to 17,000 gallons (total to date - 338,000 gallons) were also made to SX tanks.

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B. Production Planning and Scheduling Operation (Continued)

With respect to coating waste performance, Purex continues to generate more per unit processed than Redox. Currently the figure is 93%. Using six month cumulative averages to give a more realistic comparison, actual performance is tabulated below:

	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>
Redox	220	199	148	154	148	154	148
Purex	329	336	311	310	304	297	285

Anticipating that the scavenging program would be terminated upon completion of the scavenging of East Area material, a study was made to determine the most economical disposal of the remaining waste without sacrificing safety. The proposal includes the following:

1. Dispose of 2,047,000 gallons to the BC Cribs. On the basis of encouraging laboratory data, it was assumed that this quantity would meet cribbing requirements. It was also concluded that the discharged material would not reasonably jeopardize the regional underwater table. Consequently, further delays in AEC approval for additional monitoring wells (Project CG-764) will not appreciably handicap early termination of the program in East Area.
2. One additional and enlarged trench (2.2 million gallons capacity vs. 1.25 million gallons normal size) plus the 1.4 unused trenches will provide adequate space (3.9 million gallons) to contain the remaining 3.5 million gallons of waste.
3. The enlarged trench will be located so as to take advantage of existing monitoring wells, thus precluding added expense for a separate well.

C. Essential Materials

The savings accumulated during the first ten months of 1957 resulting from the plan of receiving caustic soda by the most economical transportation are estimated at \$9,492. During October the least expensive mode of transportation was by rail tank car.

Bulk purchases of propane for the Redox facility was continued and 10,000 gallons were received during the month. This represents a savings of \$504 compared to our old method of receiving small truck loads from local vendors. The accumulated savings since inception of this program in August is \$1,537.

Redox Plant is now receiving hexone by the currently most economical carrier. During October the least expensive freight rate was by tank truck. The 50,280 pounds received represents a savings of \$249. Accumulated savings since inception of tank truck deliveries is \$708.

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C. Essential Materials (Continued)

During September, the inventory of essential materials decreased \$6,616 to a value of \$984,302. Reductions since September 30, 1956, total \$476,052.

D. Reports and Documents

1. Prepared and Issued

HW-52867 RD UO Plant Production Schedule, October, 1957
B. F. Campbell

HW-52868 RD 234-5 Building Production Schedule, October,
1957, B. F. Campbell

HW-52869 RD Redox Plant Production Schedule, October, 1957
B. F. Campbell

HW-52870 RD Purex Plant Production Schedule, October, 1957
B. F. Campbell

HW-52912 Essential Material Consumption - Purex - Chemical
Processing Department, Sept. 1, 1957 - Sept. 30,
1957, M. A. Thress

HW-52930 Essential Material Area Report to Cost and
Purchasing, Production Operation, Chemical
Processing Department, September 1, 1957 -
September 30, 1957, M. A. Thress

HW-52932 Chemical Processing Department - Waste Status
Summary for September, 1957, R. E. Roberts

HW-53298 Chemical Processing Department - Daily Production
Report - July 1, 1957 through September 30, 1957,
H. F. Tew

HW-53381 Scheduled Shutdown of Redox Plant, V. R. Chapman

CLVI-117 Official Quarterly Forecast - Chemical Processing
Department - October, 1957 through June, 1957
B. F. Campbell

2. Prepared for Signature and Issuance

HW-52875 Production - September, 1957, W. K. MacCready

CLVI-112 Production Forecast, W. K. MacCready

III. ORGANIZATION AND PERSONNEL

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B-6

DECLASSIFIEDA. Force Summary

	<u>Beginning of Month</u>	<u>End of Month</u>
Exempt	7	7
Non-exempt	<u>4</u>	<u>3</u>
Total	11	10

B. Safety

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

C. Security

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

D. Visits

During the week of October 7, K. E. Fields, D. S. Burrows, and J. A. Derry, Atomic Energy Commission, Washington, visited the Chemical Processing Department.

J. S. Graham and J. F. Floberg, AEC Commissioners, visited the Chemical Processing Department on October 7 and 8.

J. L. Cass, U. S. Department of Labor, visited the Chemical Processing Department on October 10, 1957.

VR Chapman

Acting Manager
Production Operation

CHEMICAL PROCESSING DEPARTMENT
PUREX OPERATION

October, 1957

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I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Processing Experience

1. Normal Processing

Processing at a 2.16 capacity factor rate continued from the September production period until October 1, at which time the rate was increased to 2.4 CF. On October 15, the rate was reduced to 1.44 capacity factor due to limitations at Z Plant. On October 22, a process shutdown was necessitated when a restriction suddenly developed in the line between the final plutonium stripper (L3) and concentrator (14). Following replacement of the faulty valve which caused the restriction, operations were resumed at a 1.44 capacity factor rate on October 24. Production rates were increased to 1.92 CF on October 27, and continued for the remainder of the month. A new production record for a primary separations plant was established in October when 477 tons of uranium were processed. The production commitment for the period was exceeded by 159 percent. Overall waste losses of 0.54 percent and 0.20 percent for plutonium and uranium, respectively, were achieved during the month. The plutonium waste loss experience is the best performance at Purex to date. On-line efficiency for the month was 93.6 percent.

All plutonium produced was within specifications except for two batches of material over gamma specifications collected immediately after the startup on October 24. The second batch of uranium produced after this same startup contained an excessive amount of plutonium, and approximately 120 tons of out-of-specification uranium were accumulated before the difficulty was traced to an abnormally high temperature condition in the final uranium cycle feed tank, K1. The temperature recorder instrument on this vessel continued to record the normal process temperature even though the temperature signal circuit had been de-energized for an indeterminate period of time. After the temperature of the feed stream was adjusted, specification uranium product was produced.

The third dissolver, C-3, was tied into the off-gas backup facility on October 4. Since that time the three dissolvers

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have been operated in various combinations of complete by-pass or alternating absorber and scrubber use to evaluate recovery efficiency of the oxides of nitrogen.

It was necessary to re-establish dissolver heels several times during the month due to the high bias of the nitric acid metering devices. The larger acid volume produced metal cuts in excess of the prescribed amount.

During the reduction of extraction rates from 2.4 CF to 1.44 CF at the middle of the month, abnormal conditions developed in the partition cycle IC column and high uranium waste losses resulted. Approximately 1,000 pounds of uranium collected from the IC column waste stream during the period were isolated and stored in G7 tank for future rework.

High plutonium losses occurred in the precycle HA column when acid-deficient feed was encountered late in the month. The acid-deficient feed resulted from the use of low strength UO_3 and Purex-recovered acid in the dissolvers. HA column waste, containing approximately 950 units of plutonium which resulted from processing the sub-standard feed, was collected and isolated for future rework.

On October 9, the interface float instrument in the final uranium cycle 2D column failed and it was necessary to shut down the final uranium cycle equipment for about 16 hours while the old capacitance-type interface instrument was installed in the column. It was not necessary to shut down the remainder of the operation during this replacement.

To alleviate the shortage of PR containers early in the month the plutonium content of the cans was increased 40 percent. This was accomplished by increasing the product concentration from 150 to 200 units per liter, and increasing somewhat the loading volume. The increased concentration also aided throughput in volume-limited 234-5 Building operations.

The aqueous waste streams from the #1 and #2 organic treatment cycles were rerouted from underground waste storage tank 241-A-103 to 241-A-101 on October 24, after the liquid level in the latter tank had boiled down to a satisfactory level. This change will help maintain representative composition of stored wastes and prevent an accumulation of organic material or other specific components in any single tank.

Ninety-one trailer loads of UNH were delivered to 244-U, and forty-seven loads of UO_3 reclaimed nitric acid were received at Purex.

2. Special Processing

A total of 44 units of plutonium were reclaimed by the backcycling of a portion of the 2WW concentrated waste stream after refluxing

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in the F-8 rework tank for five days. No deleterious effects were noted in the extraction columns as a result of processing the 2WW material.

The two batches of out-of-specification plutonium produced during the startup, and the solution collected from acid flushes of the plutonium stripper (L3) and concentrator (L4) during the shutdown were successfully reprocessed through the building.

Twenty tons of uranium, which was bypassed around the final uranium cycle equipment during repairs to the 2D column interface instrument, was successfully processed by increasing the extraction rate of the equipment to 2.64 capacity factor.

One hundred and twenty-nine cans of 234-5 Building recycle material, containing approximately 8.8 Kgs of plutonium, were processed.

B. Radiation Experience

1. Radiation Occurrences

Three radiation occurrences were incurred during the month. These involved contamination of a process operator's wrist to 10,000 d/m plutonium, and two minor spreads of plutonium contamination.

2. Radio-Iodine Emission

Weekly radio-iodine stack emissions were below the Purex limit of 6 curies per week, and the average daily emission rate was 0.35 curies.

3. Personnel Exposure

Four cases of skin contamination were incurred. The maximum levels of contamination were 10,000 d/m plutonium and 2,000 c/m fission products. All cases were readily decontaminated.

Decontamination and shielding of the K-2 interface float and the K-1 pump successfully reduced radiation and permitted maintenance at a maximum dose rate of 2 rads/hr. Excellent contamination control was maintained throughout the work.

The decontamination of the EB-2 heater in M cell continued throughout the month at personal dose rates up to 300 mrad/hr. Decontamination efforts have reduced the radiation intensity from a general level of 1.5 r/hr. at 6" to a maximum of 1.5 r/hr. at 2".

The crane cab air supply filters, contaminated to 2.5 rads/hr., were replaced at a maximum dose rate of 500 mrad/hr. Contamination control during the filter exchange was excellent.

Considerable high level radiation work was accomplished during the month at the 241-A Tank Farm. The work involved the inspection of

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a portion of the 412 off-gas line, the replacement of the 433 de-entrainment tank, and the subsequent replacement of piping associated with the 433 tank. Dose rates encountered during decontamination and shielding varied from 500 to 2,000 mrad/hr. The maintenance work was accomplished at dose rates varying from 200 to 800 mrad/hr. The replacement of the 433 tank piping was complicated by contamination leaking from the failed lines. This has necessitated repeated extensive decontamination and shielding prior to continuing the maintenance work. The maximum radiation measurement obtained from these leaks was 12 rads/hr.

Corrosion coupons, contaminated to 450 rads/hr. were removed from 101-A waste storage tank and transferred to the 300 area with a maximum dose rate of 1 rad/hr. to personnel.

4. Contamination Experience

Surveys of the 202-A swamp area indicated an increase in contamination level from 100 c/m to 4,000 c/m in algae along the edges of the inlet ditch. This contamination is discharged into the swamp via the cooling water system.

Several cases of plutonium spreads occurred in the Analytical Control Laboratory following a spread in Room 53. The contamination levels involved were 5,000 to 10,000 d/m and were caused by tracking. Although the source of the spread was not pinpointed, a general cleanup has prevented recurrence.

The canyon deck and papered areas in the head end of the canyon were contaminated to a maximum of 20 rads/hr. Disposal of the paper and hosing of the deck has restored this portion of the canyon deck to its former status. The maximum dose rate to personnel during the cleanup was 2.5 rads/hr.

Extensive decontamination efforts were made on the crane during the month. Most of the high level contamination has been reduced to general levels of 100 to 200 mrad/hr. Isolated areas are still contaminated to 3 rads/hr. Dose rates encountered during decontamination averaged 100 to 200 mrad/hr.

C. Mechanical Experience

1. K-1 Canyon Pump

The leaky K-1 pump (removed from service on 9-17-57) was successfully decontaminated, repaired, and test run. To effect repairs, the shaft, seals, and bearing were replaced. Examination of the worn parts revealed excessive wear to the upper graphitar seals and shaft bearings, with a moderate amount of wear indicated on the shaft and bowl bearings.

2. "L" Cell Package

A restriction in the L-3 to L-4 transfer line in "L" Cell package forced a plant shutdown on 10-22-57. Subsequent investigations disclosed that the gate of the 1" L-3 valve had disengaged from the stem and was obstructing line flow. Both 1" gate valves on the L-3 to L-4 transfer line were replaced and normal operation was resumed on 10-24-57.

3. Centrifuge Alternators

Excessive arcing between carbon brushes and commutator collector rings forced a shutdown of both 75-cycle centrifuge alternators for repairs on 10-10-57. All centrifuges were switched from 75-cycle, 1500 rpm to 60 cycle (AC current), 1200 rpm without process interruption. To facilitate repairs the collector rings were machined and the carbon brushes were replaced. Inasmuch as two previous repairs of similar significance were performed on these units (7-16-56 and 3-26-57) a series of special tests were conducted under direction of FEO on one unit, following the repairs completed on 10-15-57. Tests performed failed to reveal a definite cause of ring deterioration. Operation continues without the use of the alternators.

4. Diaphragm-Operated Valve Bellows

The A3-7 diaphragm-operated valve located in "A" section sample gallery for control of recovered nitric acid failed, due to bellows rupture, on 10-5-57 and caused extensive corrosive damage to nearby equipment. The diaphragm-operated valves in acid service have since been covered with plastic to prevent possible injury to personnel or damage to equipment. The failed bellows, together with a brief history of previous failures, have been submitted to FEO for analysis and recommendations.

5. Canyon Block Bails

The pickup bail of cell block G-9 parted at the apex of the bail during normal canyon crane work on 10-24-57. No damage resulted. As this is the second bail failure at Purex, FEO has been requested to evaluate the problem and submit recommendations for corrective action.

6. De-entrainment Tank (241-A Tank Farm)

Replacement of the defective #433 de-entrainment tank in the underground waste storage tank vent system was completed during the month. Inasmuch as the defective carbon steel tank was severely corroded a spare excess "T" Plant stainless steel tank was modified and used as a replacement. To evaluate the extent of the corrosion problem on the vent system, corrosion checks were performed at two locations on the underground portion of the system, following excavation near the de-entrainment building. No significant corrosion was indicated. Inspections included audigage readings on top of the 412 condenser and removal of a four foot section of

eight inch discharge pipe from the condenser for visual inspection.

7. 291-A Exhaust Fan Motor #3

The 200 HP electric drive motor connected to the #3, 291-A exhaust fan was shut down for repairs on 10-24-57 because of unusual noise and vibration. Investigation revealed defective inboard and outboard bearings and a misaligned motor shaft (.002 to .003 off center). Trueing the shaft by metalizing and remachining is planned to prevent future bearing failures.

D. Analytical Control Experience

Routine analytical control operations in support of the plant operation were accelerated as a result of the out-of-specification uranium problem. Methods used for the determination of plutonium in concentrated uranium solutions were thoroughly reinvestigated and found to be satisfactory.

A sulfate ion correction factor was established for the assay analysis for plutonium product since sulfate ion is now routinely added to the final plutonium cycle 2B column.

Erratic nitric acid results occurred in the plutonium analysis when the final plutonium product concentration was increased during the month. A minor change in the analytical procedure corrected the problem.

E. Improvement Experience

1. Process Tests and Revisions

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

To promote stable operating conditions at the higher production rates (above 2.16 CF) the aqueous flow rates to the precycle, partition and final uranium cycle "C" columns were reduced. A reduction in steam consumption in the concentrators was a direct result of the decrease in aqueous solution.

In order to prevent polymerization of plutonium when the final plutonium product concentration was increased by 33 percent the sulfate ion concentration in the final plutonium cycle 2B column was decreased from .004 M to .003 M. No change in the 2B column waste loss resulted.

2. Inventions and Discoveries

No inventions or discoveries were reported by Purex Operation personnel during October.

DECLASSIFIED**F. Events Influencing Costs**

The high production for the month and no unusual maintenance expenses resulted in record low unit costs for uranium and plutonium.

Forty-four cubic feet of silver reactor packing were coated for Redox reactors at a savings of \$5,000 for the Chemical Processing Department, based on the most reasonable estimate by off-site vendors.

III. ORGANIZATION AND PERSONNEL**A. Safety**

There were no disabling injuries at Purex during October. A total of 13 medical treatment cases were reported.

A small fire occurred in a protective clothing hamper in the canyon Hot Shop on October 16, following repairs to a piece of equipment with a welding torch. Property damage was estimated at \$250. No personal injuries resulted. An informal report was issued following an investigation of the fire.

B. Security

There were no security violations during the month.

C. Personnel Activities

One Technical Graduate completed rotational training during the month, and one Technical Graduate began his training at Purex on October 7.

Three exempt employees completed the course, "Understanding People", presented by Dr. J. C. Conant.

MANAGER
PUREX OPERATION

OC Schroeder:JCG:gt

SECRET

CHEMICAL PROCESSING DEPARTMENT
REDOX OPERATION

OCTOBER, 1957

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I. RESPONSIBILITY

Monitoring responsibilities for the HLO Laboratory in the 222-S Building were assumed by the Redox RM Operation.

II. ACHIEVEMENT

A. Processing Operation

1. Production Rates and Operating Continuity

Operations of the Redox Facility were resumed on 10-5-57 after a scheduled shutdown on 10-1-57. Operating continuity was interrupted on two occasions during the month due to equipment failures. On 10-7-57 and 10-8-57 a shutdown was taken to overcome a process leak in the silo (1-SBS feed to column). The process was again shut down for a period of 47 hours on 10-17-57 to 10-19-57 to replace the failed E-5 pump, 2AF pump, and D-14 backcycle pump.

The operating efficiency for the month was 74.2%. The mechanical efficiency was 88.5%. Production rates were 60% to 80% of nominal for all except 201 hours of operating time. Troubles encountered at Z Plant, and mechanical difficulties in the Redox Operation necessitated the reduced rates. As a result only 76.6% of the production commitment was achieved.

The uranium stream ran persistently above specifications on gamma ratio for the greater part of the period. It is suspected that this was induced from solids associated with head-end metal solution passing to the feed stream through insufficient centrifuge cake removals. The centrifuge tachometer was out of service and cake removals were not carried out under normal schedule. All of the UNH produced met shipping specifications, although 50 E-12 batches had to be ozonated and 40 of these were processed through silica gel. Plutonium production remained within shipping specifications throughout the month. The plutonium concentration has been raised to levels permitted by the new Task I with no difficulty experienced. Waste losses were higher than normal for the month amounting to 0.87% of the total plutonium produced and 0.23% of the total uranium produced. The higher than normal waste losses are attributed to (1) frequent shutdowns and changes in processing rates, (2) acid flushing of the columns, (3) sump materials bearing product from cell equipment leakage.

Iodine emission from the 291-S stack remained within specifications throughout the month. The apparent efficiency of the silver reactors was 99.78%.

The third shipment of Chalk River metal arrived on D-21-57. It was charged to the C-2 dissolver on D-22-57. Bulk samples were taken and the material will enter normal processing streams the first of November.

During the scheduled shutdown period, at the first of the month, the building steam was shut off to allow general repairs to steam lines in the building. Also, a 60% acid clean out flush was put through the silo equipment and the associated cell vessels. During the shutdown of 10-18-57 a 10% acid flush was given the 1-A and 1-S columns. The H-5 and J-2 scrubbers were regenerated in an effort to improve the H-4 pot vacuum.

Piping changes were made on the 1-A and 1-S backcycle streams to combine them with the product bearing feed streams at the feed point of the columns. Previously the backcycle was added to the column approximately ten feet up in the scrub section. More uniform decontamination, through better control of acid content in the columns, is expected. This change was made after a leak had developed in the 1-S backcycle feed line which required a shutdown for correction.

2. Equipment Experience

a. D-8 Pump

The D-8 waste neutralizer pump developed a leak at the pump seal. It was replaced with a new pump on 10-1-57. The old pump will be repaired and used as a future replacement.

b. E-5 Pump

The installation of a baffle to divert the leakage from the E-5 pump (2A feed column) back into the E-5 tank was not successful. A new pump was installed on 10-2-57 and on 10-17-57 this pump failed. The cause of the failure was apparently a broken shaft as the pump motor continued to operate. Another new pump was installed on 10-18-57 and subsequent operation has been satisfactory.

c. D-14 Pump

The D-14 pump failed on 10-17-57. Replacement was made with a second open head Peerless type pump, with modifications as described in the September report. It is hoped that the modified pump will provide the longer life so badly needed in the D-14 position.

d. H-4 Pot

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On 10-26-57 it was determined that the H-4 metal solution oxidizer was leaking at a point approximately 30 inches from the bottom of the pot. Use of the oxidizer was continued to the end of the month by making short batches, thus keeping the liquid level below the leak point while preparations were being made for replacement of the oxidizer. The building production rate was curtailed proportionately. Installation of a new oxidizer is planned for 11-1-57.

e. H-2 Centrifuge Tachometer

The H-2 centrifuge tachometer has been inoperable since 10-6-57. It failed after being in operation for 48 hours after the jumper change on 9-27-57. The oscilloscope method of determining RPM's was employed for cake removals and operation of the centrifuge continued. It is suspected that the trouble is somewhere between the tachometer and the centrifuge motor shaft and will require replacement of the centrifuge for correction.

f. DG-129 Jumper

The D-12 waste concentrator specific gravity and weight factor assembly developed a leak on 10-1-57. A new jumper was installed on 10-5-57.

g. Thermohm Jumpers

The following thermohms failed and were restored to service during the month by installing new thermohm jumpers in the cells:

1. HG-127, H-10 coating waste storage thermohm	10-1-57
2. DG-147, D-14 backcycle cooler thermohm	10-2-57
3. DG-146, D-13 waste receiver thermohm	10-3-57
4. BG-38, B-3 reactor off-gas thermohm	10-12-57

h. HG-53 Jet Assembly

Difficulties had been experienced with the jet from the H-9 metal solution storage tank to the H-7 blending tank. A condition was finally reached where the jet would not operate. It was replaced with a new assembly on 10-1-57.

i. HG-17 Jet Assembly

The H-4 oxidizer to G-5 centrifuge feed tank jet failed in service. A new jet assembly is being fabricated and will be installed upon completion.

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DECLASSIFIEDj. EG-67 Jumper (Pump Seal)

The E-5 pump seal jumper was damaged during the E-5 pump replacement. It was necessary to install a new jumper on 10-19-57.

k. 1-SBS Backcycle Jumper (FT-12, FT-13)

A leak developed at the orifice on the 1-S backcycle jumper on 10-21-57. The jumper was replaced without shutting down the columns.

l. 1-ABS Backcycle Jumper (FT-5, FT-6)

Following replacement of the D-14 pump on 10-18-57, the 1-A backcycle jumper was found to be plugged. The plug was released by loosening the FT-6 connector head and pumping solution out the loose head.

m. Equipment Burial

On 10-10-57, a box of non-repairable cell equipment and contaminated waste from the canyon was transferred to the burial garden.

n. Cask Car Lids

The test involving the removal of lids from cask cars was discontinued because of the possibility of contamination spread. It is felt that some type of lid structure is needed to prevent occasional splashing during transit.

B. Maintenance Operation

The horizontal tunnel door installed on project CG-621 has proved to be underdesigned in some respects. On October 4th, the door became inoperable. Investigation revealed that one of the centering guide roller assemblies had been torn off and at least three of the regular supporting rollers had worked loose and were laying along the side of the RR track in the bottom of the tunnel. The guide roller assembly was removed and repaired. In checking it out, it was discovered that when the spring loaded roller is compressed to the extreme, the guide bolt protrudes beyond the roller 1/4 of an inch. This undoubtedly caused the roller assembly to be torn loose from the door when the guide bolt head caught on the track. In the case of the regular rollers, the retaining screws have no means of being locked and consequently back out when the door is in operation in the direction which will turn them off. In order to correct this, all the main rollers will have to be removed and rebuilt to provide a positive means of locking the roller retainers.

The first of the Peerless open head pumps was installed in the F-1 position on September 5th. It has operated satisfactorily in this

position since that date. A second open head Peerless type pump, with certain modifications described in previous reports, was installed in the D-14 position on October 18th. It is hoped that this will be the answer to the pump problems in this position.

Canyon equipment replaced during the month in addition to the D-14 pump included one D-8 pump, two E-5 pumps, one D-7 agitator, and seven jumpers.

On October 21, a cable on the 60 Ton Canyon Crane came off the sheave. It was successfully replaced by the rigger iron workers.

To improve the effectiveness of the instrument maintenance effort, a new method of assignment of work was put into effect this month. Two men are now assigned daily to answer trouble calls and the remainder of the men are scheduled on Preventive Maintenance assignments. Formerly, the men were assigned to maintain equipment in certain zones.

The new type lead shield which was fabricated last month was largely responsible for the successful replacement of ten silo lights during the month.

The 60 Ton crane experienced an abnormal amount of electrical failure during the month. On October 4th, the clamp broke which takes the strain on the power cable to the left hand cell wrench. On October 17th, the right hand auxiliary hoist travel began stopping intermittently. After several days of testing, it was determined that the trouble was due to a break in the circuit, which intermittently made contact and caused the erratic operation. A jumper was installed by-passing the break and this corrected the difficulty. On October 22, 1957, a new bridge travel rheostat had to be installed to correct arcing. On October 23, the generator brushes for the bridge travel had to be replaced. On October 25, a broken contact on the motor shunt field relay caused failure in the main trolley. A new contact was installed. No production loss could be attributed to any of these failures with the possible exception of some lost charging time due to the failure of the 25th of October.

By installing spacers in the contacts of the D-14 and D-13 thermohm jumpers, both jumpers made up and are operating properly. Inasmuch as these were new jumpers and had previously failed every effort to establish continuity, it appears that these spacers are necessary and that past difficulties with thermohm jumpers may be due to this. To further substantiate this, the same correction was made to the C-3 thermohm jumper. On 10-18-57, the left hand crane optic head was replaced because of an inoperative high power solenoid and also a smudge on the inside protective glass. On 10-10-57, it was necessary to adjust this head because the alignment pin was improperly engaged.

A test weight for the 233-PR load-out scale was fabricated, and the scale and test weight were calibrated, using the 234-5 Kilogram

check weights. The use of this weight prior to load-outs should insure the proper operation of this equipment.

The installation of positive closing back draft dampers was completed in the stacks from EF-1 and EF-8. These dampers were installed to prevent the back flow of air through the filters in case of fan failure.

C. Waste Handling and Decontamination Operation

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1. Waste Handling

a. <u>200 East</u>	<u>Gallons</u>
Waste Scavenged	900,000
Waste Received (Purex Coating)	140,000
Waste to Ditches	977,000
Waste to Cribs	470,000
Purex Startup Waste Received in 103-C from 102-A	12,000
b. <u>200 West</u>	
Redox Coating Waste Received (S Farm)	29,294
Salt Waste Received	208,887
Total Gallons Boil-Off Salt Waste	191,080

2. Equipment Decontamination and Repair

a. Decontamination - Regulated Steam Pit

A total of three vehicles and seven pieces of equipment were steam cleaned during the period. Total time charged to this operation was 68 hours.

b. Decontamination and Repair to Railroad Equipment

A total of 135 hours was charged to the Riverland operation for timekeeping and decontamination.

Four cask lids were repaired, four casks were completely decontaminated and bungs were removed from three casks.

3. Finished Product Equipment

Decontaminated and repaired the following pumps:

1	X-30-2	approx. saving	\$2,800.00
1	X-19	approx. saving	2,500.00

Received one concentrator for decontamination and inspection.

Decontaminated and dismantled one X-19 and one X-30-2 pump.

These are ready for rebuilding.

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4. Redox Equipment

Completed repairs to pump No. J-19-20-P. Cost of repairs \$1,667.00 savings approximately \$4500.

Received two silver reactors for regeneration and six pumps for decontamination and repair.

5. Purex Equipment

Decontamination of the first Purex pump was started using Turco solution. One flushing reduced the readings approximately one-third.

6. General

a. Improvements to Work Areas

An equipment rack for contaminated equipment was fabricated and installed in cell 2 of the 221-U Canyon. The use of this rack permits the storage of hot equipment under cell blocks and has greatly reduced exposure readings in that section of the canyon.

A remote control linkage was installed on the outlet valve of the big thimble. Also, inlet air valve controls were relocated to reduce radiation exposure to operating personnel.

b. Cesium Recovery Program (Project CG-718)

As requested in this project, the program of weekly run-in of 221-B Plant equipment was continued this month.

c. Essential Materials Sales to Customers

Seven drums of caustic to CR Tank Farm. Two drums nitric acid to 105-KE Area.

7. Purex Waste Handling

A total of 140,000 gallons of Purex Coating Waste was received in the 105-C tank and 12,000 gallons of Purex Startup Waste was received in the 103-C tank during the report period.

Three plugged jumpers (Purex) were removed from the 104-C sluice pit and buried.

8. Waste Scavenging

A total of 900,000 gallons of waste was scavenged during the month representing 107% of the production forecast. Approximately 1.5 million gallons of waste remain to be scavenged in 200 East Area.

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9. Redox Waste Handling

A total of 29,294 gallons of Coating Waste and 208,887 gallons of Salt Waste was received during the period. Total gallons boil-off was 191,080 gallons.

Cleanout of old jumpers from the 240-S-151 diversion box was completed and Salt Waste was rerouted from 114-SX to 108-SX during the month.

A 500 milliliter sample of Redox Coating Waste was obtained from storage tank 107-S for the Chemical Effluents Technology Operation.

D. Analytical Control Operation

1. Control Statistics

<u>Month</u>	<u>Samples</u>	<u>Determinations</u>
September	2721	6789
October	2847	7497

2. Building Maintenance

Principal 222-S Building maintenance included cleaning of water still and storage tank, replacement of a diaphragm on vacuum pump control valve, cleaning of two sumps in the cold service tunnel, repair of roadway gate at Redox badge house and installation of adjustable leveling devices on all laboratory tables in the 222-S Building.

3. Equipment Experience

About six days of downtime were experienced with the "Intrafax" communication system. The 202-S receiver has been the greatest source of trouble.

Two days downtime were experienced with the UO_3 reactivity apparatus due to the necessity of cleaning the gas flow orifice and extending the gas discharge line.

4. Assistance to Process

Nonroutine visual inspection of LAW, LSW acid flushes at high radiation levels suggested the presence of chromium and was verified by qualitative analysis.

Unusually high fission product activity was encountered in flushes when the C-2 dissolver was being cleaned for processing Chalk River material. This was reported to Redox Processing Operation for evaluation.

A series of eight D-2 samples was analyzed for hexone as an aid in following plant organic losses. The results were forwarded to Redox Technology Operation for evaluation.

5. Analytical Procedures

Analytical procedures and apparatus for control of the 293-S Acid Recovery system have been made ready. Personnel have been trained on synthetic samples pending startup of the facility.

A system for choosing samples for referee analysis in the Quality Control Program was put into effect on 10-28-57. The new system divides the work equally between shifts and specifies the sample type, the assay, and the frequency for each. Sample types and analytical methods important to process control and SS Accountability will receive more adequate referee coverage under the new system.

E. Radiation Monitoring Operation

1. Radiation Occurrence Experience

Six Radiation Occurrences were reported in the Redox Operation this month. Some of the Radiation Occurrences were unique and included such conditions as:

- a. A burial box loaded with process jumpers from the 240-S diversion box was exposed to the heavy rain on the night of October 1. Considerable contaminated water leaked from the box contaminating the ground below to 2 rads/hr.
- b. On 10-24-57, a burial box, used to transport failed equipment from Redox to the U Plant Canyon, was inadvertently pulled from the rail car when one of the box sling cables caught on a railroad tie, or possibly a switch frog.

The area has been decontaminated from 2R down to a maximum of 20,000 c/m. Considerable dirt has been removed and work will continue until the area is unconditionally released.

- c. A sump backup from a 1 SBS line flange leak, on the 1S column, caused dose rates to increase to 1 r/hr in the column carrier north of the 202-S Building and to 100 mr/hr at the adjacent radiation zone boundary.
- d. A rigger received an estimated 75 mrad exposure and low level skin contamination when he positioned an H-4 tower capsule in a concrete box that was not known to be contaminated internally. Those responsible for the job were of the opinion that the concrete box had never been used and monitoring for the job proceeded accordingly.

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In an attempt to reduce Radiation Occurrences of the types listed, efforts will be concentrated toward improved communications and job planning.

Continued good individual performance was noted during the month in radiation work.

2. Personnel Exposure Experience

One burial was conducted during the month with personnel dose rates up to 500 mr/hr at 40 feet encountered. No contamination problems were encountered during the operation. Considerable work was directed toward removing failed jumpers and related equipment from diversion boxes during the month. Exposure rates varied from 300 mr/hr to a maximum of 3.5 r/hr at six feet while cleaning out the 240-S diversion box. The use of dirt for shielding, in a loaded burial jumper box, reduced the radiation levels from 200 mr/hr to 10 mr/hr for the truck driver transporting the box to the burial garden. Several lights in the Silo Canyon were replaced with exceptionally good contamination control and with a maximum personnel dose rate of 4 rads/hr.

Low level fission production deposition occurred to an employee working at the 240-S diversion box when he received low level skin contamination to his lips, face, and hands. Initial bioassay results revealed a slight deposition. No concern should be felt for the employee because most fission product depositions have a short biological half life and it would be expected that no long range deposition occurred to the employee.

3. Other Contamination Problems

The rail car used to transport the Chalk River material to HAPO was observed to be contaminated generally from 5,000 to 40,000 c/m. By our standards it is necessary that this car be decontaminated to normal unconditional release levels before returning to normal service. To determine the cause of this rail car contamination it is planned to confer by letter with the Chalk River Health Physics personnel to determine their radiological interpretation on contamination release levels.

Sporadic stack emissions occurred during the month with hard ammonium nitrate crystals being observed on October 11, 1957. Analysis of the crystals revealed an isotopic breakdown as follows:

Ru ¹⁰³	-	60.2%
Ru ¹⁰³	-	14.6%
Zr-Nb	-	25.2%

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Samples removed from the effluent of the sand filter revealed no evidence of any fission product breakthrough. The only other

remaining source for contamination of this nature is the dissolver off-gas line. Studies are being made to determine the causes of these emissions in order that corrective action may be taken. The contamination emitted from the stack was confined to the exclusion area.

The 293-S Iodine Removal Facility was activated at the end of the month with no unusual contamination problems being encountered. The maximum contamination levels on the dissolver off-gas lines were 80,000 c/m (all gamma).

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. Miscellaneous Improvement Items

A constant Ph Beckman monitoring instrument has been installed in the F-1, 2-D column feed tank. The purpose of the instrument is to facilitate better control of the acidic strength of 2-D column feed solution. Test and calibration work are in progress at month-end.

Piping alterations were made on the 1-A and 1-S backcycle streams to mix the backcycle solution with the product bearing feed stream before it enters the column at the feed points. More uniform decontamination is expected through better control of acid mixture in the feed solution.

3. Inventions or Discoveries

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

G. Events Influencing Costs

On 10-10-57 a waste box containing \$19,667.00 worth of obsolete and unrepairable capital equipment was buried, thus removing this amount from the Redox capital investment.

A total of six pumps, and three iodine reactors were sent to the 221-U Canyon Building to be decontaminated and repaired. If successful repairs can be made, this procedure will affect the future capital expenditures by \$3,000 to \$5,000 savings per unit through rehabilitation of major equipment.

The spare equipment inventory was reduced by \$28,000 with the removal of the H-4 pot from standby status for installation early in November. This pot will not be replaced since the inventory was increased by

one when the vessel built on Project CG-621 was sent to Spare Parts instead of being installed. This vessel will now be used to spare the one being installed.

The Redox "Budget for Equipment not Included in Construction Projects" was 50% committed or expended at the end of the first quarter of FY 1958. This is mainly due to the fact that nearly 30% of the budget was carried over from FY 1957 commitments. Actual expenditures, however, were \$60,000 under the budget for the first quarter and \$22,000 under the corresponding period last year. Although expenditures plus commitments may run in excess of the budget, it appears that actual expenditures will be well under the budget.

During slack periods and shutdowns this month, several operators were loaned to the 234-5 Building Operation for approximately 50 man days, thus reducing the manpower cost in the Redox Operation for the month.

H. Plant Development and Expansion

1. Preparatory Engineering

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Cask Car Contamination

The project proposal for hinged lids and well jet-out facilities is still under preparation. The Redox Processing Operation is considering going ahead with the cask flushing phase of the project in hopes of relieving the decontamination problems associated with cold weather. It has been determined by the CFD Financial Operation that the whole project will be funded from the operating expense budget. Drawings of a hoist and monorail for removal of cask car well lids in the railroad cut are still in the preparation stage.

Laboratory Roof Fire Protection

An estimate based on scope material has been received from the Construction Engineering Operation. The project proposal, HW-52950, is circulating within GE for approvals.

In-Concrete Piping Failures

Radiographic Testing Operation report #194, dated 10-24-57, has been submitted showing the condition of nine additional in-concrete piping lines. A meeting will be held in the near future to determine the future course of action. A representative from the Resistoflex Corporation will visit HAPO about the middle of November to discuss the possible use of their product, "Fluoroflex", as a liner for the failed piping.

2. Design and Liaison

CG-643, Redox Capacity Increase, Phase III, Rev. 2

In view of the current extreme urgency to conserve capital expenditures, a letter has been submitted to the local AEC requesting that this project be returned without approval.

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

All modifications and repairs necessary for startup have been completed. On October 30, 1957, a trial run was processed through the facility and no unusual occurrences or apparent process difficulties were encountered. A visual observation of the Redox stack off-gas, during dissolution, did not show any sign of nitric fumes. Acid up to 57% concentration was produced during this trial run. Sustained operation will begin during the first week of November.

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

All footings for building additions have been poured. A temporary airlock and jib crane at the east side of the building have been erected for product shipments while construction proceeds at the north side. Ventilation duct tie-ins were made during a total building shutdown, scheduled for this purpose. The auxiliary exhaust system portion of the project is ahead of schedule.

Erection of steel work for the stairwell on the east side of the building has been accomplished.

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

Floors have been poured for all pump pits except the 104 tank. Pit walls have been poured for nine pits and twenty pit cover slabs have been poured. Piping installation is approximately 65 percent complete. The fixed price contractor has completed excavations for a transfer line connecting the 241 SX Tank Farm with an existing cross country line to 241 U and the line has been installed.

Again this project is facing financial problems. While G. E. approval of the \$341,000 proposal revision is awaited, it is expected that a commission directive releasing money will not be forthcoming until a new financial plan is adopted. This means that when existing funds are depleted October 31st, all work by Construction Operation will be suspended until January, 1958.

CG-720, Modifications to Redox SWP Facilities

The contractor has completed the cutting of three doors through concrete, two to the change room and one to the SWP lobby. Construction of footings for the south side addition is now in progress.

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DECLASSIFIEDCG-722, Recovered Acid Receiving Station

The project proposal is being circulated for approval. Design of the Redox portion has been started.

CG-772, E Metal Dissolvers

Design funds of \$30,000 have been approved by the AEC. Approval of construction funds is awaiting a decision by the Washington AEC. Unless interim funds are provided, this approval will await receipt by the local AEC of their financial plan.

Landlord Functions

A property inventory was completed during the period. A separate report of the inventory results is being circulated within the Redox plant.

AR-CPD-6, Processing of AECL Fuel Elements

The third shipment of fuel elements from the Chalk River Plant arrived on site October 21, 1957. This shipment was made in two newly fabrication casks holding two slug buckets each.

CG-718, Fission Product Isolation, 221-B Building

The preliminary scope document has been commented on and the final document is being prepared. Elimination of rehabilitation to the shops, locker rooms and offices of 271-B will make a substantial reduction in over-all cost.

I. Reports Issued

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

III. ORGANIZATION AND PERSONNELA. Safety

There were no disabling injuries, serious accidents or incidents in the Redox Operation during October, 1957. Nine medical treatment injuries were reported during the month.

B. Security

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

C. Personnel Activities

Mr. J. E. Murray, Chemical Engineer, from the Turco Chemical Co.

SECRET

visited the 271-U Building on October 30, 1957 to review our decontamination techniques in the 271-U Canyon and is to make recommendations as to the feasibility of decontamination with Turco Products.

A well attended party was held by the Redox Operation on October 25, 1957 at the Kennewick Social Club.

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Chas. B. Grosz
Manager
Redox Operation

CT Groszwith:HWM:rc

CHEMICAL PROCESSING DEPARTMENT
FINISHED PRODUCTS OPERATION
MONTHLY REPORT

OCTOBER 1957

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I RESPONSIBILITY

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

II ACHIEVEMENTS

A. Metal Finishing Operation

Equipment difficulties in the wet and dry chemistry operations resulted in the production of unfabricated plutonium being short of commitment by 8.5%. Production of 200 model assemblies from Savannah River plutonium met schedule as did 250 model assemblies (made from the same material on a special, urgent request of the AEC on October 2). Production of 200 model assemblies from war reserve material was short of schedule by 50% with difficulties in the production of the 250 models being the prime reason. Overall fabrication was 15% under schedule.

Certain goal commitments were established earlier this year for output from the Redox and Purex plants for the fourth quarter of the calendar year. The scheduling, directed towards satisfying these goals, has resulted in increasing the plutonium feed available for the Metal Finishing Operation to all time high levels. Feed was, therefore, received from Purex routinely all month and high delivery rates prevailed. Feed began arriving from Redox about October 8, and continued for about a week when pump troubles developed there and a shutdown for repairs was necessary. Deliveries started again after an outage of about four days, and continued for the rest of the month. In general, the quality of the material received from both the plants was good with the exception of three batches of Purex material which were processed about the middle of the month. This plutonium contained higher than normal fission products. Several plutonium buttons prepared from this feed had higher radiation readings. These were shipped by mutual agreement with the customer.

All plutonium feed from the primary plants and the recovery operation was converted to plutonium metal for shipment offsite, unfabricated. For the first time all production was scheduled through the new continuous Task I and II equipment. The only material processed in the old batch type equipment consisted of sweepings and other off-standard material generated by the new unit. It was necessary to take this approach in order to give the new equipment a better chance to stabilize on routine operation. The equipment, while it was running, functioned very well and the losses to recycle were low. The metal produced from the plutonium powders from the new unit appeared to be high in quality and generally of a higher density than those produced from batch powders. It appears that less material will be lost to the recovery stream due to the inability to meet metal density specifications.

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A. Metal Finishing Operation (Cont'd)

Unfortunately, severe mechanical difficulties were encountered with the new equipment and it was not possible to process feed fast enough to stay ahead of the primary plants. Operations were slowed slightly at Purex about the middle of the month in order to keep from getting into an untenable situation with regard to transfer cans. The unscheduled shutdown at Redox, for pump repairs, also eased the situation somewhat. Equipment changes were made on an expedited basis and the performance of the unit was improved sharply toward the end of the month. Fortunately, these changes came soon enough to preclude any real adverse effects on the continuity of operations in the department. The three main points of difficulty which required emphasis were: Off-gas filtration, in-leakage, and powder handling. While definite improvements were made in these areas it will be necessary to devote additional time to these problems in order to effect a still better improvement. The equipment difficulties discussed above were responsible for button production falling short of schedule by 8.5%. It is expected that this underage will be regained during November.

B. Product Recovery Operation

Total production through Recuplex for the month of October was extremely poor. This was occasioned by the failure of the H-1 and H-3 bellows (on October 2 and 14 respectively), extreme flooding conditions from a cleanup of waste from our hood floors, the necessity for a complete column and tank flush and the fact that the Metal Finishing Operation was not always in a position to take the product when it was ready for delivery. As a result, only 15 dissolver runs were completed. Ca. 10 Kg of metal scrap were recovered and ca. 8.8 Kg of Purex off-standard feed were purified. Total output was 31.1 Kgs (35 batches). Column operating efficiency was 58.3% at an instantaneous rate of 1914 liters per day. Waste losses were 0.91%.

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B. Product Recovery Operation (Cont'd)

An inspection of the Z Plant crib and dry wells revealed that the Recuplex extraction waste cavern will require replacement in 1960. In other service areas principal effort has been to change out many of the Z and U Plant wet and dry filters and steam coils and traps in preparation for the winter months.

Successfully tested at month end was an increase from ten to sixteen in the number of reduction crucibles charged to the dissolver. This big step was necessary in order to end up with a solution sufficiently high in salts so as to enable a subsequent cut back in the addition of ANN. This ANN had been precipitating out of the earlier runs causing poor extraction column performance. Thus we gain a significant increase in productivity through the ability to process more crucibles at the same volume and we cut the cost by almost 50% of the essential material, ANN. The columns have performed remarkably well under the new flow sheet. Another major improvement was the installation of a larger capacity rotameter on the feed stream. While there have been some problems in balancing the many variables (reflux rates, pulse frequencies, etc.) early indications are that we will gain a 25% increase in throughput rates.

C. Uranium Reduction Operation

October was a banner production month for the Uranium Reduction Operation when a total of 703.75 tons (128% of commitment) of uranium was produced and approved for shipment. This represents the best month's achievement since the continuous calciners were put in full time operation. An actual total of 732.6 tons (133% of commitment) was produced during October. A total of 612,279 pounds of 100% nitric acid was shipped to Purex during the month. Calciner on-line efficiency (on 24 hour basis) was 74.2% during October. At month end there was only 91.7 tons of uranium as UNH within acceptable specifications awaiting processing at the Uranium Reduction Operation.

Calciner agitator damage occurred on five occasions during October, essentially all of which can be attributed to fatigue type failure of the agitator arm assemblies. Two of these failures occurred on M Cell with one each occurring on G, H, and K (one failure occurring late in September to L Cell was repaired in October).

The damage sustained during the above failures was routine with one exception. Clearance problems occurring in M Cell either prior to or following the second failure resulted in a heavy cake on the calciner shell, which required several days to remove.

K calciner was started on October 3, following two months of down time which was the result of a serious caking problem in August. This unit was crashed down on the 21st when an agitator failure occurred. Investigation disclosed the main shaft to be badly bent. The condition is felt to be the result of the previous failure (in August) rather than this one. The shaft is currently being replaced and new agitator assemblies will be installed.

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C. Uranium Reduction Operation (Cont'd)

Replacement of the currently used agitators with a newly designed assembly as provided by Research and Engineering was started in October. The design increases the arm strength by a factor of four but is equipped with a shear pin assembly sized to fail at 200% of the strength of the old unit. One set of these new agitators was installed in H calciner and the unit started on October 28th. The degree of agitation is increased sharply by the new assemblies but the product is good. Some speed adjustment may be necessary as experience is gained with these units. Construction operations are currently fabricating five additional sets of these assemblies which will be installed during November.

The powder remilling problem which was of such significance during the past few months was not in evidence during October. Only seven containers of out-of-specification powder were made during October but only four required remilling. Problems arising at Paducah indicate the possible need for a different set of specifications in regard to particle size as the powder being received, (a high proportion of which was remilled during September), is too fine for their process.

Calciner statistics for October are as follows:

<u>Calciner</u>	<u>Days</u> <u>Scheduled</u>	<u>Days</u> ¹ <u>Operated</u>	<u>Avg. Rate</u> ² <u>per Oper. Day</u>	<u>Avg. Rate</u> ² <u>Per Sched. Day</u>	<u>On-line</u> <u>Efficiency</u>
G	31	26	5.75	4.83	83.9%
H	31	24	5.07	3.93	77.4%
J	31	31	5.79	5.79	100 %
K	31	17	4.45	2.43	54.8%
L	31	26	5.07	4.25	83.9%
M	31	14	5.29	2.39	45.1%
Totals:	186	138	5.31	3.94	74.2%

NOTES:

1. Operating day designated by 24 hour period, 8:00 a.m. to 8:00 a.m. - if unit is in operation for any period during this time it is constituted as having been in operation for that day.
2. Rates based on output.

Operation of the wet filter continues to be most satisfactory. Some minor difficulty has occurred with momentary loss of vacuum but this has been the result of excessive pressure drop across the acid cooler which restricts the flow away from the scrubber tower. A temporary by-pass has been installed for connection purposes pending a shutdown to make permanent repairs.

D. Maintenance OperationZ Plant**DECLASSIFIED
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In Task I work consisted of replacing and repairing manual and air operated valves. This unit was used during the month entirely for providing feed to Hood 9B.

In Task II the new panels which were fabricated have not been installed due to utilization of this unit for recycling of material from hood 9B. Minor repairs of furnace doors and hydrogen fluoride valves were effected this month.

In Task III some trouble was experienced with the lifting mechanism on the crucible turn table; trouble was eliminated by removing a rough place on the shaft. It was necessary to replace the drive wheel on the turn table motor with a drive wheel fabricated in the shop. Progress was made in repairing oil leaks in the hydraulic system to eliminate oil accumulation in the pit under Task III.

In Recuplex an unloading head obtained from 231 Building was installed on the R & B hood. Pulser bellows on the H-1 and H-3 pulsers were replaced with hot spares this month. The Roth pump, located in K-1, failed this month and was replaced with a hot spare. The failed unit is being repaired. The G-10 150 to 1500 ml/min. rotameter, and Hammel Dahl valve with #5 spline were replaced with a 250 to 2500 ml/min. rotameter and Hammel Dahl valve with #2 spline. This change was effected to increase capacity in the system. All inlet filters on the S & E and R & B hoods were replaced this month. A neutron counting system was installed on the D-11 tank as a system to permit 300 Area engineers to study background problems.

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D. Maintenance Operation (Cont'd)

2 Plant (Cont'd)

Project CG-691 (Continuous Task I and II): The entire production was routed through hood 9B this month. Operation of this hood is somewhat erratic although it has been improving throughout the month. Constant maintenance is required to insure operation and to effect revisions in the existing equipment. It was necessary to replace the filter cloth, on the drum filtering device, twice during the month. This was effected relatively easily utilizing a Band-It Tool supplied by the Facilities Engineering Operation. It was also necessary to replace the slide valve wear plate. The temporary agitator installed in the rotary drum filter in September was replaced with a modified agitator shaft, bearings, and seals in an attempt to eliminate the leakage problem resulting from the previously installed shaft. The new agitator shaft assembly reduced the leakage problem but did not entirely eliminate it.

Some trouble is still being experienced with the fluorinator "banjo" valve plugging and freezing. An attempt was made to install a slower drive on the valve but due to inadequate torque in the new unit the original drive had to be reinstalled. The baffle and control gate in the feed end of the fluorinator was removed in an effort to eliminate or reduce plugging in the head end of the fluorinator; since the removal no plugging has been experienced. The fluorinator temporary off-gas filter which utilizes platinum frits was replaced with a filter designed by Facilities Engineering Operation, using porous carbon block as the filter media. Trouble is still being experienced in the fluorinator discharge system due to difficulty in moving the powder from the fluorinator to the powder pan. A new rotary valve from the 9A hood was installed due to failure of the unit, which was in service. Failure of this unit was due to wear of the rotor and adjacent parts of the valve. The excessive inleakage of air to the fluorinator section has been reduced through use of radiator hose impregnated with paraffin which is being used as a replacement for the originally installed Inconel bellows. Experimental work on flexible connections is being done at the present time, using monel metal and teflon bellows. The heater element on the discharge end of the fluorinator failed and was replaced. The Foxboro Dynalog which was being used to control oxalic acid flow was returned to the Research and Development group. An available unit from U Plant was installed and is operating satisfactorily as a replacement.

In Plutonium Metallurgy the majority work for this facility continues to be assembling and testing of equipment and systems which are to be permanently installed in the hoods in 231 Building.

In the Research and Engineering Operation four hoods fabricated by Minor Construction forces were received and installed in room 188. Attendant piping, electrical duct work and other services were installed to provide service to the new hoods.

D. Maintenance Operation (Cont'd)**DECLASSIFIED**Z Plant (Cont'd)

In Building General a bent shaft on fresh air unit #4 fan, 231-Z, necessitated the replacement of shaft and bearings and the rebalancing of the fan. Original failure was attributed to unbalance in the fan. The replacement of the corroded condensate system on the reheat and preheat sections of Buffalo units 1, 2 and 4, 231-Z was completed. A complete filter change was effected in filter room 310, 234-5 Building which consisted of replacing 128, 24 x 24 CWS filters. The yearly overhaul of seven "Poppy" counters was completed this month. Two new bag sealer units were received and placed in service in the 234-5 store room. A Stromberg Carlson Pagemaster was received, on a loan basis, for testing in the 234-5 Area. This unit has been set up and is undergoing tests to determine the feasibility of using this type of equipment to improve building communications. The wet filters in ventilation units 7 and 8 were replaced this month. Replacement of the reheat coils in SF #4 was started this month. This job is approximately 60% complete. New condensate headers for SF units 3 and 4 were fabricated and installed to replace corroded systems in these units. Control valves on SF unit #2 and #4 were removed, completely overhauled and returned to service. The 50 psi Spence 6" J Valve was removed from service and disassembled; a new diaphragm, plug, and seat were installed and the valve reassembled and returned to service.

UO₃ Plant

The UO₃ Plant Maintenance activities during the month of October continued to be in two primary categories, maintaining present equipment and effecting revisions that are considered improvements to the continuous calciners and associated equipment.

Definite progress has been made on equipment improvements during the past few months which is reflected in the production achievement during the month of October. Also the repetitive repair work on the continuous calciners and associated equipment continues to be reduced as equipment improvements are effected.

The major repair work during the month consisted of the following. Replaced brushes on A.C.A. motors to H and K calciners. Replaced nineteen brushes with broken pigtails on M-Calcliner A.C.A. motor and six on the A.C.A. motor to J-Calcliner, both of these motors have been repaired in the General Electric Shop in Spokane but the commutator bars have become high again causing the brush pigtails to break. The A.C.A. motor to J-Cell calciner will be replaced with repaired spare motor on a scheduled shut down, November 4, 1957. The removed motor will be sent to the General Electric Shop for further repairs. Repaired off-gas temperature thermocouple lines on M and K-Calcliners. Replaced Rotometers in spray lines to off-gas system with pipe spool pieces (all cells). Rotometers were not necessary in this system. Repaired the roll up doors in 224-U and UA Buildings. Replaced the M-1 air supply motor located on the roof of 224-U Building. The motor

DECLASSIFIEDD. Maintenance Operation (Cont'd)UO₃ Plant (Cont'd)

had an open circuit making the replacement necessary. Replaced the reversing starter on the X-28-2 blow ring drive motor. Repaired three portable air samplers. Unplugged UNH loop header to Luckey Pots. Replaced X-19 and X-30-2 UNH feed pumps with repaired pumps. Replaced ED-2 concentrator, removed unit and will be repaired if possible. Removed, repaired and reinstalled C-4 pump. Repaired steam coils and piping to 224-U and 224-UA heating systems. Repaired X-8-1 screw conveyor. Installed new steam tracer lines and prepared all outside pipe lines for winter. Completed repairs to the #2 Penn Compressor 271-U Building. Replaced three burned out coils in V-55 Vibrators. Repaired a damaged section of conduit on K-Calcliner off-gas thermocouple line. Installed two new thermostats on the Redox feed line to UO₃ Plant. Recalibrated the incoming steam recorder in 224-U Building. It was necessary to recalibrate the Print-Way Scales four different times during the month.

There were five major calciner failures during the month and the following work was done to effect repairs. G-Cell, replaced 10" agitator assembly. H-Cell, failure damaged seven agitator assemblies, repairs were made by installing a complete (12) set of revised agitator assemblies designed for greater strength but providing a shear pin arrangement to protect the calciner. L-Cell, replaced 10" agitator assembly. M-Cell, replaced six agitator assemblies, repaired special calciner gasket, reset all agitator blades, repaired and calibrated the four calciner feed point transmitters, installed new plugs and seats in the four UNH feed valves and installed pipe spool piece and 4" manual valve in place of DOV in the off-gas line. K-Cell, repairs are in progress to replace the agitator shaft and install a complete set of agitator assemblies of the new design.

Work accomplished during the month on the UO₃ Plant improvement program consisted of the following: Replaced rheostats to calciner heat controls on G and L Calciners, the other calciners were completed last month. K-Cell, work is in progress to install complete set of agitator assemblies of the new design. Installed time delay relay on the starter control circuit to X-22-1 star valve motor, purpose of this relay is to permit the Hammer Mill to reach maximum speed before the star valve delivers powder to the mill. Installed 3" manual operated valve on the discharge line from 007 tank in 241-WR. Fabricated and installed 3" stainless steel piping to reroute C-4 to 007-WR for HNO₃ storage. Installed sampling line at the Purex truck unloading station. Installed lucite sight glasses on X-25-1 and X-25-2. Installed individual steam valves to steam heating coils in heating system in 224-UA Building, to assist in future repair work. Installed proper size pulleys on the X-25-1 and X-25-2 Hammer Mills for 6,000 RPM operations. Installed CO₂ fire protection system in the motor room 224-UA Building. Installed stainless steel pivots, pivot blocks, pins and other movable parts under the platform of the

D. Maintenance Operation (Cont'd)

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UO₃ Plant (Cont'd)

Print Way Scales in the 224-UA Building. Completed the installation of the new designed agitators in H-Cell Calciner. Work is in progress to convert one of the calciners from a thermohm feed point temperature sensing to a thermocouple sensing system. Work is also in progress to install an automatic switching device on the tie breakers of the main electrical incoming line cubicle of the 224-UA Building. Final tie-in and test are scheduled for November 4, 1957. A revised star valve speed changer motor was installed on collection bin star valve in M-Cell. This revision allows a manual or automatic control with limit switch protection.

E. Analytical Control Operation

A total of 9645 determinations were performed on 1738 samples received in the Analytical Laboratory during the month. In all cases the Laboratory was able to furnish results so that Metal Finishing and Recuplex schedules were not interrupted.

In Product Inspection 29.5% of all parts received were rejected because of chemical and dimensional defects. This represents 20% of all inspection time which was lost to rejects during the month. An unusually large proportion (48%) of the rejects were due to coating quality. This was made known to operating people and improvement has been noted.

A new 25 curie cobalt 60 source has been pushed from C reactor and will be installed next month, replacing the present 3 curie source in the radiography room. This will greatly reduce exposure time for present models and will enable us to handle the 65's on a production basis.

F. Radiation Monitoring Operation

Twenty-one radiation occurrences were documented in October as compared to ten in September. The breakdown for the various operations is as follows: Metal Finishing 9.5, Product Recovery 4.5, Maintenance 1, Analytical Control 1, Uranium Reduction 5, and Radiation Monitoring 0. Twenty-five cases of skin contamination were reported in October as compared to twenty-six in September. The breakdown for the various operations is as follows: Metal Finishing 12, Product Recovery 3, Maintenance 6, Radiation Monitoring 1, Analytical Control 3, and Uranium Reduction 0.

The 234-5 stack emission of plutonium dropped from an average of 175 uc/day to 100 uc/day during the month. Filters in filter room 310 were changed and the air rerouted from 309 to 310. At the end of the month emission was reduced to approximately 50 uc/day with indications that the emission will continue to decrease.

DECLASSIFIED**F. Radiation Monitoring Operation (Cont'd)**

Some improvement was noted in contamination control in the UO_3 plant. No skin contamination cases occurred during the month and some areas had been decontaminated. Improvement in calciner equipment has significantly lessened contamination spreads; however, a considerable amount of decontamination still needs to be done.

Several areas were in need of decontamination along the RM Line in the 234-5 Building at month's end. Frequent equipment breakdowns contributed to this problem.

One Metal Finishing process operator exceeded the 3 r/yr limit by approximately 0.1 r. This operator will be removed from radiation zone work and assigned other tasks. There was no single event but a rather high accumulation of exposure over a two week period that caused the exceeding of the limit. This incident (CPD #4) will be investigated during the first week in November.

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

A detailed review of the Operating Budget for Product Recovery Operation has been made. It appears that sufficient economies have been realized to enable assumption of the cost for replacing building filters on Project CG-756 without increasing the budget; however, during the next nine months unit costs for this Operation will look very poor. The cost for the replacement of filters in the main exhaust room, 310, (\$13,000) will be reflected in October reports, again adversely affecting unit cost data.

Unit costs for UO_3 are expected to be down sharply during October as a result of high production and decreased costs due to decreased manpower.

I. Plant Development and Expansion**1. Project CG-691 - Improved Task I and II**

Startup activities continued and the new equipment provided in Hood 9B was operated with a full production load. In fact, the

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I. Plant Development and Expansion (Cont'd)

1. Project CG-691 - Improved Task I and II (Cont'd)

entire process stream was handled through the new unit all month. Severe equipment difficulties were experienced during the first part of the month. These troubles were almost entirely associated with offgas handling, inleakage, and powder handling. Equipment changes were made which improved the reliability of the unit, by month-end. A project revision providing additional funds in the amount of \$245,000 was approved by the Atomic Energy Commission.

2. Project CG-723 - Recuplex Conversion

Design work is essentially complete on this project. A Work Order was issued to plant forces for their portion of the work and material procurement is underway. Equipment fabricators have been provided with materials for construction of the process vessels and delivery of these items is scheduled for January 1958.

3. Project CG-734 - RMC Button Line

Detailed design of equipment for the RMC Button Line is proceeding on schedule. Purchase requisitions for some of the equipment are being prepared. The issuance of some blue prints, test procedures, requisitions, and specifications was delayed due to a re-evaluation of the security classification of these items. It is hoped that an overall speeding of the program will result when this review is complete.

4. Project CG-756 - Z Plant Filter Replacement

Detailed design is complete on the equipment portion of this project. The Construction Engineering Operation is proceeding with the fabrication of equipment and the procurement of material necessary for this work. The expense portion of the project has been approved and a review is underway to determine whether plant forces will do the work. A decision is expected momentarily. The small size filters have been received from Cambridge. Complete delivery of filters is scheduled for December 31.

5. Project CG-613 - Hanford 4X Program - Metal Conversion Plant

Work remaining on this project consists of instrumentation for the calciner wet scrubbers and automatic bus switching for the 224-UA Building power supply, fabrication of six slide valves and completion of the capacitance probe installation

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

The revised project proposal is circulating for General Electric approvals.

DECLASSIFIED**I. Plant Development and Expansion (Cont'd)****7. Project CG-725 - UO₃ Plant Liquid Waste Handling Facilities**

The project proposal is circulating for General Electric approvals.

8. Preliminary Project CG-767 - UO₃ Plant Improvements

Scoping work is continuing on the miscellaneous improvements. Interim segregation facilities will be presented as a separate project proposal.

9. Project Proposal - Interim Segregation Facilities

The scope of this project proposal will be issued during the week ending November 10, 1957. Preparation of the Project Proposal is awaiting the issuance of the project scope.

10. Project CG-770 - Feed System and Pick-up Bin Modifications - UO₃ Plant

The installation of the UNH loop head filters is continuing satisfactorily. An operational shutdown is scheduled for 11-4-57, to allow tie-in of alternate pumping facilities for the loopheader, and is expected to be complete by 12-1-57.

Modifications to the calciner feed boxes in 224-UA is proceeding on a mock-up basis. This work is scheduled as possible to coincide with the installation of the newly designed calciner agitator paddles and should be completed in January 1958. Finished Products Operation has requested that modifications to the continuous calciner pick-up bins be deleted from the project.

11. Appropriation Request - Calciner Feed Flow Control Transmitters

Modifications to the continuous calciners feed boxes is expected to make replacement of the calciner feed control box transmitters unnecessary. No further action will be taken on this request.

12. Project Proposal - Powder Milling System Modifications

A project proposal has been prepared to provide a hammermill of increased capacity and efficiency to replace those presently in use in the 224-UA Bag Tower. Approvals of this proposal are being held in abeyance, pending discussions with the vendee regarding product particle size specifications.

13. A scope and a preliminary project proposal is being prepared to provide additional calciner capacity through the installation of a seventh calciner. This proposal is justified on the basis of capacity increase and product segregation.

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I. Plant Development and Expansion (Cont'd)

14. Engineering Study

An engineering study has been requested for recommendations for elimination of the existing structurally inadequate calciner feed points and thermowells.

J. Reports Issued

HW-53236 Chemical Processing Department, Finished Products Operation, Z Plant Monthly Report, September 1957, by W. N. Mobley

HW-52865 A Summary Report - Continuous Calciner Operation, Period April 1 through August 31, 1957, by J. J. Courtney

III ORGANIZATION AND PERSONNEL

A. Organization Changes

P. J. Wiater and A. Motyka, both Supervisors, Processing in Metal Finishing and Uranium Reduction Operations respectively were switched in their assignments.

J. G. Attanas, Contact Engineer, Metal Finishing Operation, was transferred to ANP at Cincinnati, Ohio.

D. D. Deming, Contact Engineer, Metal Finishing Operation, who was on loan to the Product Recovery Operation terminated in order to take a position with the AEC locally.

B. Safety Experience

No disabling injuries or near-serious accidents occurred during the month. There were thirteen (13) medical-treatment injuries experienced this month as compared to fifteen (15) in September. The frequency rate increased from 2.22 to 2.26 due to fewer exposure hours.

On October 25 the Finished Products Operation had accumulated 1,000,000 exposure hours without having experienced a disabling injury.

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

One security violation was experienced during the month. It involved an unsecured file cabinet in the instrument shop, 234-5 Building. Action to prevent recurrence has been taken.

DECLASSIFIED**E. Personnel Activities**

Seventeen exempt employees and Chief Operators attended the "Union Relations Conferences."

Five exempt employees attended "Management Principles and Skills".

Seven exempt employees are attending "Professional Business Management".

Seven non-exempt clerical employees attended a session of "Secretarial and Steon-Typist Training".

The results of the recent Attitude Survey were received and several discussions held. Action has been taken to date regarding Safety and Salaries in particular.

F. Miscellaneous

During the month the Finished Products Operations were visited by two groups. First, two new Atomic Energy Commissioners, J. F. Graham and J. F. Floberg. Second, K. E. Fields, General Manager, AEC, and J. A. Derry and D. S. Burroughs.

R. E. Slater, Radiation Analyst, Radiation Monitoring Operation, performed radiological services for the AEC at the Nevada test site, 10-3 through 10-15-57. This was in accordance with AEC's request for the Finished Products Operation to supply a Radiation Monitoring exempt employee to assist them.

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

WNM:JPT:jjh

CHEMICAL PROCESSING DEPARTMENT
POWER AND GENERAL MAINTENANCE OPERATION

OCTOBER 1957

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I. RESPONSIBILITY

The responsibilities of this operation remained unchanged during the month.

II. ACHIEVEMENT

A. Operating Continuity

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

B. Inspection, Maintenance, and Replacement

The coal track hopper pit at 200 West Power House was inundated as a result of the heavy rains of October 2. The drive motor to the coal reciprocator was submerged and out of service until 8:00 a.m. October 4. Curtailment of the steam supply was unnecessary as coal was supplied from the emergency storage pile. Corrective measures have been taken to prevent recurrence of the situation.

No. 5 boiler, 200 West Power House, was removed from service on October 28 as a result of the mechanical failure of the traveling grate mechanism. Repairs were in progress at month end.

The semi-annual surveys of the 200 area coal piles were conducted on October 1 and 2. Results of the surveys compares favorably with current book values.

The "U" area high tank (2902-U) was dismantled and discarded as scraped equipment. The cessation of operation at the "U" Facility eliminated further need of a high tank at that location. The tank's poor state of repair precluded its further usefulness on this project.

The Power Engineering Operation is in the process of preparing cost estimates and procedures for testing the life expectancy, loading capacity, and fire resistance qualities of CWS type filters at the direct request of the Safety and Fire Protection Branch of the AEC Washington Office.

Services rendered other departments by the Power Engineering Operation include rebalancing the newly installed ventilation systems at the 105-KE and KW metal pick-up stations.

Ten process pumps from the TBP Facility are in the process of being converted to type P-130 and P-141 pumps for use in the Redox Facility. Three pumps were delivered during the month and four were run-in and ready for delivery at month end. These improvised pumps will serve as replacement until the supply of standard equipment P-130 and P-141 pumps can be replenished.

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Fabrication of the L-Cell package for the Purex Facility continued notwithstanding serious difficulties encountered in some of the welded pipe assemblies. Evidence has indicated the presence of flaws in the stainless pipe. The radiographing of the pipe assemblies has been completed, however the film had not been returned at month end, consequently a determination of the scope of the problem has not been established.

Sixteen pipe jumpers were fabricated as required for the continued operation of the Prime Production Facilities.

Fabrication of three off-gas heaters and four gage rings was completed to replenish the spare parts inventory for the Redox Facility.

Special emphasis was placed on expediting fabrication of the HA pulse column for the Purex Facility. Design changes have retarded progress, however current estimates indicate completion has not been delayed beyond November 19.

The burial of a box, of considerable size, containing highly contaminated equipment discarded from the Redox canyon was completed at the 200 West industrial burial garden without incident, and with exposure to personnel being held to a minimum.

A defective E-D2 concentrator was removed from "D" Cell of the UO_3 Plant and replaced with a new unit. A motor crane with a 75 foot boom and jib was used to hoist the units through a roof opening. The defective unit was removed to the "U" canyon building for decontamination and repair.

A situation of an emergency nature developed at the Redox Facility which required correction to prevent interference with the operation. Process material ceased to flow through an underground process line due to a restriction in the line. Corrective measures taken consisted of changing the necessary pipe jumpers in diversion box 151-A to re-route the solution through auxiliary lines.

The Operation continued to lend assistance to the 241-CR scavenger waste program. Eight pumps and their component pipe assemblies were removed to new tank locations to facilitate the movement of waste solution from settling tanks to crib areas.

C. Improvement Experience

Annual savings of approximately \$35,000 was realized in that the roll was reduced by seven (net) people during the month.

Consolidation of the 200 East and 200 West General Maintenance Units into a single component was accomplished. Special emphasis was placed on the realignment of work crews to meet current conditions.

The Operation's total work force is currently within seven of the imposed control figure of 280. Arrangements are complete for reaching the control figure on November 11.

A critical review of the \$76,000 spare parts inventory for which this Operation is responsible has resulted in a reduction in dollar value of \$13,500.41 or 17.72% of the original inventory.

III. ORGANIZATION AND PERSONNEL

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A. Safety and Security

No disabling injuries were incurred. The injury frequency rate for the month was 5.95 which was based on 27 medical treatment cases.

No security violations were in evidence.

B. Personnel Activities

Sixty-six CPD employees attended P&GM sponsored craft training sessions during the month.

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

CHEMICAL PROCESSING DEPARTMENT
FINANCIAL OPERATION

OCTOBER, 1957

I. Responsibility

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

II. Achievement

A. Product Cost

The total reduction in the essential materials inventory, fiscal year to date, is \$31 000. Since decentralization in August, 1956, the essential materials inventory has been reduced \$578 000 or 37%.

The CPD portion of spare parts carried on Relations and Utilities Operation's books is \$2 174 500, a reduction of \$66 300 during September. CPD's proportion of the HAPO total is now 49.8% as compared to approximately 56% at the time of decentralization. Obsolete spares worth approximately \$50 000 were excessed or otherwise disposed of during the month.

The control budget for CPD was finalized early in the month and considerable effort was spent in readying major detail for cost analysis. Analytical coverage of the control budget was included in the analysis letters for September. September costs indicated that the aggregate total reduction asked for in the control budget would be met, although the reductions in some cases would derive from sources other than those specified.

Further refinement of control budget figures continues and a more detailed examination is planned for the October analysis letters.

A complete review of all active work orders is being made to insure that:

1. Estimates are within authorized total
2. Supplements have been received for all overruns
3. Completed work orders have been closed

The following studies were performed at the request of operating management:

1. Analysis of Purex utility charges looking toward possible sources of cost reduction.
2. An analysis of Finished Products landlord rates and methods of distribution was made and published for the information of Finished Products landlord management.
3. A detailed analysis of historical manufacturing and unit costs was provided to the Industrial Engineering Operation to assist them in their efficiency studies.

4. A review of assigned heavy equipment was made for P & GM in order to assist them in their analysis of need versus rental cost.
5. A status report for all outstanding Facilities Engineering cross orders was issued to assist FEO in their review and examination for appropriate funding.

The Midyear Budget review call was received during the month. Schedules requesting manpower and other expense estimates were forwarded to the Level III Managers.

B. Personnel Accounting

The sixth cost-of-living increase, marking a high of 121.1 on the Labor Department's monthly consumer price index, became effective for most CPD nonexempt employees on October 28, 1957. Since July 30, 1956, the cost-of-living increases have totaled 5.90%. Coupled with the two three percent Better Living Program increases, the adjustment to date, applicable to most nonexempt employees totals 11.90%.

In order to assist management in answering questions received from their people regarding the taxable portion of income received from benefit plans, a pamphlet is being prepared for distribution to CPD exempt employees, which contains the answers to questions most frequently asked in regard to the taxability of benefit plan income.

Statistics:

1. Number of CPD Employees

	<u>Monthly</u>	<u>Weekly</u>	<u>Total</u>
Employees at Beginning of Month	412	1 266	1 678
Additions and Transfers In	1	2	3
Removals and Transfers Out	(5)	(35)	(40)
Transfers from Weekly to Monthly	-	-	-
Transfers from Monthly to Weekly	(2)	2	-
	<u>406</u>	<u>1 235</u>	<u>1 641</u>

2. Overtime Payments During Month

	<u>October</u>	<u>September</u>
Nonexempt Employees	\$15 393*	\$10 158*
Exempt Employees	<u>2 587</u>	<u>3 938</u>
	<u>\$17 980</u>	<u>\$14 096</u>

3. Gross Payroll

Nonexempt Employees	\$622 616*	\$612 030*
Exempt Employees	<u>318 149</u>	<u>318 046</u>
	<u>\$940 765</u>	<u>\$930 076</u>

* Payments to nonexempt employees cover a four week period.

4. <u>Pension Plan</u>	<u>October</u>	<u>CY to Date</u>
Number retired	0	9
Number who became eligible for participation	2	37
Number who elected to participate	2	37
5. <u>Insurance Claims Paid</u>		
Employee Life Insurance	0	3
Amount	0	\$43 961
Employee Weekly Benefit Claims Paid	14	228
Amount	\$1 586	\$22 450
Employee and Dependent Accident and Health Claims Paid	169	2 223
Amount	\$21 051	\$230 925
6. <u>Suggestion Awards</u>		
Number of Awards	0	356
Total Amount of Awards	0	\$9 566
7. <u>Preferential Rates</u>		
Number Added	1	1
Number Eliminated	0	4
Number Currently in Effect	55	55
8. <u>Number of Military Allowance Payments</u>		
Number	0	2
Amount	0	\$880

C. General Accounting

Eighty voucher checks totaling \$228 752.04 were prepared by General Books Operation during October, 1957. The voucher check procedure was expanded during the month to include the issuance of checks for reimbursement of contaminated personal effects. This was formerly done by Accounts Payable in Relations and Utilities Operation.

The CPD audit staff completed an audit of General Books during October. The audit included a review of the cashiering, travel and living, and the General Ledger functions.

All incoming invoices were received as scheduled, with the exception of the one covering the Accounts Payable Distribution. This invoice was due (along with the IBM tabulation) at noon on Wednesday, October 2, 1957, but was not received until Friday, October 4, 1957 at 10:15 a.m. All outgoing invoices were delivered as scheduled.

The General Ledger Trial Balance, Subsidiary Ledgers Trial Balance, and reports of Travel and Living expense were delivered to Contract Administration on schedule.

There were 28 active CPD projects with \$14 000 000 authorized funds as of September 30, 1957. Expenditures and commitments of \$9 800 000 and \$1 100 000, respectively, have been incurred against these projects. Cost of \$698 000 was incurred during September.

Project authorization changes received from the AEC during October were (a) \$245 000 additional funds for Improved Task I & II Facilities - 234-5 Building, (b) \$313 000 decrease in work authority funds for Expansion of 200 Area Facilities, and (c) \$30 000 interim authorization for design of E-Metal Dissolvers - Redox.

There were no projects closed during October.

During October a review of the Plant and Equipment Acquisition expenditure patterns for FY 1958 and 1959 was made in conjunction with other HAPO components. Actual expenditures for the first quarter FY 1958 were \$1 192 100 compared to the \$1 459 000 expenditures forecast. With the exception of project CA-513-A, which did not close out during the first quarter as anticipated, the expenditures and the forecast were relatively comparable.

The CWIP September cost reports, Changes of Plant and Equipment Work in Progress and Summary Cost Report and Estimate, were delivered to Contract Administration as scheduled.

<u>Plant and Equipment</u>	<u>Asset</u>	<u>Reserve</u>	<u>Net</u>
In Service	\$230 410 852	\$ 86 630 998	\$143 779 854
Held for Future Use	8 244 782	4 226 206	4 018 576
Not Used Nor Currently Useful	<u>74 686 206</u>	<u>74 686 206</u>	<u>-0-</u>
	<u>\$313 341 840</u>	<u>\$165 543 410</u>	<u>\$147 798 430</u>

September depreciation charged to product cost amounted to \$902 028 which is no change from the amount charged in August. This amount includes assessments of \$88 506 from R & UO, \$9 064 from IPD and \$18 767 from HLO. Depreciation expense charged to standby amounted to \$46 418 which is approximately the same as was charged for August.

Reports were issued covering the physical inventories of movable equipment in the custody of 200-E and 200-W General Maintenance Operations. These inventories disclosed a net overage of \$6 838 and a net shortage of \$1 693 respectively.

Physical counts of movable equipment in the custody of Shops Operation and Redox have been completed; reconciliations and reports are in progress.

D. Auditing

Findings with respect to the examination of transactions relating to Project 691 were reviewed with J. H. Warren, Acting General Manager.

Observations and tests were made of the Physical Inventory of Precious Metals taken September 27 through September 30.

An investigation was made of the problems that may be involved in connection with the issuance of a proposed CPD Advice outlining policy with respect to reimbursement for privately owned automobiles that become contaminated. Findings and recommendations were presented to the Manager - Finance for review and consideration.

CPD auditing personnel were requested, and have agreed, to audit the records of the Richland Community Chest. The secretary of the organization was contacted and the audit is scheduled to start November 7, 1957. This audit will be accomplished outside regular working hours.

During the month 265 purchase requisitions were reviewed to ascertain whether or not proposed expenditures were reimbursable. The lack of irregularities noted in our reviews of purchase requisitions indicates that CPD personnel are giving adequate consideration to the reimbursability aspects of procurement transactions.

E. Measurements

Cost and production analysis reports for Redox, Purex and Finished Products Operation, comparing actual costs and production with forecast, were prepared and issued to interested Level III Management.

Productivity indices for the base period, January through April, 1957, and each month of 1957 through September were calculated on the basis of the outline developed during the Task Force study of this Key Result Area. Indices are currently being reviewed prior to issuance.

III. Reports Issued

HW-52917	Essential Materials Inventory and Consumption Report - September, 1957	S. R. Myers
HW-52997	September Unit Cost Information - Purex	B. M. Dobbs
HW-52998	September Unit Cost Information - Redox	B. M. Dobbs
HW-52999	September Unit Cost Information - Finished Products	B. M. Dobbs
HW-53000	CPD Unit Cost Information	K. G. Grimm
HW-53233	Redox Cost and Production Analysis-September, 1957	G. H. Temple
HW-53234	Purex Cost and Production Analysis -September, 1957	G. H. Temple
HW-53235	Finished Products Cost and Production Analysis-September, 1957	G. H. Temple
Rough Draft	Product Cost Report	B. M. Dobbs
Rough Draft	Variability of 200-E Power Costs	G. E. Dyreng
CLVI-103	CPD Cost and Production Performance-September, 1957	K. G. Grimm

C. Personnel Activities

F. A. Fieser, Procedures Specialist, attended the Procedures Seminar held at Forest Hills, New York, October 21 through October 25, and visited Schenectady to discuss the various aspects of procedures work, October 28 through October 30.

Manager - Finance

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November 8, 1957

CHEMICAL PROCESSING DEPARTMENT
FACILITIES ENGINEERING OPERATION

October, 1957

I. RESPONSIBILITY

The Drafting Operation accepted joint responsibility (with Engineering Administration) for the engineering files in 271-T pending transfer of complete responsibility at such time as the files are transferred to the first floor.

II. ACHIEVEMENTS

PUREX OPERATION

A. Process Technology

1. Analysis of Purex Dissolver Operation

A detailed analysis of a typical Purex dissolver cut was made to obtain basic information relative to dissolving rate, off-gas rate and composition to permit optimizing overall dissolver-293-A Facility operation. A summary of the results obtained from a study of a "standard" 8-hour cut with a 1,600 gallon charge of 51% HNO_3 , based on data obtained at 15 minute intervals, is as follows:

- a. Uranium dissolved per cut - 4.86 tons.
- b. Nitric Acid available for 293-A recovery - 2,830 pounds equivalent.
- c. Percent of 293-A recoverable acid evolved during the first 3 hours of the cut - 91.
- d. Peak off-gas rate, based on 415 SCFM air inbleed - 4,144 pounds per hour.
- e. Maximum mol ratio during peak of reaction (mols HNO_3 consumed per mol uranium dissolved) - 5.8.
- f. Maximum uranium dissolution rate - 2,140 pounds per hour.
- g. Minimum uranium dissolution rate - 570 pounds per hour.

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h. Integrated overall mol ratio - 3.11.

The results of the above study are to be formalized in a forthcoming report.

2. G-Cell Centrifuge Ion Chamber

A newly designed jumper is being fabricated in the 200 Area Shops. It will carry an ionization chamber which will be immediately adjacent to the G-3 centrifuge. Lead shielding will screen the chamber from other radiation sources. The electrical connections will be carried through a standard electrical jumper connector; the first time that this has been attempted. The interconnections in the P & O Gallery and in the control room have been planned, and the required work is in progress. According to present shop schedules, the equipment should be ready about mid November.

3. Condensate Trap Corrosion Problem

Investigations of the feasibility of using a filming amine steam additive are continuing in the 222-S Laboratory. These investigations are being made to determine the compatibility of "Permacol" (Betz Laboratory's trade name for one type of filming amine) with both the Redox and Purex processes. Compatibility tests have been run on nearly all portions of both processes with Permacol added in two different proportions in the process solution, 3 parts per million and 1000 ppm. Three ppm was chosen because of an approximate 1/5 dilution of process streams with 15 ppm steam in jet-type pumps and 1000 ppm was chosen to give a high value, probably higher than any that might be encountered due to possible tendencies for the compound to self-concentrate under some unknown condition.

So far the only deleterious effect noted is the tendency for Permacol toward reduction of potassium permanganate used in Redox head end process. This effect, however, does not appear to be serious enough to cause concern.

Filming amines sometimes have a tendency to coat a surface so that it will become "non-wettable." Packing materials for packed towers have been checked and found to be free from these coating effects. Concern over the possibility of trouble due to an emulsifying agent has been eliminated by word from Betz Laboratories that Permacol contains no emulsifying agent.

DECLASSIFIED**B. Plant Engineering****1. Maintenance Engineering**

Plans have been made to use Industrial Engineering motion picture techniques to aid in planning difficult maintenance jobs that require coordination between a number of crafts, operating forces and radiation monitoring. It is expected that this technique will improve specific job knowledge before the work begins and materially contribute to improved performance under adverse conditions.

2. Dissolver Off-Gas Control - Donut Jumper

An engineering review was initiated on the process and mechanical adequacy of the present dissolver off-gas control valves in the "donut" jumpers. This study was prompted by (1) observed malfunctioning of the control system during the past year, and (2) possible revised process requirements as a result of studies in progress to optimize dissolver-293-A operation. Sticking of the 6-inch butterfly valves in the closed position has occurred at various times, and contact maintenance of the "donut" jumper is difficult because of high radiation levels. To date, mechanical review of past butterfly valve failure has indicated the likelihood that sticking is due to excessive corrosion of 420-series stainless steel pins and bushings in the valve linkage and stem guide.

C. Project Activities(1)**1. L-Cell Package**

The work on the L-cell package is more than 90 percent complete including all phases of the job such as testing, painting, final inspections and the additional work on the cat walks.

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

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

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2. IR-218 - Purex Recycle Dock Shelter

The project is complete. Final inspection was held October 24, 1957.

3. CA-513-E - Purex Facility, Expansion of 200 Area Facilities

A directive has been received from the HOO-AEC, dated October 11, 1957, authorizing expenditure of \$2,348,667 on the subject project and extending the completion date to February 15, 1959. This is an interim authorization of the work to convert the Purex Plant to a two-cycle operation at capacity factor 2.75, pending further study by the Commission of increased capacity requested beyond 2.75 factor.

4. CG-647 - Acid Recovery and Iodine Removal Facility

As a result of the previously mentioned detailed analysis of a typical Purex dissolver cut, page 1, calculations have shown that dissolver theoretical air inbleed rates should vary from 410 SCFM at the peak of reaction to 109 SCFM at the end of a cut. Recommendations were submitted to Purex Operation on the programming of air inbleed during cuts; these call for 450 SCFM for the first 3 hours, 250 SCFM during the next 3½ hours, and 150 SCFM until the end of the cut.

Theoretical studies were made on the absorption of NO₂ from off-gas into nitric acid solution, under various conditions in the T-XA Absorber during cuts. Based on these studies, a recommendation was submitted to Purex Operation for the installation of an acid recycle line to permit pump-back of HNO₃ from the rundown tank, TK-XC, to the top plate of the absorber. This acid recycle feature should improve the rangeability of the absorber during periods of low NO₂ evolution, at the start and end of dissolver cuts. Further, the recycle feature should permit attainment of a 20% HNO₃ acid product and automatic control of absorber reflux addition. In support of the above recommendation, an engineering flow diagram and preliminary piping drawing were submitted along with process specifications for the required control instrumentation. The total cost of the proposed recycle line including required instrumentation is about \$4,500, based on performance of work by Plant Forces.

5. CG-719 - New Waste Tank Farm Vapor Handling Facilities

Process design studies were completed on facilities for the processing of waste tank farm condensate through the waste evaporators in the 202-A Building. These new facilities would eliminate a new tank farm crib and the need for using cross-country lines for low-level waste transfer from 200 East Area to 200 West Area. The bulk

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of tank farm condensate, following the installation of new surface condensers, would be recycled to the waste tanks to control self-boiling; the remainder would be routed to the Acid Recycle Tank, TK-F7, in the 202-A Building, via the Utility Tank, TK-F13, where it would be used as a substitute for part of the present fresh water addition.

A preliminary engineering flow diagram, process specifications for alternate routings back to the 202-A Building were completed. The total direct cost for the preferred alternate, including the installation of a buried line between the tank farm and the 202-A Building, was estimated at \$35,000. The direct cost could be reduced to a total of about \$13,000, if one of the two existing lines to the tank farm could be utilized; this alternate, however, would make use of the routing planned eventually for cesium recovery operations.

6. CG-742 - HA Column Replacement

Purex Operation has requested the addition of a new pot and nozzle at the bottom of the scrub (upper) section of the HA Column. This pot is to be used for a future float which is intended to measure organic phase density at that point. The addition of the pot will delay completion of the column a few days beyond the estimated completion date of November 1, 1957.

7. CA-773 - Interim Waste Crib

The drawings and specifications necessary for the interim crib construction were reviewed and approved during the month. The AEC has called for bids on the crib construction. Bid openings are scheduled for the end of the month. If funds are available, it is expected the low bidder will be given prompt notice to proceed. The project is scheduled for completion January 1, 1958.

REDOX OPERATION

A. Process Technology

Failed Pipes

Nine additional pipes were examined by the Eddy Current Method in Redox during the October shutdown. This makes a total of twenty-five pipes examined to date, of which six are leaking. So far the leaks are in the steam lines only with no reported evidence of damage in other lines. It is planned to analyze the work done up to this time in order to determine the extent of future work.

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Study is continuing on possible methods for restoring corroded sections of imbedded piping. Under consideration at this time is use of the sprayed and fused metallizing overlay method.

B. Plant Engineering

Electric Wall Connectors

Additional funds of \$4500 have recently been authorized to complete the development of a method for repair of failed Bakelite plates in electric wall connectors. This amount will also be sufficient to complete the necessary prototype tools to handle the work remotely from the canyon crane cab.

It is estimated that the development of the tools and method is 80 percent complete at this time. The remaining work should be completed within the next two months.

C. Project Activities

CG-772, E-Metal Dissolvers

The definitive process design for E-Metal dissolvers at Redox was formally transmitted to Project Engineering as a basis for final design. This work is now in progress. Attention has been devoted to the structural problems associated with slug impact during charging. A combination of design refinements and operating controls may be needed to limit impact effects. Further tests may be required on baffling design to assure reasonable slug distribution without undue impact.

FINISHED PRODUCTS OPERATION - UO₃ PLANT

A. Process Technology

1. Calciner Off-Gas Scrubbers

The UO₃ Plant calciner off-gas scrubbers have operated satisfactorily since installation of a line to partially by-pass the cooler in the drain line. Dismantling and cleaning of the cooler tubes and removal of several baffles is scheduled during the next plant shut-down. Freer flow through the tubes is expected to allow full flow through the cooler without using the by-pass.

2. Calciner Agitator Arms

A spare parts order with Electric Steel Foundry Company for calciner paddles has been reviewed at a meeting with the vendor in

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Portland. A new design was adopted, and the order will be completed on the basis of the new design. Enough parts to equip two calciners plus four extra hub assemblies will be supplied. Advantages of the new design are (1) shear pins to keep the arms from breaking or the shell being damaged if foreign material or lumps are in the calciners; (2) separately detachable arms; and (3) less cost than the original design.

B. Plant Engineering

1. UO₃ Study

As a part of a proposal for action in the UO₃ Plant, a history of production and unit costs, anticipated cost based on production and manpower utilization in the future, a history of calciner performance and causes for shutdowns, and comparisons of previous versus present unit costs were made and presented in chart and tabular form. From this data and information concerning improvements being made or planned for the UO₃ calciners, the operating efficiency and anticipated production of the calciners was projected for the next year. A brief outline of possible programs of an industrial management nature for the plant was also presented.

2. 224-UA

A scope package is being assembled to cover raising of the X26-1 tank to accommodate a No. 4 hammer-mill between it and the load-out tanks to control the amount of under specification product. A study is also being conducted regarding the possibility of classifying all mill powder by screening.

An agitator paddle arm assembly is being tested in the 300 area laboratory to obtain strain gauge readings at various points on the structure. This assembly is to be placed in a calciner and measurements recorded while the agitator is loaded with a normal powder bed. With this information, it is believed an optimum design can be developed which will allow maximum paddle arm strength without a possibility of over-stressing the calciner trough.

Fabrication and installation of the new hot boxes is underway. New valve seats and plugs have been installed in three cells, and work is progressing on the installation of the new UNH filters.

C. Project Activities

1. 224-UA Building

Scope work was started for a project proposal on miscellaneous UO₃

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plant improvements. The items to be scoped are decontamination facilities in B-Cell and air monitoring system for use in the 224-U and 224-UA Buildings.

Failed agitator arms from continuous calciners were examined metallographically. All of the specimens showed fatigue cracks, although some of the cracks had not progressed to failure of the piece. Previous visual examination had revealed that the arms of wrought stainless steel were failing by fatigue mechanism; however, a specimen from a cast arm also showed a small fatigue crack partially through the arm.

The design and welding of serrated Model 2 type agitators were reviewed (Drawing SK-2-43236). Recommendations on welding procedure were given to Equipment Development Operation, HLO, for use in producing these assemblies.

2. Continuous Calciner Controls

A design has been prepared for the instrumentation and control of the revised filtering arrangements for the primary UNH filters. A control circuit was set up to automatically start either UNH pump when the other pump was being used as the primary pump. Instrumentation was scoped to provide for recording the UNH header pressure and the pressure drop across the UNH filter.

3. E-33690 - Interim Segregation Facility, UO₃ Plant

A project proposal requesting funds to provide an interim segregation facility for E-metal processing at the UO₃ Plant is being prepared. This facility is needed by June, 1958, according to the production forecasts. Due to the limited time available to construct the facility, it is planned to only provide accountability and feed tankage and minor amounts of piping so this material can be processed through the batch calciners. Consideration is being given to connecting this equipment to the continuous calciners after their operating efficiency has been improved.

FINISHED PRODUCTS OPERATION - Z PLANT

A. Process Technology

1. Recuplex Neutron Monitoring

Following a review of neutron monitoring application at Recuplex, Recuplex personnel requested that the points of application be increased from the original six to twelve points. This would mean two consoles instead of the one unit originally outlined.

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2. Shielding Study

A study of radiation intensities and shielding requirements in the "Z" Plant has been concluded, and data obtained by measurements taken with specialized shielding arrangements is now being evaluated. Present indications point towards specification of additional shielding for Project CG-734. This need is particularly noticeable in areas subjected to neutron radiation. Recently developed neutron measuring equipment has been used in the study together with specially adapted gamma measuring instruments including probe shields of varying thicknesses made of plexiglas, safety glass, lead glass, lead, and stainless steel.

3. "Low Density" Equipment Layout

Conceptual designs for modified equipment enclosures and layouts have been prepared and published. Advantages in improved radiological and process control which may be realized by use of localized radiation shielding close to the individual process equipment units were reported. The advantages which this design approach permits for internal ventilation control of contamination were also described.

B. Project Activities

1. CG-691 - Improved Task I and Task II Facilities

The project proposal revision, requesting an additional \$245,000, has been approved by the Commission. A directive, dated October 16, 1957, has been received authorizing the expenditure of \$945,000 on this project. The directive completion date remains June 1, 1958. Progress on some of the various equipment improvements are described below:

- a. Design work has been started on the drawings for using a five liter reactor vessel in Hood H-9A and H-9B.
- b. The variable speed drives that would be suitable for driving the reactor agitator, and the various alternates are presently being evaluated.
- c. Detail design work has been started on eliminating the packing gland on the rotary drum filter agitator by employing a rocker-arm type agitator.
- d. An improved design of the multiple rotor rotary valve is being fabricated in the shops.

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- e. Because of the greater convenience in operating procedures, it has been decided to abandon an on-off valve as a method of unloading powder from the fluorinator. Work is presently underway to determine the best design for a rotary valve with a single rotor.
- f. A Porocarbon filter installed in the fluorinator off-gas system had by the end of the month given several days of trouble-free operation. The performance of this filter will be watched carefully to determine if automatic or improved filter cleaning methods can be justified. In the meanwhile, tests are being performed in the 300 Area to evaluate the effectiveness of various cleaning methods.

2. CG-745 - RMC Fabrication Line

Word was received from the AEC that the Bureau of the Budget has released \$1,000,000 for completion of Project CG-745. It now appears that the scope of this project may have to be reduced in order to keep it within the \$1,000,000. Project Engineering is requesting a new estimate based upon 70 per cent complete design. On the basis of this new estimate a scope revision will be made as required.

GENERAL ACTIVITIES

A. Research and Development

1. Contracts

a. Testing of Remote Studs

Contract DDR-10 with Industrial Research Division of Washington State College. Lump Sum Contract for \$5,941.61.

The Industrial Research Division of the College has been working under the subject contract since December, 1956. Tests are being performed competently and with scrupulous attention to detail.

As of October 15, some twenty stud tests remain to be run with completion scheduled during October. Remaining is calibration of the Hanford impact wrench. Two men are currently working at organizing, plotting and assembling the data accumulated from the tests for assembly of the final report.

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b. Development of Centrifuge Oiling System

Contract DDR-18 with Bird Machine Company, Walpole, Massachusetts.
Lump Sum Contract for \$9,963.

Contract Administrator - W. P. Ingalls

Amount paid to contractor to date: \$9,963 (The contract has been completed).

The prototype independent oiling system, comprising the drive-head, tanks, pump etc., was shipped by the vendor and has been received at Hanford. Billing for the contract amount, \$9,963, has been received and approved for payment. A work order to cover set-up and operation of the system in mockup has been written. This will be an extended test covering perhaps 60 days of operation.

B. Process Technology

1. Experimental Storage Tanks

A study is being made of the potential engineering data that can be obtained from model waste storage tanks and the possible correlation or extrapolation of such data to plant structures.

An estimate is being obtained from Power and General Maintenance for the fabrication of 1/12 scale models of the 241-A waste storage tank and a horizontal storage tank. Construction of a structural model to this scale presents many fabrication problems foreign to experience at HAPO. Off-site fabrication and increased scale will also be considered before actual construction of these models.

2. Storage Tank Pressures and Bumping Phenomena

The 0 to 20 inch aneroid pressure gauge has been removed from the 103-A tank and is being modified for installation on the 107-SX tank for measuring the rate of pressure rise during a bump. It is currently planned to shut off the circulators in this tank sometime in December in order to study the bumping phenomena. Redox Technology estimates the vapor pressure to be not more than 10 percent of the hydrostatic head at the bottom of the tank. The possibility of recording the dome movement, if any, is being reviewed.

DECLASSIFIED**C. Plant Engineering****1. Lidless Cask Cars**

An evaluation of the effectiveness of lidless cask cars in preventing contamination spread to external surfaces was completed. The contamination spread is greatly reduced in the lidless cars, therefore less cleaning is required. The overall effectiveness of the hinged lid car, tested sometime ago, is superior to the lidless cars.

2. Power and General Maintenance Management Program

A study to evaluate possible methods of improving control over landlord maintenance expenditures was completed. The analysis indicated that better control can be exercised through the use of a system of three basic types of work authorization:

- a. Emergency or Service Orders
- b. Specific Work Orders
- c. Routine Work Orders

P&GM will place this system into effect in early November. The previously used work requests will be replaced by Service Orders which are limited to emergencies or service type jobs of eight man hours or less and/or \$50 of materials. All other work except that performed on routine Work Orders will henceforth be performed on specific Work Orders. It is anticipated that this new system will allow a degree of control previously unattainable with the unlimited Expense Accounts.

3. Work Simplification Course

Preparations were begun for conducting a Work Simplification course for Chemical Processing Department personnel. Some modifications of the previous courses are planned. After explanations, illustrations, and simple examples of the various Industrial Engineering analytical techniques are given during the sessions, the participants will be urged to study actual plant problems and apply the correct methods of analysis to develop improved methods. It is planned to present a work simplification appreciation course for level 2 and 3 Chemical Processing Department management before starting the application course.

4. Materials Engineering

Activities of a general nature included the following:

- a. To clarify the requirements for testing stainless steel pipe,

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Purchasing Operation was informed that radiographic inspection is the only non-destructive test acceptable at the present time. Concurrently, Hanford Laboratories Operation was again requested to prepare a development program which would provide information and standards adequate to allow HAPO utilization of ultrasonic and eddy-current tests in procurement of stainless steel.

- b. Suggestions were made regarding materials to use in dissolving equipment for processing enriched metal.
- c. Continued assistance was given Construction Engineering Operation in the development of code procedure data for welding dissimilar metals.

D. Project Activities

1. Financial

Project Cost information as of October 20, 1957:

Total Authorized Funds - Active Projects	\$13,925,000
Total Cost-to-date	10,079,000
Commitments and Open Work Releases	1,107,000
Unencumbered Balance	2,739,000
Costs charged to above projects from September 22, 1957 to October 20, 1957	353,000

2. CG-718 - Fission Product Isolation

Design estimates on the wet chemistry portion of the work have been completed. Preparation of a project proposal requesting design funds for the wet chemistry portion of the overall project was started.

III. ORGANIZATION AND PERSONNEL

A. Personnel

There were no significant personnel moves in the Operation during the month of October.

B. Safety

The safety topic of the month "Fire Protection" was discussed in the

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regular monthly safety meetings. Also discussed was Chemical Processing Department Accident Bulletin No. 57-7. It was emphasized that engineering personnel must comply with all safety rules when in the operating areas.

C. Inventions

A valve for the control of streams composed of powdered or granular solids, by J. M. Gerhart and H. G. Johnson.

A rotary valve that contains multiple rotors that are timed in such a manner as to assure passage of even the finest and stickiest of dry powders, by J. W. Kolb.

A mechanism which will make it impossible for a craftsman to assemble two timing gears in such a manner that they would be out of synchronization, by J. W. Kolb.

D. Reports Issued

- HW-52768 - Basic Data for 222-S Analytical Labor Standards" by A. C. Morgenthaler, dated September 19, 1957.
- HW-52888 - Standard Analytical Service for the UO3 Plant, by V. P. Madsen, dated October 1, 1957.
- HW-52913 - Essential Materials Standard for the Redox Plant, July through December 1957, by A. C. Morgenthaler, dated October 1, 1957.
- HW-53394 RD - Assumptions for Preparation of Plant Acquisition and Construction Budget for FY 1960, Chemical Processing Department (Comment Issue), by D. R. Gustavson, dated October 30, 1957.
- HW-52395 - Project Proposal, Revision 2 - Improved Task I and Task II Facilities (Project CG-691), by R. C. Baker, dated September 9, 1957.
- HW-53220 - Letter, Plutonium Fabrication and Assembly Facilities, by D. A. Snyder, dated October 11, 1957.

Letter, H. P. Shaw to L. P. Bupp and P. F. Gast, Project CG-772, E-Metal Dissolvers - Redox, Design Verification Testing, dated October 10, 1957.
- HW-53349 - Pickling Hood Requirements for Project CG-734, by J. R. Fritz, dated October 25, 1957.

- HW-52880 - Effects on Hanford Works of a Proposed Dam at Columbia River Mile 348, by R. T. Jaske, J. P. Corley, R. B. Hall, H. A. Kramer, E. F. Smith and V. W. Wood, dated October 21, 1957.
- HW-53332 - Purex Steam Condensate Crib 216-A-6 Study Report, by V. W. Wood, dated October 24, 1957.
- HW-52811 - CA-719 - Additional Facilities to Handle Purex Tank Farm Vapor Wastes - Scope Design Change No. 1, by V. W. Wood, dated October 21, 1957.
- HW-53004 - An Efficient Method for Radiation and Ventilation Control of Contamination Enclosures, by H. A. Moulthrop, dated October 9, 1957.

E. Trips

R. D. Switters and R. A. Kennedy visited Electric Steel Foundry, Portland, Oregon on October 11, 1957, to discuss engineering changes on agitators for continuous UO_3 calciners.

R. D. Switters visited General Electric Company, ANPD, Cincinnati, Ohio on October 18, 1957 to be interviewed for transfer.

J. F. Kane visited various vendor's plants in the Spokane area on October 18, 1957 to pick up engineering information relative to classifying product from the UO_3 Plant.

F. Visitors

Mr. Forrest Radel, Supervisor of Erection, and Mr. C. L. Hansen, Service Director of Manning, Maxwell and Moore, Inc., visited the Plant October 22 and 23, 1957, for the purpose of examining the Purex crane girder for shipping damage and also to discuss erection of the crane.

Mr. L. Murphy, Washington AEC liaison representative, visited the area with HOO-AEC personnel and with Chemical Processing Department personnel examining planned future work in UO_3 Plant and 234-5 Building.

HP Shaw
Manager
Facilities Engineering Operation

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CHEMICAL PROCESSING DEPARTMENT

RESEARCH AND ENGINEERING OPERATION

OCTOBER, 1957

PUREX PROCESS TECHNOLOGY

Feed Preparation

Irradiated uranium with exposure rates of 4.3 to 6.0 MW/T (502 to 589 MWD/T) and cooling times of 95 to 122 days was dissolved and prepared as solvent extraction feed during the month. Five acid-deficient feed batches were produced when a lower-than-normal concentration of nitric acid was used for dissolving. When excessive HAW plutonium waste losses developed and required segregation for rework, two HAF batches were withheld for high temperature digestion, after acidification, in order to reduce the Pu^{+4} polymer present in the solution.

A series of tests were completed to evaluate the effects of reflux water and air in-bleed rates on the 293-A Backup Facility acid absorber. Although the erratic results varied between 60 to 80 per cent recovery efficiency, the data indicated the air in-bleed rate should be varied throughout the cut depending upon the rate of reaction in the dissolver. Such adjustments in dissolving procedures are being incorporated.

A reduction in the headend centrifuge speed from 1500 to 1200 rpm (1500 to 900 g), necessitated by failure of the 75 cycle alternators, has had no apparent effect on the solvent extraction process.

Solvent Extraction

Typical performance of the solvent extraction cycles which operated 94 per cent of the month is tabulated below:

<u>Cycle</u>	<u>Log Gamma Decontamination Factor, dF</u>		<u>Instantaneous Waste Loss, Per Cent</u>	
	<u>Uranium</u>	<u>Plutonium</u>	<u>Uranium</u>	<u>Plutonium</u>
Precycle	2.5(a)	2.5(a)	(b)	0.18
Partition	1.8	1.9	(b)	0.20 (IBU=0.07)
Final	3.0	3.0	0.004	0.04
Overall	7.3	7.4	--	0.42

(a) Based on a calculated value of 2.5×10^8 uc/gal for HAF

(b) No uranium analyses

Decontamination performance of the plant, which operated continuously during the month except for an unscheduled, two-day shutdown, was excellent. In

preparation for a rate increase above $CF = 2.16$, the IAS flow was reduced to 75 per cent of flowsheet. When the rate increase did not materialize and the seven-fold increase in the 2AF gamma activity produced a two-fold increase in the plutonium product gamma activity, flowsheet conditions were restored. Later during a rate decrease, a ten-fold increase in 2AF gamma activity was caused by a temporary condition of excess nitric acid (2.7 M) in the IAF. No adverse effects on the process were noted when a test batch of 2WW was reprocessed after five days of refluxing to hydrolyze organic compounds in the solution.

A new low plutonium waste loss (0.51 per cent) was established despite high HAW plutonium losses (up to 2.0 per cent) near the end of the month. However, the majority of the plutonium in the HAW, caused by processing acid-deficient dissolver solution, was segregated for rework. An increase in the IAF nitric acid concentration (from 0.92 M to 2.25 M) did not appreciably reduce the IAW plutonium loss, although the IAS flow reduction to 75 per cent of flowsheet apparently lowered the loss but additional confirmation is required before a definite conclusion can be drawn.

To promote stable operating conditions at the higher production rates, the L/V for the IC Column was reduced (1.25 to 1.12), and the temperature increased (30° to $50^{\circ}C$). Loss of approximately 1000 pounds of uranium occurred to the ICW when the temperature was dropped to $30^{\circ}C$ without an increase in L/V. The uranium was recovered in the organic wash solution, and laboratory studies indicate recovery is feasible following dissolution of the MnO_2 in the solution.

Successful operation of the Final Uranium Cycle at $CF = 2.64$ followed shutdown of the cycle to remove the failed float-type, bottom-interface controller in the 2D Column, while the remainder of the plant continued on stream. After the capacitance probe had been reinstalled, the 2DF which had been temporarily stored was processed. Failure of the float-type controller was traced to an unwelded joint which allowed process solution to come into contact with the electrical circuit. Satisfactory operation of the 2E Column at $L/V = 1.10$ and $50^{\circ}C$ was demonstrated at the higher processing rate.

Subsequent to startup after the unscheduled shutdown, plutonium in the uranium product exceeded specifications (10 parts plutonium per billion parts of uranium) up to 50-fold despite process changes designed to increase plutonium decontamination in the 2D Column. Discovery and correction of a $97^{\circ}C$ 2DF operating temperature ($40^{\circ}C$, normal), which had not been detected because of an inoperative temperature recorder, returned column performance to normal. A 2DU sample taken during the period of poor plutonium decontamination indicated all the plutonium present to be Pu^{+4} , although the total iron in the 2DW analyzed as Fe^{++} . Fission product decontamination during the period of poor plutonium decontamination was excellent. All out-of-specification uranium is being reprocessed along with the normal feed by operating the Final Uranium Cycle at a processing rate of $CF = 3.15$, a new sustained maximum capacity rate for this cycle.

Analyses indicated approximately 60 per cent of the neptunium 237 present in the feed appeared in the uranium product during the major portion of the month. No

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recognized flowsheet change accounts for the neptunium recovery other than perhaps the continuous alkaline potassium permanganate washing of the first cycle solvent.

Plutonium Concentration

Concurrent with the continuous Task I operation in the 234-5 Building, increased plutonium loading of PR cans in a smaller liquid volume was requested. Accordingly, the concentration of the final plutonium solution was increased to 200 grams per liter. To preclude the possibility of sulfate precipitation, the sulfuric acid concentration in the 2BX was reduced from 0.004 M to 0.003 M.

On October 22 failure of the valve between the Plutonium Stripper (T-L3) and Concentrator (E-I4) stopped the flow of solution between these two pieces of equipment, and a crash shutdown of the plant resulted. During the shutdown for valve replacement, hydrostatic testing proved the integrity of the T-L3 and E-I4 tube bundles.

Cold shakedown operation of the plutonium anion exchange prototype equipment continued with satisfactory demonstration of the exchange column temperature control and product concentrator operability. Anion resin, Dowex 1 x 4, 50-100 mesh was charged into the system, but initial attempts to push the resin through the system were unsuccessful. Microscopic inspection of the charged resin revealed a large quantity of resin fines and fractured beads, which proved to be responsible for poor movement characteristics according to a physical comparison with an elutriated resin. Following the removal of fines from the resin, satisfactory resin movement was obtained in both water and 2 M HNO₃. Tie-in to the Purex Plant equipment is scheduled for the November shutdown.

Solvent Treatment

Gamma activity of the solvent in the No. 1 Solvent Treatment System ranged from 700 to 2000 uc/gal. with a reduction in the Zr-Nb/Ru ratio from 4 to 0.5 as continuous potassium permanganate batch washing was maintained in TK-G1. Investigation of the erratic analyses indicated the laboratory procedure of sample drying prior to counting had a pronounced effect on the results. Non-uniform drying conditions cause a variation in the amount of ruthenium and iodine distilled from the sample disc. Accordingly, a "wet" method of analysis has been developed which yields consistent but several-fold higher results than the "dry" method.

Improvement in the IO Column operating conditions resulted from (a) a reduction of the pulse frequency from 80 to 60 cycles per minute, and (b) a reduction of the column L/V from 0.33 to 0.25. No carryover of MnO₂ into the IOO has been detected despite doubling the period of time between centrifuge cleanouts. Failure of the 75 cycle alternators resulted in a reduction of the centrifuge speed from 1500 to 1200 rpm.

During the short plant shutdown on October 22 the pump boot, pump and associated jumpers for the continuous solvent contactor were installed in TK-G7. Modifications to the turbomixer and fabrication of the final jumpers are

nearing completion, and the unit will be installed during the November shutdown.

Operation of the No. 2 Solvent Treatment System was satisfactory during the month. Solvent in this system ranged from 8 to 26 uc/gal. in gamma activity. Overall solvent loss for the month was a normal 0.3 per cent.

Waste Treatment and Acid Recovery

The Waste Treatment and Acid Recovery sections of the plant satisfactorily processed solvent extraction wastes during the month. Waste volumes sent to the 241-A-101 Tank averaged 124, 259, 16 and 135 gallons per ton of uranium processed for neutralized IWW, solvent washes, centrifuge cleanouts and cell drainage, respectively. Coating wastes amounting to approximately 249 gallons per ton of uranium were transferred to the 241-C Tank Farm. Overall waste losses for the month were 0.51 and 0.19 per cent for plutonium and uranium, respectively. Coating waste losses for plutonium and uranium amounted to 11 and 23 per cent, respectively, of the overall losses. Approximately 44 units of plutonium were recovered without incident from 2165 gallons of 2WW which had been refluxed for five days prior to reprocessing.

Self-concentration in Tanks 241-A-101 and 103 continued at a boil-off rate of 6.6 and 5.1 gallons per minute, respectively. All solvent wash wastes were rerouted from TK-103 to TK-101 when the concentration rate became adequate to maintain the proper tank liquid level.

Corrosion by the oxides of nitrogen in the off-gases of the packed, black iron deentrainer in the 241-A condenser vent system necessitated replacement of the unit with a stainless steel tank. Oxides of nitrogen concentration in the off-gases is currently 10 to 20 parts per million compared to a maximum concentration of 800 to 1000 parts per million during the peak of the evolution, the exact cause of which still remains uncertain.

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REDOX TECHNOLOGY OPERATION**DECLASSIFIED**Feed Preparation

The dissolvers were in operation 87 percent of the month, processing irradiated uranium having exposures ranging from 500 to 589 MWD/T at power levels of 4.4 to 6.3 MW/T. The emission of iodine-131 to the stack averaged 0.17 curie per day of dissolver operation with metal cooling periods of 102 to 126 days. The apparent efficiency of the silver reactors, for the period of dissolver operation, was 99.78 percent.

Approximately 2.6 tons of sheared NRX fuel elements from Chalk River (AECL) were dissolved on a segregated basis to facilitate accurate determination of the plutonium content. Losses due to coating removal, which was preceded by a dilute acid flush to prevent loss of fines, averaged approximately 0.1 percent with the AECL statement of the amount shipped, and incomplete analyses for plutonium indicate the yield to be approximately 94 percent of the amount calculated by the shipper.

Initial tests of the Acid Recovery and Iodine Removal facilities in processing off-gas from one up-draft dissolver indicate very satisfactory performance with the recovered acid concentration averaging about 55 percent. Extended operation with both up-draft and down-draft dissolvers will be required to delineate the optimum operating conditions and to define accurately the extent of recovery. The low radio-iodine input prevented determination of the efficiency of iodine removal. Some minor modifications will be required to permit full utilization of the control instrumentation.

Concentrated waste was used in the permanganate reduction step for approximately 85 percent of the feed batches prepared during the month. The volumes of waste employed ranged from 250 to 400 gallons during normal operation and up to 800 gallons during periods of waste rework. Approximately 25 percent of the feed batches contained additional waste as rework, with volumes ranging between 300 and 1300 gallons per batch. Principal sources of the waste requiring rework were (1) salt wastes containing higher-than-normal product values, and (2) sump wastes containing leakage from the H-4 oxidizer, the 2AF pump and the HAIS line.

A leak in the H-4 oxidizer tank between the 3.5 and 4-foot levels necessitated a reduction in batch size from 4 to 3 tons and reduced the throughput rate of the feed preparation system. This vessel, constructed of 304-L stainless steel using 308-L welding rod, was installed in January, 1956, and had been in boiling service for approximately 5900 hours.

Solvent Extraction

The solvent extraction system was operated at rates ranging from 72 to 132 percent of Phase II with interruptions caused by leaks in the back-cycle jumpers and failure of the 2AF pump. The leaking back-cycle jumpers prompted the

installation of new jumpers which introduced the back-cycle (HAIS) stream at the feed point, 8 feet below the previous introduction point. Since this change made the HA and LA Columns essentially identical process-wise, the HAX flow was increased from a flow ratio of 370 to 400 to prevent possible reduction and deposition of plutonium from the HAP stream. Evaluation of the effect on decontamination efficiency of increased HAIS stream acidity, desirable to prevent precipitation of the Fe-Cr-Al complex, has been prevented due to decontamination difficulties arising from inadequate feed clarification.

As a result of the high LAX flow ratios being employed, there has been no discernible repetition of the plutonium deposition previously encountered in the LA Column. The LAX flow ratio was reduced from 425 to 400 on October 9, in a continuing effort to determine the maximum plutonium concentration attainable in the LAP stream without deposition.

Product Recovery

The over-all recoveries for uranium and plutonium averaged 99.81 and 99.19 percent respectively. The unusually high plutonium losses appear to be associated primarily with the HA Column, since the HAW losses were approximately 5 times normal and about 2.5 times the losses from the HS Column operating on the same flowsheet. Dilute acid flushes of these two columns showed the product hold-up in the HA Column to be two-fold to nine-fold higher than that in the HS. Samples from the HCW and LOW streams permitted estimation of the plutonium losses to the waste system via the 100 stream. This loss approximated 0.25 percent and appeared to be insensitive to 15 and 100 percent increases in the HCX and LOX flows respectively.

It is suspected that the primary source of the loss is plutonium polymer deposited in the HAF tank during September when approximately 1065 units of plutonium, from the leaking 2AF pump, were stored as a dilute nitric acid solution for a period of approximately 38 hours. A flush of the HAF tank employing concentrated nitric acid is being made to recover the remaining plutonium.

Decontamination

The plutonium decontamination was excellent throughout the report period with an average over-all log decontamination factor of 8.2 and all batches well below the specification level for fission product activity. The uranium decontamination was relatively poor with only three 2EU batches meeting the specification for fission product activity. Approximately 95 percent of the 2EU product was processed through the ozonation system where an average arithmetic decontamination factor of 1.47 was obtained. Subsequent treatment of about 75 percent of the 2EU product in the silica gel system gave an average arithmetic decontamination factor of 2.9, permitting all the uranium product to meet shipping specifications. Increases in the HAS, LAS and ZDS flows had little beneficial effect on the uranium decontamination; however, some improvement in decontamination was observed near the end of October when the frequency of centrifuge cake removals was increased.

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The principal factor affecting the uranium decontamination appeared to be the loss of the centrifuge tachometer during September, further complicated by lack of a skimmer. The earlier loss of the skimmer necessitated slurry-washing of the cake with resultant recycle of approximately half the cake activity. Following the loss of the tachometer the amount of cake activity recycled, due to washing, rose to greater than 80 percent. Until permanent installation of an oscilloscope on October 18, an average of 16 batches was processed between cake removals. Figure 1 compares normal centrifuge operation with operation after the skimmer failure and after the tachometer failure.

Figure 1

Waste Storage

The neutralized waste volume averaged 1050 gallons per ton of uranium, exceeding the flowsheet value by approximately 14 percent. The coating waste volume averaged 140 gallons per ton of uranium dissolved.

Testing of the SX tank farm air-lift circulators, by increasing the air flow above the 3.5 scfm normally maintained, resulted in increases in condensate flow equivalent to a maximum heat release of 300,000 Btu at rates up to 3,500,000 Btu/hr. There was no noticeable pressure build-up associated with the surges in condensate. The air flow to the 108 and 107-SX circulators was subsequently increased to 5 and 6 scfm respectively, effectively preventing further condensate surges.

FINISHED PRODUCTS TECHNOLOGY OPERATION**DECLASSIFIED**URANIUM CONVERSION OPERATIONProcess Performance

Uranium trioxide shipped during the month met all product specifications. Sulfur content of the UO_3 was reduced from 3000 to 1500 parts sulfur per million parts uranium at the request of the customer. No change in product quality has been indicated on the basis of current laboratory evaluation tests.

Nine hundred ninety pounds of nitric acid per ton of uranium processed (94% of theoretical) were recovered. The average concentration was 48%. An increase in the product acid uranium concentration from 0.037 to 0.133 pounds of uranium per gallon since the wet separator system was installed indicates that the dry filters removed about 75% of the dust from the off-gas.

Continuous Calciners

Agitator damage was sustained in three calciners during the month. A prototype set of agitator blades with increased strength and shear pin weak point, was fabricated and installed in one cell and is currently under test. In other respects calciner performance was very satisfactory.

The wet separators for off-gas clean-up were in operation in all cells. Difficulty experienced with the separator acid drainage system was traced to a partial plug in the acid cooler.

METAL FINISHING OPERATIONTask I and II

A total of 388 runs were processed in the continuous facility. Supernate losses to recycle averaged 6.2%. The high losses were caused by a period of inadequate oxalate filtration and/or poor oxalate strike conditions. A filter drum cloth change and an increase in the degree of agitation in the precipitation vessel reduced the supernate losses to one percent or less under steady state conditions.

During the period of wet oxalate cake difficulties a series of low density buttons were produced owing to insufficient washing of the precipitate. Button densities returned to well above acceptable limits when filtration conditions were improved.

Recuplex

Nineteen runs, consisting of miscellaneous fragments, powders and clean-outs, were processed through the SC hood. Slurry losses to the crib averaged 0.5% of the recovered Pu.

In an attempt to reduce the amount of solids getting by the filter in a

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10-crucible run (Al/F ratio = 2.5/1 during coagulation), a coagulant, American Cyanamide Company S-3171, was added to the dissolver. No improvement in percent solids was noted.

The SE columns processed 1100 liters/day of feed at an operating efficiency of 58.5% for an instantaneous rate of 1880 liters/day. Waste losses averaged 0.0096 g/l or 0.80% of the Pu processed to the columns.

Approximately six days of operating time were required to flush the SE columns and associated tanks. The flush included 8 M HNO_3 , water, 20% caustic, and a final water flush. Rework of the flush material resulted in high waste losses using flowsheet conditions of 1.0 M HNO_3 and 0.015 M NaNO_2 in the feed because of the slow rate of the Pu (III) to Pu (IV) oxidation reaction. It was necessary to raise the acid molarity to 2.5 M and the NaNO_2 molarity to 0.04 M before satisfactory waste losses were realized. To prevent high waste losses in the H-3 Column prior to the flush, the hydroxylamine sulfate concentration in the CCX was increased from 0.02 M to 0.05 M $\text{NH}_2\text{OH} \cdot \frac{1}{2}\text{H}_2\text{SO}_4$. Though the flooding capacity of the H-3 Column was reduced (necessary to drop the frequency from 70 to 60 cycles/min.) the column efficiency was increased substantially.

The H-3 bellows failed for the second time after approximately one month of operation. The second failure may have been caused by the abrasive action of corrosion products from the aluminum spacer within the bellows.

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PROCESS CHEMISTRY OPERATIONPROCESS ASSISTANCE**DECLASSIFIED**General Process Studies

A laboratory study was made to determine any effect that slugs lubricated with Dow-Corning No. 44 silicone grease might have on the chemical separations processes. The studies indicated that the silicone grease from the coated slugs would accumulate in the dissolvers and would eventually be carried into the solvent extraction columns along with feed solution. Concentrations of grease up to 1000 ppmp HAF had no apparent deleterious effect on the Redox (hexone) process other than the undesirable accumulation of grease in and on the surfaces of process equipment. Purex (TBP) process HA column decontamination factors were reduced by a factor of 1.2 with from 15 to 1000 parts of grease per million parts HAF. Disengaging times in the scrub section of the Purex HA column were increased by a factor of 1.2 when silicone grease was present. Purex HCW losses, solvent plutonium retention, and solvent gamma activity were not affected by the presence of the silicone grease.

Purex Process Studies

Laboratory studies indicated that a carbonate waste solution could be successfully reworked by acidifying the waste and blending it with fresh dissolver solution. Sodium nitrite should be added to the blend to dissolve any MnO_2 present and to assure proper valence adjustment of the plutonium.

Waste Scavenging Studies

Scavenging procedures have been recommended for tanks 108-BX, 109-BX, 110-BX, and 111-BX. Laboratory data indicate that the recommended scavenging should result in cribbable material from these tanks.

ANALYTICAL ASSISTANCEAnalytical Measurements of Redox and Purex Plutonium Product Solutions

As a result of a large plutonium Book-Physical Inventory Difference (B-PID) which currently exists between the Separations Plants and Z Plant, the analytical methods used to measure the plutonium content and the specific gravity of plutonium product solutions (Purex L-9 and Redox L-6) were examined for possible biases.

Plutonium product solutions are presently assayed by the Direct X-ray Photometric Method. As the method is based on the absorption of x-rays by pure plutonium nitrate solutions, corrections are made for the absorption by impurities known to be present in process samples. Though the absorption of x-rays by the very heavy metals (plutonium, uranium thorium) is many times greater than by normal process impurities such as iron, chromium, and nickel, small inaccuracies could result from the presence of unknown impurities or from errors in analyzing or correcting for known impurities.

The accuracy of the present x-ray method was verified by assaying Redox and Purex plutonium product solutions by two independent methods not affected by impurities present in process samples. The referee methods used were the Coulometric Method and the Anion Exchange-Ceric Sulfate Method. Results obtained on process samples by the referee methods agree within 0.10% of the assay values obtained by x-ray analysis.

The method used for determining the specific gravity of plutonium product solutions, the Falling Drop Method, was also examined and found unbiased. Specific gravities obtained by this method agreed within 0.001 specific gravity units with those obtained by weighing a known volume of the process solution.

QUALITY CONTROL AND STANDARDS

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

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234-5 DEVELOPMENT OPERATION**DECLASSIFIED**Continuous Task I Prototype

Four prototype runs were made to further test the feasibility of simultaneous reduction-precipitation in the continuous oxalate process. Both Redox and Purex products were used as feed with no dilution except for 500 ml of water as can flush. Two strike solutions were used, containing 35 and 50 ml 50 percent H_2O_2 per liter of 1 M oxalic acid, and both were satisfactory. The cake quality was normally excellent, but again was very sensitive to flow control (i.e., oxalate excess). During one interval the oxalic excess was fairly constant at about 0.15 molar (0.10 molar desired), with a very pasty cake resulting. Restoration of desired rates soon gave a good cake.

Some quick tests have indicated that the oxalic-peroxide strike solution is not very stable and would probably have to be made up fresh daily, unless a suitable stabilizing agent was employed.

Calcination proceeded smoothly with a calciner outlet temperature of approximately 300 C (inlet 200 - 275 C) and a 13-minute residence time. This material has fluorinated nicely in the prototype continuous fluorinator.

Three evaporative kill runs have been made, using supernatants from the prototype filter. It will be necessary to add manganous ion to the supernatants now being obtained because they do not contain enough plutonium and iron to sufficiently catalyze oxalate decomposition. The supernatants generally contained some solids but no solids have been observed in concentrator bottoms.

EVAPORATIVE CONCENTRATION OF OXALATE SUPERNATANTS

Run No.	Feed Composition		Conc. Factor	Residence Time	Final Bottoms Composition		
VK-1	Pu	0.9 g/l	1.5	45 min.	Pu	1.3 g/l	
	Oxalate	0.13 M			Oxalate	0.06 M	
					HNO_3	4.7 M	
VK-2	Pu	1.85 g/l	2.3	104 min.	Pu	4.3 g/l	
	Oxalate	0.06 M			Oxalate	Not detected	
VK-3	Pu	0.8 g/l	2.1	86 min.	Pu	1.7 g/l	
	Oxalate	0.1 M			Oxalate	0.005 M	
	Mn+2	0.02 M			HNO_3	5.6 M	
					Mn+2	0.04 M	

DECLASSIFIEDRecuplex Solvent

Satisfactory extraction and stripping were obtained in experiments with the proposed solvent, dibutyl-butyl phosphonate in a tetrabromoethane-carbon tetrachloride diluent. Based on batch data, equilibrium diagrams for extraction and stripping have been drawn and operating lines have been estimated.

Higher aqueous to organic flow rates are possible in the extraction column and will result in a higher plutonium concentration in the organic effluent. The ratio of reflux to product volume necessary to attain the desired product concentration will be smaller by approximately one-third. Stripping has been found highly satisfactory with a solution: 0.05 M HNO_3 and 0.05 M $(\text{NH}_2\text{OH})_2\text{SO}_4$. A maximum concentration of 48 g/l was obtained. The reflux will carry some poorly extractable plutonium(III) to the extraction column which will have to be oxidized to plutonium(IV) by nitrite addition to the feed. Final product concentration will be limited by criticality considerations in the stripping column.

Ceramic Development

Difficulties in fabricating the four-place slip cast magnesia casting mold (CS-201) were overcome. The mold consists of a dish about 3" I.D. and 3/4" deep, to the bottom of which are joined four wells, symmetrically spaced, each about 7/8" I.D. and 2-3/4" deep. The mold, requested by the Finished Products Technology Operation, is for simultaneously casting four rods.

A standard H-4 magnesia pouring crucible was successfully coated externally with a layer of nickel about 1/32" thick. The coating was done by the Physical Metallurgy Operation using a Metco spray gun. It is planned to try the coated H-4 in production operation.

Several LS-105 tensile specimen and other crucibles were successfully slip cast of Glascast, a non-crystalline silica product of the Corning Glass Works, recommended for casting molds.

DECLASSIFIEDINVENTIONS

All Research and Engineering Operation personnel engaged in work that might reasonably be expected to result in inventions or discoveries advise that, to the best of their knowledge and belief, no inventions or discoveries were made in the course of their work during October, 1957, 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(s)Title

None

BUSINESS TRIPS AND VISITORS

R. E. Tomlinson, Manager Advance Process Development Operation visited the Oak Ridge National Laboratory, Oak Ridge, Tennessee on October 10 and 11, 1957 to review development program.

E. Hall of the Atomic Energy Commission, Washington, D.C. visited M. K. Harmon on October 4th to discuss the civilian application program.

R. D. Fletcher of the Idaho Chemical Processing Plant (Phillips Co.), Arco, Idaho visited M. K. Harmon on October 10th to hold technical consultation on gaseous waste disposal problems at Arco.

R. M. Edwards and W. C. Philoon of the Mallinckrodt Chemical Works visited R. E. Smith, M. J. Szulinski and E. R. Irish on October 8th to hold discussions on the UO_3 production methods and to tour the Purex plant.

George Quinn of the Division of Production, Washington, AEC visited R. E. Tomlinson on October 17th to discuss radioactive gas recovery.

Dr. R. P. Craig and R. E. Troeltzsch of the Dow Chemical Company, Denver, Colorado visited H. H. Hopkins, Jr., R. E. Smith, E. R. Irish, M. N. Raile, M. J. Stedwell, M. J. Szulinski and C. J. Berglund on October 14th and 16th to exchange technical information and tour the Purex plant.

F. C. Legler of the Atomic Energy Commission, Washington, D.C. visited E. R. Irish on October 1st to discuss instrument development.

R. E. Blanco, Hal E. Goeller and J. J. Perona of the Oak Ridge National Laboratory, Oak Ridge, Tennessee visited E. R. Irish on October 1st to tour Purex plant and ion exchange facility.

W. D. Decker, W. J. Ramsey, Max Harris, E. R. Wittry and Jim Jepson from the Livermore site of UCRL visited E. R. Irish on October 23rd to tour Purex plant.

Manager, Research and Engineering
CHEMICAL PROCESSING DEPARTMENT

VR Cooper:jap

EMPLOYEE RELATIONS OPERATION

October, 1957

UNCLASSIFIED

I. RESPONSIBILITY

There was no change in responsibilities during the month.

II. ACHIEVEMENTS

FIRE PROTECTION

A. Fire responses

There were no fire responses requested during the month. There was a fire loss of \$4,500 in the Department resulting from a fire in the Purex Operation.

B. Fire Extinguisher Service

During the month, 285 fire extinguishers were inspected, 3 installed, 3 delivered, 12 seals broken and not reported, 32 serviced and 220 weighed.

There were 28 gas masks inspected and 3 serviced, as well as 20 hand lines inspected.

C. Fire Prevention Month Activities

1. Fire protection personnel presented two 30-minute programs on "Fire Prevention in the Home", one in 200-E, and one in 200 W. These demonstrations were conducted in the open and all 200 Area employees were invited to attend.
2. Assisted in practice fire drills of all Non-Process buildings.
3. Furnished personnel to serve on inspection teams where requested.
4. Fire Protection officers conducted 17 talks and demonstrations with 352 personnel in attendance during the month.

D. Training of other personnel in other operations

1. Trained 17 evacuation bus drivers in proper bus operation and evacuation procedures.

E. Services performed for other operations

Flushed roadway at 19th RR crossing due to contamination in 200 W; checked all 200 area evacuation busses for cleanliness and heater connections; checked buildings 2704-E, 224-B, 222-B, and 271-B for fire and safety hazards; reset sprinkler system in 272-E building, and flushed gasoline spill at 2713-W.

COMMUNICATION**UNCLASSIFIED****A. Statistics**

GE NEWS Items	9
Priority Messages	4
General Manager's meetings with exempt employees	2
Management News Bulletins	7
Employee News Letter	1
Employee Location Records mailed out	69
CPD FAMILY NEWS	1

B. Comments on Statistics

Nine items were carried in the GE NEWS during the month. These included a story on the 100-200 Areas Circle Tour; two pictures with cut-lines regarding fire prevention week; an article listing the names of those employees who have received 15-, 10- and 5-year service pins -- a total of 40 CPD employees were listed; pictures and a story covering the CPD embossograph service to the HAPO Operation; an attendance award story; a service pin article; pictures and a story on CPD safety meetings; and a full-page feature on FPO's million-man hours without a disabling injury.

A letter, signed by the Acting General Manager, discussing the Department's position in the current layoff plan, was prepared and distributed to all employees at their work locations on Friday, October 4.

Four priority messages were prepared and initiated during the month. One concerned GE being assigned the engineering design of a large-scale reactor; two had to do with reduction of force statements in HAPO and CPD; and one was an announcement of a letter which was prepared for the Acting General Manager's signature and distributed to all employees concerning the reduction in force announcement.

The Acting General Manager was furnished with a list of items for discussion by the men who attended the Management Information meeting on October 17, and October 31.

The first issue of the FAMILY NEWS, which is now being published for CPD employees on a monthly basis, was prepared and distributed to employees' homes October 15.

C. Other Employee Communication Activities

Introductory material and a transmittal letter to be signed by the Acting General Manager were prepared for inclusion in the report on the Attitude Survey to be distributed to all employees November 1.

A letter was prepared to accompany sensitivity survey material sent to level 3 and 4 managers. In addition, Communication helped in the distribution of this material.

The Communication Specialist gave the first of a series of four talks on Communication to a group attending the new supervisory training course being conducted by the CPD Training Specialist.

Arrangements were made with the R & U artist to prepare a cover for a Compendium of Personnel Development Courses.

The CPD-IPD Family Tour was held on the weekends of October 19-20 and 26-27. Over 55 per cent of CPD employees participated in the tour. This included 549 CPD cars the first weekend and 409 on the second weekend, or a total of 958 cars, with each car averaging 4 persons. This means that about 3,800 entered the project on CPD tickets. Total attendance was 2,992 cars or approximately 12,000 people.

D. Public Communication

Necessary arrangements for three tours in CPD were made with the Manager, Purex. These included the tour by the visiting AEC Commissioners, the tour by Gen. K.E. Fields, and the tour by Under-Secretary of Labor, Milard Cass.

A request was received from Press Relations to coordinate an interview between R. F. Nowakowski of Tri-City Herald and the appropriate member of management regarding a statement by Gen. Fields of the AEC concerning future prospects for producing and marketing fission products. L. M. Meeker of the Production Operation agreed to serve as the CPD contact representative.

An advertisement pointing out civic participation by HAPO people appeared in local papers Friday, November 1. A member from CPD was submitted for and used in this ad.

UNCLASSIFIED

UNION RELATIONS OPERATION**UNCLASSIFIED**

Seven sessions of the Labor Relations Conference series were conducted during the month.

Seven grievances were processed at Step II during the month.

The Company was notified by the HAMTC that the steward lists for the Chemical Workers and Operating Engineers were again official and recognized by the Council. It is noteworthy that no situations arose during the difficulties within the Council which placed the Company in a compromising situation.

The Company has received no indication that the Council is intending to further pursue the Carlisle grievance at arbitration (dealing with routine checks on the continuous calciners in 224-UA Building).

	<u>October</u>	<u>September</u>
Bargaining Unit Employees in CPD	898	926
Bargaining Unit Employees utilizing check-off	599	620
Percentage of Total Bargaining Unit Employees utilizing check-off	66.7	66.95

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

	<u>Unit</u>	<u>Nonunit</u>
Grievances received year to date	124*	1
Grievances pending at Step II on 9-30-57	9	0
Grievances received during the month	8	0
Satisfactorily answered at Step I	1	0
Settled at Step I through expiration of 90-day time limit	6	0
Processed at Step II	8	0
Pending at Step II on 10-31-57	2	0
Pending at arbitration	1	0

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

EMPLOYEE COMPENSATION OPERATION

UNCLASSIFIED

The new organization for Power and General Maintenance was approved and placed in effect October 1, 1957. The changes principally consolidated the East and West General Maintenance work under one manager, placed Power Maintenance responsibilities under the Manager, Power, and made some changes in the Shops Control Operation. Several new positions were established, including: "Manager, General Maintenance" and "Supervisor, Shops Control", and five specific Foreman positions. Numerous position audits were performed, and a general "clean-up" of position titles was included for the organization. Deletion of five positions and ten title changes were involved.

The radiographer function in Final Inspection Operation of Finished Products Operation was found to meet FLSA exempt qualifications and, with the concurrence of Legal, was established as such under the title of "Specialist, Non-Destructive Testing", effective November 1, 1957.

The new position "Contact Engineer II (Provisional)" was established for Finished Products Operation for use in placing technical graduates off the rotational program.

To kick off the 1957 Appraisal-Salary Review program a letter of instructions summarizing the ground rules and schedule for preparation of appraisals was developed and issued. The schedule calls for completion and reporting of appraisals by November 25, 1957 and salary review recommendations by December 13, 1957.

The plotting of salary and appraisal history on the Salary Planning Worksheet continued with approximately 90% complete at month-end. These charts will be offered to managers for use in connection with the coming Salary Review.

We are participating in revisions to the "Position Evaluation Guide", "Position Description Guide" and in removal of Fire Prevention Operation positions from fixed rate status with other HAPO Salary Administration Operations.

Three secretarial jobs were reviewed for merit promotional purposes. Warranted promotional action was completed. One semi-technical job was reviewed in detail resulting in the determination that no change should be made in classification at this time. The appropriate classification was determined and established for a new clerical job in the Financial Operation and another clerical job is still in process of review.

Continued study of the Chief Operator question, particularly in respect to our situation vs. that in IPD, developed no additional information which would force a decision. The question remains at about the same status at month end for CPD. However, the Separations Chief Operator job was reviewed and the history of the classification investigated in connection with determining appropriate CPD action. The conclusions reached were that as a nonexempt job the presently established classification for the Separations Chief Operator is appropriate for the duties; that there is insufficient difference between this job and the Reactor Chief Operator job to warrant or justify having one classified higher than the other; and because both are borderline cases for exemption both should remain nonexempt.

The request for establishment of a new unit classification for ventilation balancing and control work was completed and forwarded with supporting information for necessary action, to the R&J Specialist, Salary and Wage Surveys. As of October 31, 1957, no definite information has been received relative to the exact status of this request.

The explanation of the HAPO nonexempt wage structure and its administration was completed and forwarded to the CPD Communication Specialist for his use in connection with CPD Round Table discussions.

Administratively papers were processed as listed in the statistical portion of this report. All discrepancies incident thereto were handled with supervision concerned.

ADDITIONS TO ROLL

	<u>Exempt</u>	<u>Nonexempt</u>
New Hires	-	0
Reactivations	-	1
Transfers From Other Departments	1	0
Reassignments from Exempt to Nonexempt	-	2
Reassignments from Nonexempt to Exempt	-	-

REDUCTIONS FROM ROLL

Terminations	1	5
R.O.F.	-	7
Deactivates and Leaves	1	3
Transfers to Other Departments or Divisions	2	21
Reassignments from Exempt to Nonexempt	2	-
Reassignments from Nonexempt to Exempt	-	-

CHANGE IN STATUS (NO SALARY CHANGE)

Intra-Departmental Transfers	9	64
Reassignments - Title Change	23	-
Level Changes - Increase	2	-
Level Changes - Decrease	-	-
Location Change	-	-

CHANGE IN SALARY

Promotions	6	10
Demotions	-	2
Merits - (Salary Review)	16	-
Merits - Interim	-	-
Automatics	-	25
Temporary Reclassifications	-	5
Salary Adjustments	-	-

REQUISITIONS	-	5
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SUGGESTION PLAN

UNCLASSIFIED

SEPTEMBER

OCTOBER

Suggestions Received	55	38
Acknowledgments to Suggestors	40	49
Suggestions Pending Acknowledgment	15	4
Suggestions Referred to Operations for Investigation	40	49
Suggestions Pending Referral to Operations	15	4
Investigations Completed and Closed	52	52
Adopted Suggestions Approved by Board	1*	0
Adopted Suggestions Pending Approval by Board	58	75
Total Net Tangible Savings	0	0
Total Cash Awards Paid During Month	0	0

In addition to the above suggestions there are 40 Board approved suggestions which are ready for payment.

*Adopted with no award. .

Total number of Suggestions outstanding to Operations at the end of the month.	193	156
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PARTICIPATION IN BENEFIT PLANS

SEPTEMBER

OCTOBER

Insurance Plan	99.8%	99.7%
Pension Plan	99.1%	99.2%
Stock Bonus Plan	58.2%	56.9%
Good Neighbor Fund	65.5%	63.5%

Two General Managers Information Meetings were held during the month of October with a total of 41 supervisory, exempt, tech grads, business grads, and chief operators in attendance.

UNCLASSIFIED

HW-53449 DEL

During October, one Chemical Processing Department employee was retired on normal retirement effective November 1, 1957. All matters pertaining to his retirement regarding Insurance, Pension Plan, Savings and Stock Bonus Plan, as well as Social Security, was discussed with him.

The Attitude Survey raw score data were distributed to 2nd and 3rd level managers during the week of October 14, 1957. 4th level data were distributed October 22, 1957.

The report to employees was completed and printed during October and will be distributed to all employees starting on graveyard shift November 6, 1957. An advanced copy to all exempt will be distributed on November 5, 1957. To date 19 Sensitivity Survey forms have been returned to this office.

MILITARY SERVICES RECORDS

1. Our records now reveal that C.P.D. has a total of 124 employees who are subject to military training through Selective Service or Armed Forces Reserve actions. They are categorized as follows:

	<u>Exempt</u>	<u>Nonexempt</u>
Ready Reserve	13	13
Standby Reserve	12	6
Non Veterans		
1A		13
2C	1	
3A	6	38
4F	8	2
1S		1
*Selective Service		
1A	0	0
2A	<u>11</u>	<u>0</u>
	51	73
	<u>124</u>	

2. Deferments

Deferments Requested (October)	2
Deferments Granted (October)	0
Deferment requests pending	5
Routine	5
Appeal	0

STATUS - PERSONNEL DEVELOPMENT PROGRAM FOR NONEXEMPT EMPLOYEES

<u>Month</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Total</u>
Number of appraisals scheduled	132	76	108	96	117	529
Number of delinquent as of 11-4-57	4	1	8	10	58	81

Individual contact in the form of letters or telephone calls have been made in attempt to expedite the completion of appraisals due for the months of June, July, and August.

PERSONNEL DEVELOPMENT AND PLACEMENT

UNCLASSIFIED

A. Employment

	<u>Exempt</u>	<u>Non-exempt</u>	<u>Total</u>
<u>Additions to Payroll</u>	3	8	11
Reactivates	0	2	2
Transfers into CPD	3	1	4
Changes from exempt to nonexempt	0	5	5
<u>Removals from Payroll</u>	9	44	53
ROF	0	7	7
Illness	0	4	4
Leave of absence	1	0	1
Transfers out of CPD	2	30	32
Resigned	1	3	4
E-5-C Not satisfied with wages	1	0	1
E-9-C Another job or position	0	1	1
E-24-C To seek another job	0	2	2
Changes from exempt to nonexempt	5	0	5
<u>Requisitions for Personnel (Non-exempt)</u>			
Number on Hand 10/1/57	9		
Number Received	5		
Number Filled	6		
Number on Hand 10/31/57	8		
<u>Requests for Transfer (Non-exempt)</u>			
Number on Hand 10/1/57	178		
Number Received	0		
Number Transferred	0		
Number on Hand 10/31/57	178		

Service Pins

A total of 42 pins were issued as follows:

15 Yrs. Service	0 Male	0 Female
10 Yrs. Service	27 Male	7 Female
5 Yrs. Service	8 Male	0 Female

Attendance Awards

UNCLASSIFIED

Pass folders were issued to 17 persons for perfect attendance as follows:

1 Yr.	4 Persons	4 Yrs.	3 Persons
2 Yrs.	6 Persons	5 Yrs.	3 Persons
3 Yrs.	0 Persons	6 Yrs.	1 Person

Twenty one inquiries in regard to credit references, records of employees, or other aspects of employment for CPD employees were answered during the month.

During October, CPD reduced its force by 29 non-exempt unit personnel that consisted of 23 crafts personnel, 5 separation utility operators, and one Chief Power Operator. ROF notices were given to one plumber steamfitter journeyman, two electrician journeymen, and five separation utility operators. One of the separation utility operators accepted a job as a painter in FPD in lieu of his ROF notice, the others in ROF status left CPD as LOW employees. The remaining 21 crafts personnel were transferred to other HAPO components and bumped out lower seniority employees in accordance with the HAMTC agreement.

Also during October an additional 13 crafts personnel were declared excess, their effective date for removal from CPD rolls will be November 8th. In addition to the crafts personnel, 10 non-exempt non-unit personnel have been declared excess; they consist of 4 clerks, 2 secretaries, 2 stenographers, 1 draftsman, and 1 graphic illustrator. The actual removal from the CPD rolls of these people will take place during November.

Four tests were given during October, they consisted of 2 Supervisor Selection Tests and 2 Stenographic Tests.

Requests for Transfer (Exempt)

Number on Hand 10/1/57	25	
Number Received	1	
Number Transferred	1*	*Transfer was not due
Number Closed Out	1	to a request
Number on Hand 10/31/57	25	
Number of Interview Trips	2	(One person was interviewed at two sites.)

Applications for Employment (Exempt)

Applications received during October	1
Hired	0
Closed Out	1
Invited for Interviews	0
Applications on Hand 10/31/57	0
Open Requisitions	2

Lists of persons available for other assignments were received at the first of the month and action started to find suitable positions for those personnel where names are known. At month end one person from FEO had been placed in HLO with no positive responses received on others referred to other Company locations.

B. Personnel Training and Development**UNCLASSIFIED**Participation in Training Courses - Monthly Personnel

Management Principles and Skills	16
Data Processing	4
Understanding People (Conant)	20
Labor Relations	66
PEM-I (Enrolled)	54
Value Analysis	9
Process and Equipment Orientation	2
Craft Training	15
Projectionist and Visual Aid Training	1
TOTAL	187

Participation in Training Courses - Weekly Personnel

Management Principles and Skills	24
Process and Equipment Orientation	14
Craft Training	51
Non-exempt Personnel Development	20
Projectionist and Visual Aid Training	6
Labor Relations	5
Secretarial and Steno-typist Training	52
TOTAL	172

G. E. Supervisory Selection Program - Number Completed	4
G. E. Supervisory Selection Program - Revaluation	3
Technical Graduates on Rotation	4
Technicians in Training	1
Employees counseled in self-development	2
Films Shown	19
OPGs Issued (One new, three revised)	4

A compendium listing of the major personnel development programs in the Chemical Processing Department was issued to all exempt people during October.

"Understanding People" was extended by one session to include discussion of personal test information as requested by both groups.

Part I of a new course, "Management Principles and Skills" was presented on four consecutive weeks to forty CPD new supervisors, chief operators, and group leaders. Part I consists of history, organization, and philosophy of the General Electric Company as well as safety and time card procedures.

Special work-shop training was given to two secretaries for the purpose of giving follow-up assistance and training as needed. The following day, two IBM proficiency training sessions were held for 50 secretarial and steno-typist personnel. The group reaction to this type of training was very favorable.

C. Office Services**UNCLASSIFIED**Duplicating

Orders on Hand 10/1/57	31
Orders Received	893
Orders Completed	891
Orders on Hand 10/31/57	33
Total Copies Produced	178,397
Embosograf Signs Made	265
Verifax Copies Produced	622
Ozomatic Copies Produced	15,699

Mail

Total Pieces of Mail Handled	59,413
Registered Deliveries	366
Library Mail, Pounds	624

Addressograph

Instrument Charts Imprinted	8,608
Management News Bulletin	3,600
Information Bulletin	826
Fire Prevention Pamphlets	826
Accident Prevention Bulletin	413
CPD Training Bulletin - November 1957	450
Rocky Flats Fire	62
Note to Level 4 Managers	62
Envelopes	62
CPD-OPGs	760

Sometime during the period between October 18 and October 29 the embosograf machine in 271-B Duplicating was used by an unauthorized person, or persons, to prepare a sign for an exclusion area badge house. Inexperience on operation of the machine caused damage to several pieces of type. The matter has been reported to the head of Security Patrol and a thorough investigation is underway.

Total production on the second can of Xerox developer reached 1768 masters, at the same time the production on the first can of developer reached 1374 masters. In an effort to obtain as many masters as possible, the two cans of developer were combined into one tray. As a result a marked improvement in the quality of masters was noted and some 97 masters have been made from this mixture. The total production for the two cans of developer has now reached 3239 masters. Prior to December, 1956, production average was 20 masters per can. On this date a study was started on the use of the developer and by thoroughly instructing operators on the use of the developer, the average has been increased to better than 1600 masters per can of developer. The two cans put into use during December are still producing satisfactory results. Unit cost per master has been reduced from approximately \$1 to \$.01½ each.

UNCLASSIFIEDHEALTH AND SAFETY OPERATION

<u>Chemical Processing Department</u>	<u>October</u>	<u>September</u>	<u>Year to Date</u>
Disabling Injuries	0	0	1
Serious Accidents	0	1	7
Medical Treatment Injuries	62	43	553
Overexposure Incidents	1	0	4
Potential Overexposure Incidents	0	0	3
Radiation Occurrences	31	25	277
Fires	1	0	15
Security Violations	2	2	27

Comments on Statistics

The overexposure incident consisted of the cumulative exposure of a Metal Finishing operator exceeding 3 r.

A fire was detected in protective clothing hampers in the 202-A Building Hot Shop following a torch heating job. Damage was \$4500.

A sharp increase was noted in medical treatment injuries; lack of attention was the prevailing cause.

Programs

Work was begun on preparation of CPD Radiation Control Standards.

A review of measurements in the area of health, safety, and security was started.

A CPD Million Man-Hour club was created to promote competition and recognize outstanding safety performance on a level three component basis. Finished Products Operation accumulated a million exposure hours without a Disabling Injury on October 25, 1957. GE News publicity was arranged.

The Fire Prevention Week program emphasized home fire hazards. Take-home pamphlets were distributed to all CPD people. GE News publicity featuring HAPO families and fire prevention practices was coordinated by CPD. Inspections, fire drills, displays, and safety meetings and fire demonstrations were promoted.

Training and Education

A Radiation Topic was issued for RM personnel summarizing four incidents in another department and pointing out the need for improvement in monitoring practices.

A one-hour meeting was prepared and conducted in Personnel Development's "Management Principles and Skills" Program. The Health and Safety portion was given four times; 39 people attended.

A Maintenance Safety Training Program was developed and conducted for level five personnel. The two-hour session was given three times; 38 people were present.

OFFICIAL USE ONLY

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Advice and Counsel

- Redox - Satisfactory testing of 276-S fire fog, heat detector devices, 804 enclosure fog system and detector devices and Silo Sample gallery heat detector devices.
Approved project proposal for additional fire protection for 222-S Building roof.
Proposed installation of a helium gas cylinder on 222-S hydrogen piping system to prevent flash backs from reduced hydrogen gas pressure.
Recommended locations and installation of spray booth, paint shop and oil storage.
Recommended changes in escape ladder hatch cover and installation of fire detector system in offices and cable ways in 202-S Cable Room.
- Purex - Approved request to omit Operations Lock and Tag requirement for calibrations of the Flow Transmitters demi-valve Manifold by Instrument Service group.
- Finished Products - Advised against eliminating safety glass rule for 221-U P & O gallery.
Recommended the task 9-B and adjacent area be cleaned up to reduce fire potential.
Recommended improved use of steam hoses in 224-UA Building.
- P & GM - Recommended wearing of hard hats in mock-up cell of 277-W Building.
Issued letter of justification for installation of oxygen-acetylene piping systems in 277-W and 272-E Shops.
Denied approval to Stores, Excess, to fall Y Plant high tank; approved removal after supervisory responsibility reassigned to Maintenance.
Recommended provision of scaffold midrail instead of rope railing in Shops.
Recommended use of liquid CO₂ in shop machining.
- Facilities Engineering - Information letter issued to supervision on exposure data available.
Favorable opinion given as to tentative concepts for new regulated railroad repair program.
Excavation work by contractor under electrical power lines.
Approved modification drawing H-250434 of project CG-770 for 234-5 roof ladder.
- Financial - New Chapter 0550 AEC Manual reviewed. Recommendation - not suitable for compliance in radiation protection.
- Employee Relations - Letter issued to off-site installations requesting information for use of work restriction policy task force.
- General - Sprinkler system inspection record forms were designed and prepared for use by the Services Operations.
Controlled issue of assault masks with non-fog devices for outside use.

Advice and Counsel**UNCLASSIFIED**

General - Approved Mechanical Standard M-4-4 support for Dump Bed Truck.
Advised Exposure Records and Evaluation Operation, HLO, as to
desired content of IBM-processed internal exposure reports.

Inspection, Investigation and Audit

The Construction Engineering Operation Radiation Protection Manual was reviewed, preparatory to assumption by CPD of construction monitoring responsibilities. No changes were found necessary.

An inspection of 234-5 Building was made with HOO and the Washington, D. C. AEC Fire and Safety Representatives. Improved housekeeping is desired in this location.

An informal fire investigation was made in 202-A Building.

Trolley hoists were inspected in 202-A Building; trolleys will be strengthened by provision of tie bolts on the weight bearing steel plates.

Made spot check inspection of pick-up trucks for possible leading gas tanks located inside the cab. No leaks were found.

Reports Issued

None.

II. ORGANIZATION AND PERSONNEL

UNCLASSIFIED

1. Meetings

Employees of the Employee Relations Operation attended over a hundred meetings during the month. These included staff, information, safety and security meetings as well as conferences with their counterparts in other departments.

The Specialist, Safety and Fire Prevention, went on an information tour of the Phillips Chemical Plant with other HAPO Safety Specialists.

A demonstration of Heat Detection Devices conducted by the Pyrotronics Company was also attended.

The Manager, Personnel Development and Placement, attended the Western Regional Conference of the American Society of Training Directors in San Francisco.

The Specialist, Communication attended a two-week 'Communication Workshop' course in New York City.

2. Safety and Security

Employee Relations Operation experienced no medical treatment injuries during the month.

3. Personnel Activities

Fire Protection Operation personnel participated in 41 outside drills, 58 inside drills and 490 man hours were spent in training. There was 5,355 feet of hose used and 634 feet of ladders used.

C. J. Sheeran, Acting Manager
Employee Relations

END

**DATE
FILMED**

12 / 14 / 92