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This document consists of
106 pages.

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
FOR
SEPTEMBER, 1957

HW--52864-Del.

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Compiled By
OPERATION MANAGERS

October 22, 1957

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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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

SEPTEMBER, 1957

GENERAL SUMMARY

PRODUCTION

As a result of high production during August, which was accomplished by reducing the normal feed inventory, the production of plutonium in the separations plants during September was 88% of the monthly commitment. The production of plutonium in the separations plants during the first quarter of fiscal year 1958 exceeded the quarterly commitment.

September production of UO_3 was 99% of the monthly commitment and production during the first quarter of fiscal year 1958 was 98% of the quarterly commitment. Offsite shipment of UO_3 remained ahead of the shipping schedule.

The production of fabricated plutonium cores met both the monthly and the quarterly commitments. Production of unfabricated plutonium metal was 97% of both the monthly commitment and the quarterly commitment.

ENGINEERING

Mechanical work on the prototype anion exchange unit at the Purex Plant was essentially completed. The unit is now ready for initial shakedown operation with nitric acid circulation.

Nitric acid concentrations approximating those from the UO_3 plant and Redox recovery systems were studied for their effect upon the dissolver capacity of Redox plant. The recovered acid streams should permit dissolver operation at 145 - 150 percent of Phase II rates (updraft system) or 185 - 190 percent (downdraft system).

Improved continuity of operation of the continuous calciners has resulted from installation of wet type filters on the off-gas systems. Further gains in continuity of operations are anticipated from more durable agitator arms. A new design arm has been conceived and is being fabricated for prototype testing.

The prototype equipment for fabricating Model 65 parts was advanced to a point permitting successful demonstration on aluminum. The equipment is considered to be reliable and capable of producing machined parts to the close tolerances required with a minimal amount of operator skill.

A scheme for the regeneration of depleted silver reactors from the iodine removal system has been defined. Potassium cyanide solution (190 gals/Redox reactor) will remove the degenerated AgI , AgNO_3 from the packing. Subsequently a new AgNO_3 coating can be applied to the packing. Extended usefulness of in-storage and in-service reactors will result from reduction to practice of this approach.

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GENERAL

On September 6 the second Department Safety Council Award was achieved, gifts were selected and ordered.

The Superior Court hearing on the arbitrability of the Wonacott (radiation monitoring jurisdiction) grievance was held on September 25. The Court's opinion was that the matter was arbitrable under the provisions of the HAMTC-GE contract.

The present situation in the HAMTC, with the chemical workers and Operating Engineers banned from Council activities, placed the Company in a hazardous position with respect to administration of the grievance procedure. The removal of stewards of the locals as agents of the Council left the two groups without steward representation.

The local AEC office approved the 100-200 areas Circle Tour. Dates for the tour are October 19-20 and 26-27.

CPD's portion of the spare parts inventory at August 31, 1957, represents 51% of the HAPD total as compared with 58% at the time of decentralization.

The recent modification of craft trainee progression schedules to permit a beginning rate at the 27 month level, for those so qualified, has raised considerable question in CPD as well as in the other components. The principal problem raised is the proper date to effect the change. Several operations feel it should be retroactive to date of employment if the evidence of tests then conducted shows the trainee was qualified.

In this regard the question of nonreimbursability has been raised since there is the possibility that to place the schedules in effect retroactively would not be covered by Appendix "B". An investigation as to the proper date to place the schedules in effect is under way, with resolution expected in 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

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CHEMICAL PROCESSING DEPARTMENT
NUMBER OF EMPLOYEES
SEPTEMBER 30, 1957

OPERATION	EXEMPT		OTHER		TOTAL	
	8-31-57	9-30-57	8-31-57	9-30-57	8-31-57	9-30-57
GENERAL MANAGER'S GROUP	10	10	1	1	11	11
PRODUCTION	7	7	4	4	11	11
PUREX	44	44	251	247	295	291
REDOX	55	53	294	294	349	347
FINISHED PRODUCTS	56	56	327	319	383	375
POWER AND GENERAL MAINTENANCE	46	46	251	249	297	295
FINANCIAL	22	22	48	48	70	70
FACILITIES ENGINEERING	79	79	27	25	106	104
RESEARCH AND ENGINEERING	65	64	24	24	89	88
EMPLOYEE RELATIONS	31	31	55	55	86	86
	415	412	1282	1266	1697	1678

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CHEMICAL PROCESSING DEPARTMENTPATENT SUMMARY
FOR
MONTH OF SEPTEMBER, 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.

INVENTORTITLE

A. Brunstad

Solvent Density Increasing Agent

R. A. Ciccarelli and
R. A. KennedyA Valve with Remote Removal of all
Operating Parts ACTING GENERAL MANAGER
CHEMICAL PROCESSING DEPARTMENT

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CHEMICAL PROCESSING DEPARTMENT
PRODUCTION OPERATION

September, 1957

I. RESPONSIBILITY

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

II. ACHIEVEMENTA. Production Statistics

The production of plutonium in the separations plants was 88% of the monthly commitment as a result of high production during August, which drew from the normal feed inventory. The increased August production in the separations plants enabled more uniform feed deliveries to be made to the fabrication facility. The production of plutonium in the separations plants during the first quarter of fiscal year 1958 exceeded the quarterly commitment. At the end of the month the Redox Plant was shut down for routine equipment flushing and building maintenance.

Although mechanical difficulties seriously hampered the operation of the continuous calciners the production of UO_3 was 99% of the monthly commitment. Production of UO_3 during the first quarter of fiscal year 1958 was 98% of the quarterly commitment. Shipment of UO_3 continues to remain ahead of the shipping schedule.

The production of fabricated cores met the monthly commitment, while the production of unfabricated plutonium metal was 97% of the monthly commitment. Difficulties associated with the start-up of the continuous Task I and II equipment caused a reduction in the output of buttons. For the first quarter of fiscal year 1958, the production commitment for fabricated cores was met and the production of unfabricated plutonium metal was 97% of the commitment.

1. Purex Operation

	<u>September</u>	<u>August</u>
Tons uranium delivered to storage	263.54	433.38
Average production rate per operating day (tons)	13.5	14.4
Average yield, %		
Uranium	96.2	97.7
Plutonium	96.4	100.5
Total Waste Loss, %		
Uranium	0.31	0.21
Plutonium	0.69	0.57
Average cooling time (days)	112	115
Minimum cooling time (days)	105	107
Percent operating time	65	96.8

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2. Redox Operation

	<u>September</u>	<u>August</u>
Tons uranium delivered to storage	219.5	153.2
Average production rate per operating day (tons)	9.0	7.4
Average yield, %		
Uranium	100.7	100.1
Plutonium	108.3	101.0
Total Waste Loss, %		
Uranium	0.10	0.09
Plutonium	0.42	0.39
Average cooling time (days)	114	113
Minimum cooling time (days)	105	104
Percent operating time	80.9	66.6

3. 234-5 Operation

	<u>September</u>	<u>August</u>
Batches completed through Task I	476	421
Batches completed through Task II	470	398
Runs completed through Task III	214	205
Reduction yield, %	98.34	97.84
Waste disposal (units)	536.62	494.26

4. UO₃ Operation

	<u>September</u>	<u>August</u>	<u>To Date</u>
Uranium accepted (tons)	543.86	452.96	22,497.43
Uranium shipped (tons)	544.92	506.29	22,350.56
Average cooling time (days)	120	119	
Minimum cooling time (days)	111	110	

5. Power

	<u>200 East</u>	<u>200 West</u>
Raw water pumped, gpm	7,915	4,925
Filtered water pumped, gpm	1,041	862
Maximum steam generated, lbs/hr.	217,000	111,000
Average steam generated, lbs/hr.	120,480	84,070
Total steam generated, M lbs.	86,746	60,836
Coal consumed, est. (tons)	5,466	4,079

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6. Waste Storage

	Equivalent Tons U	
	Sept.	Aug.
Salt waste reserve storage capacity-Redox	7,851	7,976
Salt waste reserve storage capacity-Purex	7,677	7,717
Coating waste reserve storage capacity-Redox	15,822	16,042
Coating waste reserve storage capacity-Purex	13,033	13,298

B. Production Planning and Scheduling Operation

An extension of the present UO_3 shipping schedule which expires on December 20, 1957 was prepared. Figures were provided which extend the schedule through June, 1958 for presentation to the AEC during the coming Planning Meeting in Washington, D. C.

A question has arisen out of a communication from the Washington, D. C. AEC office which indicated that consideration is being made to zero out excess UO_3 shipments which existed at the end of the May, 1957 shipping period. This would not be in agreement with the existing agreement with HOO-AEC whereby excess deliveries will apply toward meeting the over-all shipping requirement. The matter is under consideration by HOO-AEC.

Scavenging continued during the month with feed supplied from B Farm. Processing of Evaporator Bottoms (remnants of T Plant first

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cycle and early TBP wastes) was started in latter August and results to date have been only moderately successful. The major obstacle has been inability to pump the waste from storage tanks to 241-CR.

Reclaimed storage since scavenging was resumed in March, 1957 has now reached 4,967,550 gallons, of which 864,000 gallons were recovered in September. Remaining wastes in East Area to be scavenged comprise approximately 3,000,000 gallons, excluding Purex start-up salt waste, of which only 2,200,000 gallons are estimated to be recoverable.

During August the self-concentration of Purex waste in Tank 103-A continued at a fast rate; however, the net increase in storage was zero due to the addition of 333,000 gallons of water to maintain the liquid level above the bottom circulators. Total water additions since last February have been 1,372,000 gallons. Self-concentration in Tank 101-A increased to 183,000 gallons which discounted 84% of the waste received during the month. Total self-concentration in A Farm since inception in July, 1956 amounts to 2,657,000 gallons (65.1% of total Purex waste currently stored in A Farm) as compared to 4,024,000 gallons (33.1%) reclaimed at SX Farm where self-concentration started in November, 1954. Water additions amounting to 116,000 gallons (total to date - 321,000 gallons) were also made to three SX tanks.

Because of low salt waste volumes per unit processed and the significant effects of self-concentration, it was possible to store Purex salt waste generated from approximately 3776 TU in Tank 103-A (vs. an estimated capacity of 3968 TU at 8 M sodium ion) before routine to Tank 101-A on 6-26-57. As of September 1, Tank 101-A had received salt waste from approximately 1055 TU processed. In comparison, Redox salt waste from approximately 783 TU, 862 TU, and 893 TU processed had been contained in Tanks 101-SX, 104-SX, and 107-SX (still active) respectively.

There were no further developments relative to uncovering the cause for the intermittent downward trend in Tank 105-SX. Last month it was suggested that the 26,000 gallons loss since January might be explained by evaporation and/or shrinkage as the elevated temperature dropped (165° F in January vs. 130° F in August). It was further concluded that should this be the situation, it would be reasonable to expect additional losses until the temperature stabilized. Significantly, both the liquid level and temperature remained constant during the past two months.

During the month an economic study was initiated to evaluate feasibility of continuing the waste scavenging program. Using past six months performance of the separations plants as a guide and assuming no further scavenging, the following estimated need dates for new tank farms were established:

<u>Plant</u>	<u>Type Waste</u>	<u>Need Date</u>
Redox	Salt	11-1-61
Redox	Coating	4-1-71

<u>Plant</u>	<u>Type Waste</u>	<u>Need Date</u>
Purex	Salt	1-1-66
Purex	Coating	3-1-63*

* By storing Purex coating waste in West Area, the need date would be delayed several years.

On the basis of the information developed, it was concluded that scavenging in East Area should be completed but that the situation should be reviewed again before starting on wastes stored in West Area.

C. Essential Materials

The following is a resume' of the savings on essential materials realized during the first year of operation of the Chemical Processing Department:

1. \$5,869 by receiving caustic soda via the most economical carrier. Tank trucks were utilized from January through July of 1957. Rail tank cars provided the most economical transportation during August, 1957 and September through December of 1956.
2. \$270 by volume ordering ferrous sulfamate solution.
3. \$1,386 by buying ferrous sulfamate solution in 30 gallon drums instead of 15 gallon drums.
4. \$8,304 by buying as much nitric acid as possible in the first year of the three year contract.
5. \$664 by the re-scheduling of various chemicals prior to a 7 percent rail increase which was effective August 26, 1957.
6. \$526 by initiating bulk purchases of propane.

D. Statistics and Reports

During the month preliminary plans were established to coordinate the work in the Department in compiling data for the HAPC Annual Report for 1957.

Efforts continued in assisting and coordinating the issuing of SS Material Management Procedures Manuals in the Department. The Manuals have been issued by four Operations. The two remaining Operations have the Manuals essentially complete.

A study was initiated during the month to determine the approach to be used in reducing the book-physical inventory differences which have been experienced in the Department.

E. Reports and Documents

1. Prepared and Issued

HW-52354 Essential Material Consumption - August, 1957 -
Purex Plant, M. A. Thress

HW-52355 Essential Material Area Report to Cost and
Purchasing - August, 1957, M. A. Thress

HW-52356 Essential Materials Ordered, D. E. Peterson

HW-52357 UO₃ Plant Production Schedule - September, 1957,
B. F. Campbell

HW-52358 234-5 Building Production Schedule - September,
1957, B. F. Campbell

HW-52359 Redox Plant Production Schedule - September, 1957,
B. F. Campbell

HW-52360 Purex Plant Production Schedule - September, 1957,
B. F. Campbell

HW-52419 Purex Plant Production Schedule Rev. 1, September,
1957, B. F. Campbell

HW-52414 Chemical Processing Department Waste Status
Summary for August, 1957, R. E. Roberts

Undocumented 234-5 Building Production, September, 1957,
B. F. Campbell

Undocumented UO₃ Shipping Schedule - FY 1958, B. F. Campbell

HW-52790 Scheduled Shutdown of Redox Plant, V. R. Chapman

HW-52855 Low NGS Retrofit Program, V. R. Chapman

2. Prepared for Signature and Issuance

HW-52348 Production - August, 1957, W. E. Johnson

III. ORGANIZATION AND PERSONNEL

A. Force Summary

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

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B. Safety

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

C. Security

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

D. Training

Two exempt employees enrolled in the Professional Business Management I course during the month.

E. Visits

J. H. Warren gave a talk at the Northwest Shippers Advisory Board meeting in Spokane, Washington on September 20, 1957

L. M. Meeker visited Battelle Memorial Institute; Stewart, Dougall and Associates; and Arthur D. Little, Inc. during the week of September 23. These agencies were asked to consider undertaking a survey program to determine the potential markets for all types of irradiation sources.

J. H. Warren attended a feed material meeting in Washington, D. C. on September 26 and 27. Mr. Warren also visited the General Engineering Laboratory at Schenectady on September 30 and October 1 for the purpose of discussing in-line instrumentation and data processing between KAPL and Hanford.

V R Chapman
Acting Manager
PRODUCTION OPERATION

CHEMICAL PROCESSING DEPARTMENT
PUREX OPERATION

September, 1957

I. RESPONSIBILITY

The Purex Operation accepted responsibility for the "A" Plant Off-Gas Treatment Facility (Project No. CG-647) on September 16, 1957.

II. ACHIEVEMENT

A. Processing Experience

1. Normal Processing

The operating period for the month began on September 11, when virgin feed was introduced to the first extraction column at a 1.44 capacity factor rate. The production rate was increased to 1.92 CF on September 23, and again to 2.16 CF on September 26, 1957. Processing at the 2.16 capacity factor rate was somewhat unstable initially as the limitations of some equipment pieces were approached. However, after process flow revisions were made and operation techniques were further developed the process stabilized. At this high production rate the partition cycle 1A column is near its volume capacity and the extractant rotameter to the partition cycle 1B column is at the limit of its range.

The first two batches of plutonium produced after startup were high in gamma activity and were shipped to Recuplex for processing. The gamma activity in the plutonium product decreased rapidly to normal and subsequent batches of plutonium were within specifications. All uranium product was within specifications. Product losses to waste were 0.31 percent and 0.69 percent for uranium and plutonium, respectively. Approximately 0.11 percent of the plutonium loss is attributable to equipment flushes conducted during the scheduled outage at the first of the month.

Production for the three month's period ending September 30, exceeded the commitment by 3.4 percent. On-line efficiency for the month was 65 percent.

Coating waste solution from the first batch of metal in A dissolver after the shutdown at the beginning of the month was high in uranium and plutonium. The cause of this high waste was traced to leakage of about 500 gallons of nitric acid into the dissolver and the resultant dissolution of a portion of the metal heel. The high coating waste solution was transferred by special cell jumpering to a metal solution receiver tank (D-3) and held for special processing later in the month.

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On September 17, the coating waste line to tank 241-C-104 plugged between 153-CR diversion box and the tank, necessitating the transfer of coating wastes to tank 241-A-103 on a temporary basis. On September 26, jumper changes were completed to route coating waste to tank 241-C-105 and solvent wash solutions to tank 241-A-103.

Thirty-four trailer loads of UNH solution were delivered to 224-U during the period and thirty-two loads of recovered UO_3 acid were received.

2. Special Processing

During the scheduled outage at the beginning of the month the dissolver metal heels were removed, resulting in the production of 2200 gallons of off-standard metal solution. This material was isolated and subsequently processed without incident by blending with normal metal solution batches.

The high product coating waste solution collected from A dissolver when nitric acid leaked into the dissolver during the scheduled outage, was recovered by blending with virgin feed batches. No adverse process conditions were evident as a result of processing this material.

A batch of waste collected from a flush of the final plutonium cycle 2B column during the shutdown was reworked by intermittent small additions to virgin feed batches. The rework of this material caused a two- to three-fold rise in gamma activity in the intercycle feed streams but no appreciable increase in product losses.

During the shutdown, routine chemical flushes were performed in the solvent treatment, final uranium cycle, and final plutonium cycle equipment to remove any buildup of fission products, product materials, and extraneous solids. A special flush of the first and second waste concentrators was conducted to restore the heat transfer coefficient of the steam tube bundles which was impaired by material collected on the process side tube surfaces.

Fifty-seven cans of plutonium recycle material from 234-5 building were processed; this represented approximately seven percent of the Purex production for the month. Analysis of the recycle material continues to be biased in favor of Z Plant.

B. Radiation Experience

1. Radiation Occurrences

Seven radiation occurrences were incurred during the month. Significant occurrences were:

Contamination ranging from 5 to 20 rads/hr. was spread in the crane-way, canyon, railroad tunnel, and on the remote crane and railroad right-of-way during burial of two failed waste concentrator tube bundles.

A backup of fission product contamination into the recycle hood from the floor drain header caused an increase in the radiation intensity in the hood and resulted in uncontrolled exposure to process operators. No overexposure to personnel resulted. The floor drain was sealed to prevent recurrence.

A process operator entered the railroad tunnel in violation of procedures for respiratory protection. The potential for inhalation of fission products was negligible as air samples taken immediately after the incident revealed the concentration of contamination to be below mask levels.

A speck of contamination measuring 4 rads/hr. was found in the laboratory counting room. No skin contamination or exposure to air-borne contamination was associated with the incident.

2. Iodine 131 Emission

A total of 3.33 curies of radio-iodine were emitted from the stack during the period for an average rate of 0.11 curies per day. The maximum emission in a 24-hour period was 0.35 curies.

3. Personnel Exposure

Thirteen cases of skin contamination were incurred during the month, three of which were radiation occurrences. The maximum levels of contamination involved were 30,000 d/m fission products and 2,000 d/m plutonium. All cases were readily decontaminated.

Personnel dose rates to 1 rad/hr. were encountered during decontamination of the recycle and vessel vent sampler hoods. Surface contamination in the recycle hood was reduced from 20 rads/hr. to 15 mrad/hr.

Two thermohms were replaced in the plutonium concentrator package at a maximum dose rate of 250 mrad/hr. Floor and sump contamination of 20 rads/hr. was encountered during the maintenance work in the cell.

A diaphragm operated valve was replaced in the "B" cell off-gas (donut) jumper. Personnel dose rates ranged from 400 to 3,000 mrad/hr. for the decontamination, shielding, and maintenance work.

The 241-A Tank Farm vapor condenser and associated piping were uncovered prior to the removal of a section of the piping for corrosion analysis. Personnel dose rates of 250 mr/hr. at six inches were encountered to excavate and to 6 rads/hr. to remove the section of piping.

The results of the radiation profile measurement of the 101-A and the 103-A waste tanks made in August indicate maximum radiation

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measurements of 15,000 r/hr. and 23,000 r/hr., respectively. The complete profiles can be found in document HW-52504.

Radiation measurements made at the 293-A dissolver off-gas treatment facility indicate no exposure problems in either the absorber or scrubber cells.

4. Contamination Experience

A general fallout from the Nevada tests deposited low-level contamination over the entire area late in the month. No contamination control problems resulted.

Decontamination efforts in the areas affected by the general contamination spread which occurred during the burial of the failed F-6 and F-11 tube bundles were continued throughout the month. The results of the progress is as follows:

- a. The railroad cut was decontaminated by excavation and flushing. Ground surveys are equivalent to background.
- b. All smearable contamination has been removed from the railroad tunnel and fixed contamination has been reduced to a maximum of 25 mrad/hr. The major portion of the area affected has been repainted.
- c. The canyon was restored to its former status.
- d. The craneway was restored to its former status with the exception of spotty contamination of 1.6 rads/hr. in the extreme east end of the craneway.
- e. The bulk of the high-level contamination was removed from the crane. General levels of 200 to 1,000 mrad/hr. are still encountered with isolated areas still contaminated to 10 rads/hr. Decontamination efforts are continuing.
- f. Most of the railroad right-of-way has been decontaminated. Contamination which varied from 200 to 80,000 c/m was reduced 50 percent by flushing with water, using a specially equipped tank car.

C. Mechanical Experience

1. Sodium Nitrate Makeup Tank

Three leaks were repaired on the bottom of the sodium nitrate makeup tank after one leak was discovered emitting a stream approximately 1/4" diameter. The badly corroded areas were repaired by sawing out 3" diameter coupons and welding in replacement inserts. Internal inspection of the tank revealed severe corrosion attack to approximately 20 percent of the tank bottom, and no evidence of corrosion to the tank sides.

The results of inspection, together with coupons, have been submitted to the Facilities Engineering Operation for study and recommendations.

2. K-1 Pump

The final uranium cycle feed pump (K1) was replaced with a spare on 9-17-57, due to excessive leakage (about 38 gallons in 24 hours) from the upper vapor seal. Replacement of the defective pump was made during a short shutdown of the final uranium cycle; the remainder of the process continued normal operation. The defective pump will be decontaminated and repaired.

3. Third Party Inspection

Third party inspection of Purex elevators (AMU and PR) and the remainder of unfired pressure vessels has been completed for the FY-1957 with no unusual findings reported.

4. Canyon Supply Fan #SF-1

Unusual and excessive bearing noise in the 75 HP motor noted during a weekly motor inspection necessitated a scheduled shutdown of the #1 canyon supply fan for repairs on September 27. The bass retainer cage assembly of the outboard bearing was found sufficiently loose to permit the ball retainer cage to contact and wear on the outer bearing race. The damaged bearing was replaced and the unit has since operated satisfactorily.

5. F2 Heater and Reactor

During the scheduled building shutdown, a reconditioned and modified off-gas steam heater was installed on the vessel and condenser vent system in F cell in place of the inoperative unit (steam leaks to process side). The F cell silver reactor was then given a partial regeneration.

6. Steam Tube Bundle Tests

The two acid concentrator steam tube bundles (F6, F11) and the two plutonium concentrator bundles (L3, L4) were submitted to a routine hydrostatic test and no leakage was observed. The prototype titanium bundle installed in the L4 position has been in service for five months. Previously installed units of stainless steel construction failed after six weeks to two months service.

7. 2D Column Interface Instrument

Following satisfactory demonstration of a float type interface instrument in the #1 organic decontamination column (I0), a similar unit was installed in the final uranium 2D column. Interface detection in this column has since been very satisfactory. Operation of the new unit is superior to the old capacitance probe instrument.

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8. 241-A Waste Farm Vapor System

In July leaks developed in the de-entrainer vessel in the off-gas vapor line from the underground waste storage tanks. To further define the corrosion problem in the vent system, the 241-A-412 condenser and vent pipe were audigauged. These pieces of equipment were determined to be free of excessive corrosion. A four foot section of piping was cut out of the vapor line from the 412 condenser and a new section, equipped with a water flush assembly, was installed in its place. The water spray will be used to flush out condensate and foreign matter from the vent piping. The old section of vent pipe is being held for corrosion inspection.

D. Analytical Control Experience

Routine analytical control operations in support of the plant operation were conducted without major difficulty during the month.

Special studies were made during the period on a number of problems, among them the analysis of E3-A recycle material from Finished Products Operation. Work completed on this problem, with samples exchanged between the two laboratories, shows that the analytical accuracy obtained by both laboratories is well within the expected analytical range limits. A report has been issued on this investigation.

Assistance has also been rendered on the potassium permanganate treatment step for solvent decontamination in the #1 solvent system. Samples of potassium permanganate were analyzed, and the permanganate treated solvent was tested by the plutonium retention method.

Work was initiated on establishing a satisfactory method for determination of nitrates and nitrogen oxides in the off-gases from the underground waste storage tanks and from the I₁₃₁ backup scrubber in the dissolver off-gas treatment facility.

E. Improvement Experience

1. Process Tests and Revisions

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

With the start of operations on September 11, a new, dual chemical treatment scheme was placed in operation for decontamination of the spent #1 organic solvent. Potassium permanganate (0.32 M) was added to the IO column feed tank (G1) on a continuous basis, and the normal 2½ percent sodium carbonate solution was continued in use in this tank and in the column. The addition of permanganate improved the decontamination efficiency of the organic cleanup system five-fold.

An acid flush of the final plutonium cycle (2B) column conducted

during the shutdown yielded only 50 units of plutonium as compared to an average of 1.5 Kg's obtained from previous flushes. The decrease in plutonium holdup in the column is a result of a test initiated in July to prevent plutonium polymer formation by increasing the acidity of the column's extractant stream from 0.01 M to 0.15 M nitric acid.

2. Inventions and Discoveries

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

F. Events Influencing Cost

While operating at rates above 1.44 CF, it is necessary to operate both G cell centrifuges to obtain the desired residence time and to maintain flows within the capacity of the piping from the #1 organic (IO) column. Accordingly, when one centrifuge is down for a routine cleanout, the organic and carbonate solution flows to the column must be decreased. At rates in excess of 1.92 CF it is extremely difficult to control flows and, as a result, solvent may be lost through the IO column vent to the vent collection tank (F18). Approximately 2500 gallons of organic were lost in this manner during the month. Recovery of this material is considered impractical with present equipment. Modified procedures are expected to aid in control of this loss.

The price of nitric acid and caustic soda was reduced sixty-eight and five cents/100 pounds, respectively, effective September 1, 1957. Based on average consumption rates for the past three months, the resulting September savings will be \$2600.

G. Plant Development and Expansion

1. Off-Gas Treatment Facility (CG-647)

A "hot" startup of the Off-Gas Treatment Facility was made with the B dissolver in operation on 9-9-57. Minor difficulties with the pH monitoring system, and plugging of the nitric return line and the caustic supply line were corrected and two runs completed.

The second (A) dissolver was placed "on stream" 9-19-57, and operating data is being accumulated as a basis for establishing a permanent flowsheet.

III. ORGANIZATION AND PERSONNEL

A. Safety

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

On September 5, a serious accident occurred when several hundred gallons of acid were inadvertently blown from an acid line on which maintenance work was in progress. Fortunately no injuries were experienced as a

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result of this accident. CPD Serious Accident Report #57-7 was issued following the formal investigation of the incident.

B. Security

There were no security violations during the month.

C. Personnel Activities

Effective September 11, C. A. Lorenzen, Specialist, Product and Material Handling, Redox Operation, was transferred to the Purex Operation and assigned to the position, Supervisor, Processing Operation, replacing J. E. Rice, who was transferred to the Redox Operation.

W. M. Wilbur, Engineering Assistant, completed three month's rotational training in the Analytical Control Laboratory on September 13, 1957.

Seven Purex managers and specialists are attending the Professional Business Management I course, which began during September.

MANAGER
PUREX OPERATION

OC Schroeder:JCG:gt

CHEMICAL PROCESSING DEPARTMENT
REDOX OPERATION

SEPTEMBER, 1957

I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Processing Operation

1. Production Rates and Operating Continuity

Processing operations for the Redox Facility were maintained at nominal rates during the scheduled operating periods. Operating continuity was interrupted on three occasions during the month due to equipment failures. On 9-5-57 and 9-6-57 a 29 hour shutdown was taken to replace the F-1 and D-14 pumps and on 9-7-57 a five hour shutdown was necessary to unplug the ANN chemical addition line to the F-1 tank. The process was again shut down for a period of 13 hours on 9-14-57 in order to make a second D-14 pump replacement. The original D-14 pump replacement on 9-6-57 was made with the glass bearing F-1 pump which was replaced on 9-5-57. This installation was made because the required flow in the D-14 position is considerably less than that required for the F-1 position, and because it was felt that the leak, which was past the throttle bushing, would have a beneficial effect in preventing any bearing seizure in the D-14 position. However, this experiment was not successful because the leak was excessive and prevented the pump from producing the required head to pump the solution to the top of the column. The second D-14 pump replacement was made with a graphite bearing pump.

The mechanical efficiency for the periods during which the facility was scheduled to operate was 93% while the over-all operating efficiency for the entire month was 81%. The production commitment for the month was exceeded by 9%.

All UNH produced during the month was within shipping specifications; however, seventeen batches with excessive gamma activity had to be ozonated and nine of the seventeen required processing through silica gel to meet shipping specifications. All plutonium produced, except five PR cans, was within specifications. The five PR cans were slightly above gamma specifications, but were shipped to the Finished Products Operation for blending with low gamma activity material. The inadequate decontamination performance resulted from interface upsets in

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the 1A and 3A columns, several processing interruptions, and difficulties in controlling the acidity of backcycle streams. Waste losses for the month were normal and amounted to 0.33% of the total plutonium produced and 0.05% of the total uranium production.

The dissolvers were in operation all but one day of the month processing metal with cooling periods of 105 to 160 days. Iodine¹³¹ emission to the stack averaged 0.22 curies per day and the apparent efficiency of the silver reactors was 99.65%.

The extraction columns were given a routine ten percent nitric acid flush during the shutdown periods on 9-5-57 and 9-14-57. Both flushes were made because of indications of flooding in the 1A and 1S columns.

High differential pressures across the D-5 hexone stripper tower were intermittently encountered throughout the month. Anti-foam addition facilities were installed, and the addition of anti-foam has reduced but not eliminated the DP problem. Investigation will continue during the coming month.

2. Equipment Experience

a. B-3 Silver Reactor

Numerous regenerations of the B-3 silver reactor failed to increase its efficiency and on 9-3-57 a new unit was installed. Iodine¹³¹ emission to the stack was subsequently reduced from an average of 0.58 curies per day during August to 0.22 curies per day during September.

b. C-3 Silver Reactor Heater

The C-3 silver reactor heater was replaced on 9-19-57. Sufficient elements in the old unit had burned out so that it would not supply enough heat for satisfactory reactor operation.

c. F-1 Pump (Partition Cycle Feed Pump)

On 9-5-57, the glass bearing pump in the F-1 position failed to produce the required flow after operating satisfactorily since 4-13-57. A new type Peerless Pump especially designed for this position was installed and to date has operated satisfactorily.

d. D-14 Backcycle Pump

On 9-6-57, the D-14 graphite bearing pump failed due to a seized shaft after being in operation for only twelve days. Replacement was made with the glass bearing F-1 pump removed on 9-5-57, as noted above. However, excessive leakage

around the pump shaft and throttle bushing finally prevented the pump from producing the required head to pump the solution to the top of the column. A new graphite bearing D-14 pump was installed on 9-13-57, and subsequent operation of the pump has been satisfactory.

e. D-7 Waste Tank Agitator

The D-7 waste rework tank agitator failed on 9-14-57 due to a broken coupling and lost paddle. The unit was replaced on 9-30-57 and is now operating satisfactorily.

f. H-2 Centrifuge Tachometer

During the early part of the month, the H-2 centrifuge tachometer failed due to a burned out generator. On 9-12-57, a new tachometer jumper was installed and the tachometer returned to normal service. In order to continue the operation of the H-2 centrifuge, while the new jumper was being fabricated, the H-2 cake removal procedure was performed using an oscilloscope.

g. Dissolver Vent Jets

Work on the change-over from three to six inch discharge piping on the three dissolver vent jets was completed by Minor Construction on 9-26-57. Preliminary evaluation of the change-over indicates a satisfactory lowering of the jet discharge pressure. This work was done in conjunction with Project No. CG-648, "Redox Auxiliary Iodine Removal and Nitric Acid Recovery" (293-S Facility).

h. Canyon Crane

Considerable difficulty was experienced this month with the left hand optic on the 60 T Canyon Crane. On 9-6-57, the oil was changed in an unsuccessful attempt to correct a tendency to slip out of low power. On 9-9-57, another head was installed but had to be replaced on 9-16-57 because of a cracked low power mirror. The second replacement unit is now working satisfactorily with the exception of a smudge on the lower power head which cannot be removed because it is on the inside of the lens.

During the month, the relay on the left hand trolley travel also failed because of loose wiring. The wiring was subsequently repaired and the unit restored to normal operation.

B. Maintenance Operation

The facility operated at a mechanical efficiency of 93% during the periods of scheduled operation.

Canyon equipment replaced during the month included one F-1 pump, two D-14 backcycle pumps, the B-3 silver reactor, the C-3 silver reactor heater, the D-7 waste tank agitator, and four equipment jumpers.

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A new type Peerless Pump especially designed for the F-1 position was installed on September 5, 1957 when the glass bearing pump in the F-1 position failed to produce the required flow. Although the new type pump is not equipped with glass bearings, it is planned to install glass bearings in future pumps for this position. Pump failures averaged one a month before the installation of the glass bearing pump on April 13, 1957. The combination of glass bearings and the new Peerless design should serve to prolong the pump life considerably in the F-1 position.

The special D-14 backcycle pump, which was requested of the Power and General Maintenance Operation, was completed this month. This pump was requested in an effort to resolve the frequent pump failures in the D-14 position. The following modifications were incorporated into the special pump: (1) Increased the clearance between the throttle bushings and the shaft to 0.010 inches. This is being compensated for by installing an additional roller bearing just above the tank in order to properly stabilize the shaft. (2) Extended the shaft through the top of the end bell on the motor and installed an impact nut to free the pump with an impact wrench in case of seizure. (3) Provided the pump with a 7 1/2 H.P. motor to lessen the chances of seizure.

Plans are now being made to install this special pump following the next D-14 pump failure.

During the first part of the month, the cask car decontamination platforms were installed at the decontamination station just outside of the 202-S Building Railroad Gate. This will facilitate the cleaning of the lower decks on the cask cars and improve the safety in performing this work, particularly during the winter months when ice and snow present slipping hazards.

A general overhaul of the product load-out scales in the 233-S Building was completed this month. Revisions were made to provide easier adjustment of the scales. New knife edges and saddles were installed and the unit recalibrated.

All equipment in the 211-S Tank Farm Area has been checked and prepared for cold weather operation. Steam traps were dismantled and replacement parts installed, where necessary, to put them in first class operating condition. All pipe covering repairs have been made.

C. Waste Handling and Decontamination Operation

1. Waste Handling

a. <u>200 East Area</u>	<u>Gallons</u>
Waste Scavenged	1,176,000
Waste Received (Purex Coating)	55,000
Waste to pitches	1,389,000
Waste to Cribs	None
Purex Startup Waste Received in 103-C from 102-A	287,000

b. 200 West Area

Gallons

Redox Coating Waste Received (S Farm)	28,057
Salt Waste Received (SX Farm)	235, 972
Total Gallons Boil-off Salt Waste	145, 910

2. Equipment Decontamination

a. Regulated Steam Pit

A total of three pieces of equipment and eight vehicles were decontaminated during the month. The total manhours charged to decontamination work was 227. Of this total, 136 hours were charged to railroad decontamination work and timekeeping at Riverland.

b. 221-U Building

Two pumps were received from the UO_3 Plant for decontamination and repair. One of these pumps (X-30-2) was decontaminated and rebuilt at a total cost of \$2170. Since the pump was valued at \$5,000 when purchased, a savings of approximately \$2,800 has been realized over the cost of a new pump. The second UO_3 pump has been decontaminated, dismantled, and is now in the process of being rebuilt.

Rebuilding of the first Redox pump (J-19-21-P-130) from the D-14 backcycle position was completed this month. Total cost of rebuilding was \$1,799. Since the pump was purchased at \$7,365, a savings of approximately \$5,566 has been realized over the cost of a new pump.

3. Railroad Cask Cars

Five cask lids were decontaminated and repaired this month. Four of these were exchanged for cask lids that had failed because of faulty locking mechanisms. A total of 106 manhours was charged to this operation during the month.

4. Purex Waste Handling

A total of 55,000 gallons of Purex Coating Waste was received in tank 105-C. Purex startup waste received in tank 103-C totaled 287,000 gallons for the period. 276 manhours of labor were charged to the Purex Operation during the month.

5. Waste Scavenging

A total of 1,176,000 gallons of waste was scavenged during the month representing 136% of the forecast. Disposal of scavenged waste to ditches continued this month.

Two motor failures on the 101-C waste tank pump were experienced

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this month. A new motor was installed after the second failure and to date has been operating satisfactorily.

The primary valve on the BC crib line in the BY Tank Farm Area failed this month. Due to high radiation levels excavation and repair was extremely difficult; however, the job was completed without incident.

6. Redox Waste Handling

A test manifold was installed at the 107-SX tank to determine the feasibility of unplugging instrument lines by use of water which is available at the instrument enclosures of each tank. Initial results are promising, but further evaluation is desirable before a firm decision is made.

An inspection of the Cathodic protection system in the 241-SX Tank Farm was made during the month. It was found that heat from the boiling tanks and excavation work by Minor Construction forces had caused damage to cathodic cable sheathing. Minor Construction has agreed to make repairs in order to restore temporary cathodic protection to this equipment. A study recently completed by Facilities Engineering indicates that the cathode part of the system will have to be replaced. Efforts are presently being made to purchase cable that will be suitable for the 241-SX Area.

All transmitters and transducers on storage tanks 107, 108, 111, 112 and 114-SX were recalibrated during the month. Specific gravity, differential pressure, and air flow readings were obtained on each of these tanks.

7. Cesium Recovery Program (Project CG-718)

Weekly run-ins of the 221-B Canyon Building equipment were continued this month in anticipation of project approval.

D. Analytical Control Operation

1. Control Statistics

<u>Month</u>	<u>Samples</u>	<u>Determinations</u>
August	2945	6867
September	2721	6789

2. Building Maintenance

Principal 222-S Building maintenance included replacement of a valve in the inert gas supply line, repair of a trap in the main steam supply line, repair of the gang valve at the 101 laboratory waste tank, and the replacement of four dust stop filters in various laboratory hoods.

3. Equipment

The mass spectrometer in the 222-S Laboratory was placed on standby status this month. This was brought about by the change in isotopic content analysis of UO_3 carloads which was initiated during August, 1957. Basically the change consisted of analyzing a composite sample representing a month's production instead of analysis of individual carloads. The one analysis per month will be performed by the Hanford Laboratories Operation.

The ultrasonic decontamination apparatus formerly located at the 221-T Canyon Building was moved to the 222-S Laboratory this month. This instrument will be tested for effectiveness in decontaminating laboratory equipment.

4. Assistance to Process

A special sampling and assay program on the H-10 coating waste solution was completed this month in an effort to more closely evaluate the waste losses from this source. The data have been forwarded to the Redox Technology Operation for evaluation.

Clear point determinations were made on a series of samples taken from the H-1 feed preparation tank at the request of the Redox Technology Operation. The knowledge gained relative to the temperature below which this solution may congeal will aid in the use of higher feed concentrations and so in effect increase equipment capacity. Although high radiation levels were encountered the analyses were completed without incident.

Solids observed in a screen test of UO_3 powder submitted by the 224-U Operation proved to be metal fragments from broken plant equipment. The fragments were submitted to the operating personnel for identification and possible future prevention.

5. Analytical Procedures

UO_3 sample containers for Paducah are now being sealed with wax as insurance against erroneously low results that might arise from a gain in moisture content during shipment. Data are being collected to evaluate the effect.

A new procedure prepared by the Research and Engineering Operation personnel for determination of sulfate in UO_3 powder was evaluated this month and found suitable at the 2000 ppm level. The new procedure consists of a precipitation of barium sulfate with radio barium followed by gamma counting. In replacing the present hydrogen sulfide evolution method, it appears that the analytical time will

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be reduced and the corrosion of stainless steel hoods and plugging of the hood filters will be minimized.

E. Radiation Monitoring Operation

1. Radiation Occurrence Experience

Six radiation occurrences were reported in the Redox Operation this month reflecting an improvement in radiation control in this Operation. Five radiation occurrences were related to contamination spread of work areas or sampling equipment. An unusual amount of difficulty was experienced in plutonium bearing sample containers from the North Sample Gallery and on three instances plutonium was spread outside the radiation zone area. The cause of this condition is being investigated and action will be taken where necessary to correct the problem.

Definite improvement was observed in the self-monitoring phase of radiation work and the improvement appears to be a result of the concerted effort over the past two months to stem the undesirable trend in self-monitoring practices.

2. Personnel Exposure Experience

Dose rates of 5 r/hr at three feet were measured over the open 151-CR diversion box. The work involved unplugging a process line bearing Purex coating waste. The radiation levels encountered represent the potential problems that we can anticipate in the Cesium Recovery Program, unless additional shielding and more remote methods are instituted in the design of the affected diversion boxes.

3. Other Contamination Experience

Minor Construction work immediately north of the 233-S Building has uncovered some of the plutonium contamination that was deposited in the 233-S Incident of June, 1956. Close coordination with the HLO monitoring forces has prevented any undue contamination spreads at this location.

A fallout from the Nevada Proving Ground Atomic Tests was observed on 9-25-57 with a maximum 200 to 300 c/m direct measurement and with contamination smears up to 2000 c/m on horizontal surfaces of vehicles. The fallout did not present any unusual complexities with respect to normal operating conditions.

In an attempt to determine the value of removing well lids from cask cars, four cask cars with their well lids removed were put on a test program this month. The initial experience indicated that the water level was sufficiently high in the well to cause splashing during inter-area movement. The water level in the cask car wells was subsequently lowered but apparently not sufficiently to prevent splashing during inter-area movement. Although the splashing water caused some low level con-

tamination to the external surfaces of the cask cars, the contamination spread was not so significant that further studies could not be attempted. Preliminary results indicate that the manhours required to decontaminate cask cars was reduced considerably by the absence of well lids but that some type of lid structure is necessary to prevent occasional splashing during transit. The results of this test tend to support the need for a different type lid on cask cars favoring generally the hinged lid type structure.

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

Installation was started this month on a diamond plate caustic basin and equipment base cover for the two caustic pumps in the 211-S Tank Farm Area. This will protect the concrete base and basin around the pumps which has been damaged in the past due to caustic seeping into and under the concrete, thus causing concrete breakage from the swelling action of the caustic.

3. Inventions or Discoveries

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

G. Events Influencing Costs

On September 11, 1957 the Redox Operation started receiving hexone delivery by tank truck rather than by tank car. A savings of approximately \$3,000 to \$4,000 per year will be realized.

The delivery of propane gas by tank car rather than by tank truck was started this month. A savings of \$500 per tank car delivered will be realized.

A reduction of \$4,600 in spare parts was made this month. However, due to receiving the H-4 tube bundle which was fabricated on Project CG-621, a net increase of \$8,750 resulted.

The spare equipment inventory was increased by \$44,500 with the arrival on site of the H-4 vessel and the H-5 tower which are a part of Project CG-621, Redox Contamination Control. This is a temporary increase since this equipment will not be replaced when any of it is used.

Commitments for capital equipment not included in the construction

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budget since July 1, 1957 include the following:

Two pumps	\$2,657
Two absorber towers	14,800
One silver reactor	10,850
Five impact wrenches	5,115
Total	<u>\$33,422</u>

H. Plant Development and Expansion

1. Preparatory Engineering

Cask Car Improvement

The project proposal for hinged lids, well jet out facilities, and loaded cask flushing devices is still in preparation. Rough sketches of a monorail and hoist assembly for the removal of well lids in the railroad cut have been prepared. Finished drawings will be available early in October. This equipment is intended as a temporary measure to relieve the work load of cask car cleaning during the coming winter months.

Sealing of Silo Lights

A request is being made through the Facilities Engineering Operation to engage the assistance of the General Electric Lamp Division in the design of a light tube for light transmission from the cold side AMU levels to the cell. If successful, this will reduce the manhours required for changing silo light bulbs by at least a factor of ten.

222-S Laboratory Roof Fire Protection

Drawings of a spray and fire alarm system to be installed on a project proposal have been completed. Scoping of the project is finished. Provisions are made in the scope for protective equipment in the two storage rooms on the duct level of the 222-S Building and an alarm system on the remainder of this floor.

2. Design and Liaison

The third shipment of fuel elements from the Chalk River Plant is scheduled to arrive at month end. This shipment will be in two newly fabricated casks holding two slug buckets each. AECL has requested construction of two additional double casks to allow eight bucket shipments. Under this arrangement, four casks containing six to seven tons of metal can be shipped at once. A structural study of the assigned flat car has indicated that such shipments are feasible. The AEC has contracted with the Monarch Machine Co. of Pasco, Washington for construction of this equipment.

CG-772, E-Metal Dissolvers, Redox

General Electric approvals of the project proposal have been received and it is now in the hands of the AEC Review Board for signatures.

CG-621, Redox Contamination Control

Satisfactory testing of the Canyon Washdown Installation during the month end shutdown will close out the project.

CG-643, Redox Capacity Increase Phase III

Project proposal Revision II, requesting total project funds has been transmitted to the Washington AEC.

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

The three inch off-gas lines from the dissolvers (3) to the stack breeching have been replaced with new six inch lines. Other minor modifications and operability tests are now in progress. The Facilities Engineering Operation has tentatively set November 15, 1957 as the date on which the new facility will be in normal operation.

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

Footings for an outside stairwell to the upper levels of the greenhouse have been poured. Excavation has started for the slab on which the new addition at the north end of the building is to be erected. Drawings for the structural steel and shell cover have been received from the fabricator, commented on and returned.

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

Sub-floors have been poured for pump pits on all tanks except 104-SX and 107-SX. Walls have been poured for seven pits. Radiation levels on the dome of tank 107-SX, originally recorded at 42 R/hr, have been reduced to 1 R/hr by plugging the twelve inch riser extending through the dome.

The fixed price contractors field work, per contract, is scheduled to start October 7, 1957.

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

Scoping is still in progress. The Engineering Flow Diagrams have been issued for comment. Of interest to the Redox Operation is the decision to transport door stop sample containers from B Plant to the 222-S Analytical Laboratory for process analysis. This method was selected to effect an estimated \$100,000 savings

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in construction costs that would be required if aumont sampler transfer station was installed. Proposed process changes are being considered that will allow direct pumping of the Purex 1W wastes to the 221-B Building, thereby eliminating an intermediate pumping station.

CG-720, Modifications to Redox SWP Facilities

Work began this period with the arrival on site of the fixed price contractor. Construction Operation has done some work inside the building, preparatory to the cutting of doorways through concrete. The contractor is in the process of cutting two doorways through to the change room.

I. Reports Issued

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

III. ORGANIZATION AND PERSONNEL

A. Safety

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

A newly designed apparatus for sulfur determinations on UO_3 powder was installed in the 222-S Laboratory this month. The new design prevents the back flow of cold ammoniacal cadmium chloride to the evolution flask containing acid thus reducing the possibility of an uncontrolled reaction with possible breakage of glass equipment.

A demonstration of the hazards of uncontrolled chemical reactions in the laboratory was carried out by personnel of the 222-S Analytical Laboratory. Photographs were taken for the Hanford Works News.

B. Security

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

C. Personnel Activities

J. Neil, Director of Health Physics, Chalk River Project, visited the Redox Operation for purposes of comparing the radiological protection program of the Redox Plant with the Chalk River Project.

L. G. Koch, Supervisor Waste Handling and Decontamination Operation, terminated on September 27, 1957 to accept a position with the Boeing Aircraft Co. in Seattle.

C. A. Lorenzen, Supervisor Redox Processing Operation, was transferred to the Purex Processing Operation on September 10, 1957.

J. E. Rice, Supervisor Purex Processing Operation was transferred to the Redox Processing Operation on September 10, 1957.

B. W. Mercer, Supervisor Analytical Control, was transferred to the Hanford Laboratories Operation on September 15, 1957.

S. A. Baker, welder journeyman, attended a welding school during the last two weeks of September as sponsored by the Construction Engineering Operation.

Chas. B. Grosz

Manager
Redox Operation

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CHEMICAL PROCESSING DEPARTMENT
FINISHED PRODUCTS OPERATION
MONTHLY REPORT

SEPTEMBER 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

instances.

Feed was received steadily from the primary plants during the entire month and ample supplies were available at all times. The Redox Plant delivered feed all month until September 29, when operations were suspended for scheduled repair work. Deliveries from the Purex plant did not start until September 9, but continued for the remaining part of the month. The quality of the feed received was good with the exception of three batches of Purex material produced during startup. This small amount of material contained excessive amounts of fission product and it was necessary to process this plutonium through Recuplex in order to effect decontamination. Receipts of material from the Product Recovery Operation were higher during the month than they had been for several months. From the above it is indicated that very high production rates were required in order to process the feed available.

Mechanical troubles developed in the Task I, wet chemical operation, early in the month and were severe enough to effect the progress of the work. As in previous months most of the problems were associated with valve failures, plugs in lines, and leaks. During this period, the poor function of the equipment was also responsible for increasing the recycle to about 7% which added an additional load at an inappropriate time. Earlier, recycle had been held to about 5%. Some delays were also experienced due to the process behavior of several runs of Recuplex material which, for undisclosed reasons, generated precipitates which were difficult to filter. After considerable maintenance efforts, the wet chemical equipment was restored to good operation but, unfortunately,

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A. Metal Finishing Operation (Cont'd)

repair problems then developed in the Task II, dry chemical equipment, and production delays were again encountered. Most of the trouble in this instance was due to plugs in the offgas lines. It was necessary to replace several critical portions of these lines with new equipment in order to minimize delays. A rash of problems which affect equipment performance developed in the remelting furnaces during the first two weeks of the month and delays in fabrication resulted. Fortunately, in this case no permanent effects in fabrication resulted.

Generally, fewer problems were encountered with regard to rejects and other troubles which have been experienced in previous months in the preparation of plutonium parts. The primary difficulty being that mentioned above regarding remelting furnaces.

B. Product Recovery Operation

Major inroads to the backlog of Pu metal scrap were made, a total of ca. 19 Kg being dissolved in hoods 40 and 41. All but an equivalent of eleven PR cans had been purified in the solvent extraction system prior to month end. Forty-eight slag and crucible dissolver runs were completed, some of which had plutonium metal scraps added as another means of speeding up recovery work. The foregoing, coupled with the processing of four of the nineteen PR cans of off-standard Purex feed and ca. 16 Kg of plutonium in supernates from Task I, resulted in the purification and return to production channels of ca. 51.5 Kg (75 batches) of plutonium. Column operating efficiency was normal at 79% in spite of the changeout of the H-3 column diaphragm operated valve and the H-2 bellows. Instantaneous rates were low (1725 liters/day). This was caused by excessive fouling of the lines and column flooding attendant to the recovery of plutonium from slimy residues on hood floors. This major cleanup job has now been completed; in addition to the foregoing problems, this work necessitated the discard of approximately 1300 liters of organic solution and caused column waste losses to be slightly high at 0.9%.

It should be noted that the Polish Residues account, consisting roughly of forty-five boxes of plutonium impregnated sandpaper, filters, grits, etc., was completely eliminated. This was done by charring the paper on a hot plate and charging the residues to a normal dissolver run.

One of the two Nash Hytor 26" vacuum pumps developed a hole in its housing. Pending emergency replacement, the hole was plugged in order to allow continuing operation. The complete vacuum system has been inspected for leaks to assure that proper service is being delivered to the Metal Finishing Operation.

Emergency steps have been taken to arrange for the complete replacement of all secondary filters in Room 310, one of the two main exhaust rooms. This step, among several others, is being taken to eliminate excessive plutonium emission from the 234-5 Building stack.

C. Uranium Reduction Operation

Production through the Uranium Reduction Operations was 98.8% of commitment (based on material approved for shipment) during September with both calciner mechanical difficulties, and the installation of wet filters as replacement for the Adams type dry filters, being the factors limiting production.

A total of 399,000 lbs. of recovered 100% nitric acid was transferred to Purex during the month. A backlog of 278.38 tons of uranium is on hand at month end awaiting processing through the Uranium Reduction Operation.

Particle size difficulties presented a continuous problem throughout the month. Approximately 230 tons of material was processed out-of-specifications, and required remilling. An attempt to resolve particle size difficulties through increased mill speed (5100 to 6900 RPM) was initially unsuccessful. Two subsequent problems of screen plugging and overload on the hammermill bearings and motor developed. Further investigation of increased mill speed is in progress.

Remill mechanical problems compounded the particle size trouble but have been satisfactorily corrected at month's end. The major portion of material has been remilled to specifications.

During the past five months the amount of remilling necessary to meet product specifications has increased. Remill by months is as follows:

<u>Month</u>	<u>No. Containers</u>	<u>Total Tons</u>
May	6	30
June	7	35
July	33	165
August	11	55
September	46	230

The powder system is under investigation by both the Operations and Engineering groups. Minor Construction is also installing additional piping at month end to divert a portion of the calciner powder through the 224-U Building X-6 hammermill for flexibility and added capacity.

Five of the operating calciners (G, H, J, L, M) now have the off-gas system wet-filter installation completed. Minor Construction forces are installing the final wet filter on K Cell at month's end and will return the unit for operation by October 2.

K Cell has been successfully cleaned of material which had set up to the consistency of concrete when the horizontal thermohms of this experimental calciner failed to record proper feed control temperatures during August. The unit has been remodified to conform with proven practical mechanical conditions as demonstrated in G, L, and M Cells, and will be placed in operation early in October.

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C. Uranium Reduction Operation (Cont'd)

Major operational problems during September continued much the same as in previous months. Although no operating time was lost through the pump or loop header failures, the perennial feed point plugging and breaking problem remained unchanged. Three calciners (H, J and M) required repairs when damage occurred to the agitator assembly arms. In all cases it appeared that a bending and/or twisting occurred on the arms which caused the blades to ultimately hit the feed points and thermowells. All the damaged arms were of the type that had sustained previous damage at other locations and had been repaired and modified for re-use. A new design has been completed and future replacements will include added strength to the agitator arms at the apparent weak points.

Actual calciner performance during September was as follows:

<u>Calciner</u>	<u>Days Scheduled</u>	<u>Days Operated</u>	<u>Avg. *Rate per Oper. Day</u>	<u>Avg. Rate* per Oper. Day</u>	<u>On Line Efficiency</u>
G	30	29	6.72	6.50	96.7%
H	30	17	3.82	2.16	56.7%
J	30	17	4.75	2.69	56.7%
K	30	0	0	0	0%
L	30	26	5.07	4.29	86.7%
M	<u>30</u>	<u>18</u>	<u>4.03</u>	<u>2.43</u>	<u>60.0%</u>
Total	180	107	5.10	3.03	59.6%

* - (output basis)

G Calciner: (29 days on line - 96.7% on-line efficiency)

A 96.7% operating efficiency was effected from this calciner during September with a 6.72 actual production rate per operating day. This is by far the best sustained operation obtained from any unit since the calciners were first placed in service. The newly installed wet filter contributed effectively to this performance. The lack of any internal calciner damage was an encouraging factor. Lost time: One day for feed point plugging and replacement.

H Calciner: (17 days on line - 56.7% on-line efficiency)

Mechanical failures varied from agitator damage to filter pump failure. Agitator damage occurred on 9-17-57 when an apparent weakness in the arms of a previously repaired hub failed. Damage extended to three sets of arms through movement of broken parts. Repairs were completed and operation resumed in five days. Failure of the HNO₃ pump to the experimental wet filter caused a one-day shutdown. Other lost time involved broken feed points, bent thermowells and feed piping leaks. Lost time: Three days for repair of broken feed points and bent thermowells, one day for feed line leakage, five days for agitator repairs, three days for wet filter installation, one day for wet filter pump repair.

C. Uranium Reduction Operation (Cont'd)

J Calciner: (17 days on line - 56.7% on-line efficiency)

Although the operating efficiency of this unit appears relatively low, nine of the thirteen days lost time was due to difficulties encountered by minor construction forces during the wet filter installation. These difficulties required that the unit be kept out of service over an additional week-end and extended the down time by four days. Failure of weak agitator arms and feed point damage was the only other major mechanical difficulty. Lost time: Nine days for wet filter installation, three days for repairs to agitator arms and feed points, one day for agitator seal repacking and hot box repairs.

K Calciner: (0 days on line)

All remaining caked powder was removed from the trough and agitator assemblies. The feed control thermowells were again installed from the top side through 2" thermowell guides and the agitator blades were remodified to correspond with the more mechanically operable L Cell calciner. The unit was charged with powder and heated to a standby condition. At month end K Cell has been released to minor construction forces for wet filter installation.

L Calciner: (26 days on line - 86.7% on-line efficiency)

Again L Calciner demonstrated a top production efficiency with a minimum of lost time. All down time occurred on a scheduled routine basis. The wet filter installation was completed without incident and placed back in service within two days. Lost time: Two days for Adams filter element removal, two days for wet filter installation.

M Calciner: (18 days on line - 60.0% on-line efficiency)

Damage to three sets of agitator paddles, two feed points and two thermowells curtailed operations during the latter part of the month. Repairs were completed on September 28, but five hours after startup a high horsepower requirement developed on the agitator and at month end the calciner is down for investigation of cause. Lost time: Two days to thaw frozen feed system, three days for wet filter installation, seven days for damaged agitator repairs.

D. Maintenance Operation

2 Plant

In Task I considerable trouble was experienced due to plugged lines, leaking valves and valve failures. The station 4 SNCT in-line filter failed by cracking. As a spare was not available an experimental in-line filter was substituted temporarily until a spare can be fabricated by the P & GM Shops.

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D. Maintenance Operation (Cont'd)

Z Plant (Cont'd)

In Task II new panels have been fabricated and are ready for installation at such a time as production schedules permit. New doors were installed at stations 2 and 3 this month to replace a damaged door and one which was corroded beyond repair. Plugged hydrogen fluoride rotameters at stations 3 and 5 were cleaned. It was necessary to clean station 4 oxygen rotameter four times.

In Task III, the lifting mechanism on the crucible turntable failed due to the failure of the bearing assembly which was replaced with a new unit. The old unit will be repaired as soon as bearings are available and will be retained as a "hot" spare. The cylinder on the mixer-vibrator failed due to a separated shaft and was replaced with a spare unit. It was necessary to replace three G.M. Counter tubes due to erratic counting.

In Task IV the heating elements were replaced twice in furnace 3 and once each in furnaces 4 and 1. Failure in all cases was due to open heating elements. Thermocouple wells and thermocouples were replaced in four bases to eliminate leaks in the vacuum system. (Some trouble is being experienced in obtaining satisfactory thermocouple wells from the P & GM Shop due to welding techniques. Plant metallurgists are assisting with this problem.) Diffusion pump heaters, which failed in service, were replaced on vacuum units 3 and 4. Ten thermocouple vacuum gauges failed and were replaced on Task IV this month.

In Task V no unusual maintenance problems were experienced during September.

In Task VII two failed heat traps were replaced in station 5 this month. An urgently needed tripod bellows was received from the vendor and installed in station 6. At this time the tripod temperature thermocouples were replaced due to a heavy metallic coating on those in service. New wheels were installed on one conveyor car to replace badly worn wheels which have been requiring considerable maintenance. Twelve vacuum measuring thermocouple gauges required replacement this month.

In Continuous Task I and II, due to mechanical and process difficulties, attempted operation of Hood 9B was suspended the first half of September while revisions were made. The major revisions consisted of: (1) Replace reactor vessel with a smaller vessel; (2) Modify reactor agitator twice; (3) Replace bent reactor shaft; (4) Provide continuous agitation to drum filter slurry; (5) Repipe to eliminate excessive weight on drum filter valve; (6) Modify discharge hopper to calciner; (7) Design and fabricate feed valve to fluorinator; (8) Design and fabricate off-gas filter for fluorinator; (9) Modify fluorinator discharge valve; (10) Install different type of oxalic acid feed control; and (11) Install hold-up vessel and repipe to permit plutonium solution feed from hood 9B instead of Task I.

D. Maintenance Operation (Cont'd)

Z Plant (Cont'd)

Attempts to operate hood 9B continuously have been unsatisfactory although considerable improvement has been noted after the above revisions. The major problem at the present time appears to be lack of vacuum capacity or excessive air inleakage to the fluorinator section.

In Recuplex the H-8 pump failed this month and was replaced with an available hot spare. The failed unit was repaired and stored in the hutment as a "hot" spare. Bellows failure was experienced on the H-2 column pulser. This is the first failure for this unit. A "hot" spare bellows assembly was installed and the unit returned to service. The J-3 recirculating pump failed and was replaced with a new unit. The multi-point temperature recorder for D-1 and D-2 dissolver hoods was modified to permit continuous reading of the D-1 dissolver temperature if desired. It was necessary to repair the multiple switch and replace the #3 H.M. Chamber on the Beckman monitor unit.

In the Plutonium Metallurgy Operation the major work consisted in placing in operation an extrusion press and a rolling mill at 272-Z Building and the installation of vacuum equipment in the Sample Preparation Hood, Room 50, 231-Z Building.

In the Research and Engineering Operation the reduction hood, Room 188, 234-5 Building was disconnected, removed from 234-5, and buried, without incident.

In the Analytical Control Laboratory the X-Ray unit failed due to a faulty rectifier in the X-Ray head. An available spare head was installed and the unit returned to service.

In Z Plant General, one of the 26" Nash Hyltor vacuum pumps developed a leak in the casing of the suction side. Temporary repairs were effected and a new unit ordered. The 13.8 KVA transformers, #2 and #6, were removed from service for repairs at the request of electrical distribution.

Uranium Reduction

The Uranium Reduction Plant maintenance activities during the month of September continued to be in two primary categories; maintaining present equipment, and effecting revisions that are considered improvements to the continuous calciners and associated equipment.

The recurring repair work associated with the off-gas system has been essentially eliminated by this month-end by the installation of an off-gas wet separator system. However, repair work will continue to be repetitive on the feed and powder systems until improvements which are in progress are completed.

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D. Maintenance Operation (Cont'd)

Uranium Reduction (Cont'd)

The major repair work during the month consisted of the following: Calibrated temperature transmitters for calciners; unplugged and repaired calciner UNH feed Rotometers, valves and feed points; repaired rotary valves throughout the powder system; unplugged and repaired hammermills; tested the existing ED-2 Concentrator and found internal leaks; made replacement ready for installation and prepared to install it in the near future; made extensive repairs to X-30-2 UNH feed pump; replaced the motor on the C-2 pump; replaced the D-4-2 pump; repacked agitator shafts on all calciners; made major repairs to the Print Way Scales in the UA Building; repaired the X-1 pump; repaired two special calciner gaskets; installed special steam jet in the 008 tank to remove 35,000 gallons of nitric acid; installed 3" manual valve and repaired remote valve on this tank; replaced electric heating cable on Product Line from Redox; replaced bearings in motor to X-4 Exhauster; fabricated two special unloading nozzles to expedite unloading of powders for remilling.

There were three major calciner failures during the month and the following work was done to effect repairs; H-Cell, replaced two agitator assemblies and two thermocouple nozzles; J-Cell, replaced six agitator assemblies, two thermocouple wells and two feed points; M-Cell, replaced three agitator assemblies and two thermocouple wells.

On the K-Cell calciner Operations has completed extensive cleaning work and Maintenance has removed the agitator bumper rings, replaced agitator blades and set to proper clearance, relocated thermocouple nozzles. This unit is ready for operation with the exception of Feed Rotometer repair work and the Wet Separator installation. Both items are in progress and will be completed by October 4, 1957.

Work accomplished by Maintenance during the month on the Uranium Reduction Plant improvement program was very limited because of the additional activity by Construction Operations in the installation of the Off-Gas Wet Separator System. Improvement work consisted of the following: Revised calciner powder pickup bins (all cells) to provide proper air flow for movement of UO_3 powder; installed additional supports under grating at the 10' level in the 224-UA Building (Safety); replaced rheostats in electrical system to increase current to H, J, K and M Calciner heating systems (G, L Calciners will be completed when production will permit); installed revised feed points on H-Cell calciner (revisions will permit the feed points to expand); increased and improved the S.W.P. clothing storage; replaced G calciner A.C.A. Motor with repaired motor from the General Electric shop in Spokane. (This completed the repair program on the A.C.A. Motors).

Installed feed valves with revised seats and plugs in the number 2 and 3 position in H Cell for evaluation of flow control improvements.

E. Analytical Control Operation

The first plutonium standards for the control of the Chemical Assay method were submitted to the Analytical Control Operation by the Process Chemistry Operation on August 30, 1957. The average recovery on the standard solutions for the period, September 2 through September 24 was 99.992%. The precision on a total of 102 determinations was .036% at the 95% confidence level.

During the month a complete set of plutonium oxide standards was prepared for the emission spectrograph. Comparison of all samples against the plutonium bearing standards will commence in October. Until now samples have been read against uranium oxide standards. The use of a plutonium standard is highly desirable because this eliminates any difference that there may possibly be in the arcs of plutonium and uranium. Only recently has the Process Chemistry Operation been able to obtain a sufficient amount of plutonium of high enough purity to use in such a standards program.

An improvement in the quality of materials received in Final Inspection was noted. Thirteen pieces failed to meet chemical specifications; fourteen evidenced a dimensional or physical defect; and five were rejected for casting defects. Again it was necessary to work up to the last hour in order to complete the commitment for the month.

F. Radiation Monitoring Operation

Ten radiation occurrences were documented in September as compared to seventeen in August. The breakdown for the various operations is as follows: Metal Finishing two, Product Recovery two, Analytical Control two, Maintenance three, Uranium Reduction one, and Radiation Monitoring none.

Twenty-six cases of skin contamination were reported in September as compared to thirty in August. The breakdown for the various operations is as follows: Metal Finishing six, Product Recovery three, Analytical Control one, Maintenance ten, Uranium Reduction six, and Radiation Monitoring none.

The 234-5 stack emission of Plutonium continued to increase. An average of 175 uc/day was emitted in September. Routine surveys have revealed no ground contamination around the stack area. There has also been no indication of contaminated air returning into the building through the air supply system. Efforts are being made to repair and improve the exhaust air filtering system. The present Hood 9 in Task II of the RMA Line is one of the principle sources of contamination and when the new Hood 9B takes the full production, a sharp decrease in stack emission should be noted.

The contamination status of the PR and RC cans is poor. It has been necessary to ship nearly all RC cans while they were contaminated above limit and occasionally PR cans also. All major production facilities are working on this problem and the status of these cans should be satisfactory in a short time.

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F. Radiation Monitoring Operation (Cont'd)

The exposure problem which has been previously reported as extremely serious, now appears to be under control, and with the proper manipulation of job assignments for the Metal Finishing Operators, it will be possible to stay within the 3 r/yr limit.

The poor contamination status of the UO_3 plant remains essentially unchanged from that reported in the August report. Many areas were grossly contaminated at month's end. The wet filters do minimize contamination spread in the continuous calciner cells since they prevent pressurization of the calciners. However, it has been necessary to open the calciners frequently and contamination spreads occur at these times.

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

On 9-30-57 the Maintenance Operation discontinued three-shift maintenance coverage at the Uranium Reduction Plant. This change is permitting the release of eighteen people (13 craftsmen and 5 operators) from the Finished Products organization. Reassignments to outside CPD will take place during October.

I. Plant Development and Expansion

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

It was mentioned last month that certain operating difficulties were disclosed during the startup of the new continuous equipment and it was decided to suspend operations until improvements and modifications could be made. The troubles encountered were as outlined earlier, and associated with slurry agitation, powder feed, flow controls, and in-leakage. The modifications were completed about the middle of the month and startup activities were resumed during the last week of the month. The improvements which were made resulted in smoother operation and the unit generally operated better than it had before the shutdown. Some problems still persist, however, and have caused the operation to be more erratic than desired. The main trouble now appears to be associated with powder handling and more work will be necessary on this part of the equipment. Process wise, the unit

I. Plant Development and Expansion (Cont'd)

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

functions very well and produces a fine quality product and the waste losses are very low. Of course, work on the permanent unit for the RMA Line has been suspended pending final decision regarding equipment which cannot be made until the temporary unit has been made to function properly.

2. Project CG-723 - Recuplex Conversion

Work segregation is being reviewed again to assure compliance with current policies. When this review is completed a work order will be issued to start equipment installation.

3. Project CG-734 - RMC Button Line

Detailed design is proceeding ahead of schedule and is approximately 35% complete. The preparation of purchase requisitions for certain hood equipment was started.

4. Project CG-756 - Z Plant Filter Replacement

A work authorization was issued to the Construction Operation for the equipment portion of this project which includes the installation of a sprinkler system in certain rooms on the top floor, providing a special filtering system for exhaust gases containing hydrogen fluoride from Task II, and installation of access ladders on the outside of the building. A portion of the filter production, by the Cambridge Corporation, was diverted to Rocky Flats to help in their difficulties which developed during the month, however, it does not appear that any permanent delay in the HAPD order will result because complete delivery is promised by November 15.

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

The installation of five wet scrubbers on the 224-UA calciner off-gas piping has been completed, with the final installation in K Cell, scheduled for completion October 2, 1957. Instrumentation for the scrubbers will be installed upon receipt of thermohms from offsite.

6. Project CG-712 - Reduction of Air Borne Noxious Fumes - 224-U Building

This project was accepted without exceptions on September 27, 1957.

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

A revised project proposal estimate, based on the revised approved scope has been prepared for inclusion in the revision to the Project Proposal. Detailed design on this project is in progress.

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I. Plant Development and Expansion (Cont'd)8. Project CG-725 - UO₃ Plant Liquid Waste Handling Facilities

Facilities Engineering Operation are preparing the Project Proposal based on modifications to the scope.

9. Preliminary Project CG-767 - UO₃ Plant Improvements

AEC Directive HW-442 - authorized the expenditure of \$25,000 for preliminary studies, scope preparation, and detailed design.

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

An AEC Directive authorizing the expenditure of \$135,000 for the above project was received on September 4, 1957. A construction field release has been issued to Construction Operations for initiation of work on this feed filter replacement.

11. Appropriation Request - Calciner Feed Flow Control Transmitters

An appropriation request in the amount of \$4,620 has been issued to replace twenty transmitters in the calciner feed control systems with new transmitters that will operate satisfactorily under the elevated operating temperatures.

12. Capital Work Orders

Work is in progress on capital work orders issued for the installation of stairways in the 224-UA bag tower and for the tie-in of the 224-U and 224-UA powder unloading systems. Work on these orders will be completed during October 1957.

13. Request for Project Proposal - Uranium Segregation

Facilities Engineering Operation has been requested by the Finished Products Operation, to prepare a Project Proposal for providing facilities for the Uranium Segregation Process for the Uranium Reduction plant.

14. Request for Project Proposal - UO₃ Calciner Agitators, Feed Points, Thermowells

Facilities Engineering Operation has been requested by the Finished Products Operation to prepare a Project Proposal for providing improved continuous calciner agitators, feed points, and thermowells. Preliminary design of improved calciner paddles has been completed.

J. Reports Issued

HW-52490 Chemical Processing Department, Finished Products Operation, Z Plant Monthly Report, August 1957, by W. N. Mobley

III ORGANIZATION & PERSONNEL

A. Organization Changes

The three shift maintenance coverage was discontinued at the Uranium Reduction Plant on 9-30-57. This resulted in a reduction of two maintenance foremen as follows: R. H. KirkPatrick was returned to his former non-exempt position of Pipefitter-Journeyman in accordance with his previous request to be relieved of his supervisory responsibility; A. N. Mabbutt who was on temporary assignment as Foreman was returned to his former non-exempt position of Millwright-Journeyman.

B. Safety Experience

No disabling injuries or near-serious accidents occurred during the month. There were fifteen medical treatment injuries experienced this month as compared to twenty-one in August. The frequency rate decreased from 3.61 to 2.22.

C. Radiation Experience

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

D. Security Experience

No security violations were experienced during the month.

E. Personnel Activities

Twelve exempt employees and Chief Operators attended the current series of Labor Relations Conferences.

Nineteen employees attended Radiation Monitoring meetings at which the functions of the new badges were discussed.

W. N. Mobley, Manager
Finished Products Operation

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CHEMICAL PROCESSING DEPARTMENT
POWER AND GENERAL MAINTENANCE OPERATION

SEPTEMBER 1957

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I. RESPONSIBILITY

The responsibilities assigned this operation remained unchanged during the month.

II. ACHIEVEMENT

A. Operating Continuity

An electrical outage of two hours and 49 minutes duration, affecting the 282-E, 283-E, and 284-E Buildings, occurred at 9:20 p.m., September 17. Continuity of operations of the process plants was unaffected as a result of the satisfactory response of automatic standby equipment at the 282-E water pump house. The outage resulted from two distribution lines making contact during the high winds of that evening. Conditions were restored to normal at 11:49 p.m.

B. Inspection, Maintenance, and Replacement

Fabrication of a special fluorinator feed valve, for use in the production line at the 234-5 Facility, was among the top priority jobs in the Shops Operation during the month. The Shops were alerted on September 3 of the urgency of the assignment and immediately resorted to around-the-clock work schedules in an effort to meet desired delivery dates. Some 750 man-hours were expended on this very difficult job. The unit has been in operation since September 23, however, its performance has not been entirely satisfactory and further efforts are being made to improve the design.

High priority was necessarily devoted other shop jobs, including fabrication of the L-Cell package and the HA pulse column for the Purex Facility, both of which were scheduled for completion during the last week of October. X-ray pictures, however, have indicated the presence of flaws in the pipe purchased for use in the L-Cell package. Work on the unit has been suspended until a course of action can be agreed upon by parties concerned.

The Shops Operation placed special emphasis on meeting demands for replacement equipment and component parts required for the UO₃ Plant continuous calciners. This emphasis and scheduling of effort will of necessity be continued until problems presently associated with the operation and run-in of new equipment have been eliminated.

A succession of P-130 pump failures at the Redox Facility developed into a situation requiring the special attention of the Shops Operation. Spares for these units are critically low which necessitated procurement of new motors, glass bearings, and other pump parts as expeditiously as possible. Other corrective measures being taken

include the conversion to P-130 units of seven pumps previously excessed from the Metal Recovery Plant. These will be used as replacements until original type P-130 pumps can be provided.

A spare tank originally designed for use in the bismuth phosphate extraction process was successfully converted to a de-entrainment tank for use at the Purex Tank Farm.

This month marked the completion of third party inspection of all pressure vessels and elevators under custody of P&GM property management. The Travelers Insurance Company was the third party representative.

Further assistance was rendered the 241-CR scavenger waste program. Eight pumps were removed and installed at different locations. Pipe jumpers were relocated in two diversion boxes to facilitate the desired movement of solutions from underground tanks to crib areas.

A burial box containing two highly contaminated concentrator tube bundles from the Purex Facility was successfully buried. Due to the high level of radiation it was necessary to keep personnel a distance of 550 feet from the equipment and to have ten railroad cars between the engine crew and the flat car upon which the box was loaded. A soil bank was used to shield the drag-line operator as the initial layer of earth was placed over the box. Exposure to personnel was held to a minimum during the entire operation.

Mechanical failure of the traveling grate on No. 5 boiler in the 284-W Power House necessitated the unit's immediate removal from service on September 23. Continuity of operations was unaffected however. Repairs were completed the following day and the unit returned to service.

Power Engineering personnel from this operation continued to lend assistance to the Irradiation Processing Department. In an effort to improve contamination control a survey was made of ventilation equipment in the 105-C Building. Preliminary surveys of the 1704-K Buildings were completed in an endeavor to correct conditions involving uneven heating and ventilation.

C. Improvement Experience

Annual savings in the approximate amount of \$10,000 annually was realized in that the roll was reduced by two (net) people during the month.

A significant development contributing to future savings involves arrangements for off-site procurement of glove port rings which are used extensively in the production line hoods in the process plants. The rings are being set up as a stores stock item which will reduce the unit price from \$13.00 to \$4.00 when purchased in lots of 100 or more.

A critical review of seven distinctly different classes of spare parts, totalling \$76,000 in value has been completed. From this amount spare parts totalling \$13,500 in value (or 17.7%) have been deleted to date.

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The development of a building preventive maintenance and inspection program is essentially complete. The administrative mechanics to provide control of the program are being installed in cooperation with the Maintenance and Industrial Engineering Operation.

III. ORGANIZATION AND PERSONNEL

A. Safety and Security

No disabling injuries were incurred. Medical treatment cases totalled 14 which reflects an injury frequency rate for the month of 2.68.

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

B. Personnel Activities

No off-site trips were taken by personnel of this operation during the month.

Craft training sessions sponsored by this operation were attended by 44 employees from throughout the department during September.

Eleven employee suggestions were submitted through the suggestion system by employees of this operation of which four contained sufficient merit for adoption.

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

CHEMICAL PROCESSING DEPARTMENT
FINANCIAL OPERATION

SEPTEMBER, 1957

I. Responsibility

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

II. Achievement

A. Product Cost

A new operating report form has been designed for the detailed presentation of items comprising General and Administrative and Protection of Plant and Personnel overhead costs. It is anticipated that in addition to providing more information at management levels, the mechanical routines accompanying the preparation of these reports will save considerable time in the consolidation and balancing of operating statements.

As a cost reduction measure, all pocket size code books have been recalled and replaced with code listings on 8½ x 11 inch paper. Elimination of the small pocket size code books will save approximately \$600 per year through the elimination of the special reproduction processes required in printing the small size books.

During the month, arrangements were finalized and approved for the distribution of waste scavenging charges to both Purex and Redox. Previously all waste scavenging costs were absorbed by Redox. The August costs reports, issued in September, reflected this revised cost distribution.

During August, essential materials inventory decreased \$24,000 from the previous month. Since the decentralization at August 31, 1956, the essential materials inventory has been reduced \$571,000 or 36%.

CPD's portion of the spare parts inventory, at August 31, 1957, represents 51% of the HAPD total as compared with 58% at the time of decentralization.

B. Personnel Accounting

A plan has been developed jointly with Employee Relations which will culminate in a drive to increase participation in General Electric's Stock Bonus Plan and an attempt to press more closely to the 100% level of participation in the Insurance and Pension Plan.

In the case of the latter two plans, within CPD, five non-exempt employees have signed waivers of participation in the Insurance Plan, while seven exempt and seven non-exempt employees eligible to participate in the Pension Plan have either signed waivers or have discontinued participation.

An effort will be made to "sell" these few, on the demonstrated advantages of GE's Insurance and Pension Plan by letter to their respective supervisors. If unsuccessful in this attempt, Employee Services will contact the employees direct. It is anticipated that these efforts will result in increased participation in the subject benefit plans.

A plan has been completed which will result in moving Personnel Accounting to 222-B and combining the voluminous files of Employment, Salary and Wage, Security and Personnel Accounting. In addition to the benefit of combining the files, much better liaison can be maintained between the two operations which have many closely related functions in the area of employment, terminations, transfers, salary data, etc. It is anticipated that as a direct result of this move two non-exempt people will be released for other assignment (one in Personnel Accounting and one in Employment) resulting in a savings of approximately \$9 000 annually.

This planned consolidation is currently under study awaiting management approval.

The recent modification of craft trainee progression schedules to permit a beginning rate at the 27 month level, for those so qualified, has raised considerable question in CPD as well as in the other components. The principal problem raised is the proper date to effect the change. Several operations feel it should be retroactive to date of employment if the evidence of tests then conducted shows the trainee was qualified.

In this regard the question of non-reimbursability has been raised since there is the possibility that to place the schedules in effect retroactively would not be covered by Appendix "B". An investigation as to the proper date to place the schedules in effect is under way, with resolution expected in October.

Statistics:

1. <u>Number of CPD Employees</u>	<u>Monthly</u>	<u>Weekly</u>	<u>Total</u>
Employees at Beginning of Month	415	1 282	1 697
Additions and Transfers In	2	6	8
Removals and Transfers Out	(5)	(22)	(27)
Transfers from Weekly to Monthly	--	--	--
Transfers from Monthly to Weekly	--	--	--
Employees at End of Month	<u>412</u>	<u>1 266</u>	<u>1 678</u>
2. <u>Overtime Payment During Month</u>	<u>September</u>	<u>August</u>	
Non-exempt Employees	\$10 158*	\$22 759**	
Exempt Employees	<u>3 938</u>	<u>3 268</u>	
Total	<u>\$14 096</u>	<u>\$26 027</u>	

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

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

3. <u>Gross Payroll</u>	<u>September</u>	<u>August</u>
Non-exempt Employees	\$612 030*	\$793 470**
Exempt Employees	<u>318 046</u>	<u>321 319</u>
Total	<u>\$930 076</u>	<u>\$1 114 789</u>

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

4. <u>Pension Plan</u>	<u>September</u>	<u>CY to Date</u>
Number retired	0	9
Number who became eligible for participation	2	35
Number who elected to participate	2	35

5. <u>Insurance Claims Paid</u>		
Employee Life Insurance	0	3
Amount	0	\$43 961
Employee Weekly Benefit Claims Paid	28	214
Amount	\$2 003	\$20 864
Employee and Dependent Accident and Health Claims Paid	171	2 054
Amount	\$18 798	\$209 874

6. <u>Suggestion Awards</u>		
Number of Awards	54	356
Total Amount of Awards	\$375	\$9 566

7. <u>Preferential Rates</u>		
Number Added	0	0
Number Eliminated	1	4
Number Currently In Effect	54	54

8. <u>Number of Military Allowance Payments</u>		
Number	1	2
Amount	\$432	\$880

9. <u>Participation in Benefit Plans</u>	<u>Qtr. Ending</u> <u>9-30-57</u>	<u>Qtr. Ending</u> <u>6-30-57</u>
	<u>Number</u>	<u>%</u>
Pension Plan	1 653	99.1
Insurance Plan - Personal Coverage	1 702	99.8
Dependent Coverage	1 333	—
Stock Bonus Plan	977	58.2
Savings Plan	242	14.1
Good Neighbor Fund	1 066	63.5

C. General Accounting

There were 26 active GPD projects with \$14.0 million authorized funds as of August 31, 1957. Expenditures and commitments of \$9.4 million and \$1.6 million, respectively have been incurred against these projects. Cost of \$268 000 was incurred during August.

Project authorizations received during September totaled \$312 300 consisting of \$122 500 for the expense portion of providing Fire Resistant Exhaust Filters - Z Plant, \$135 000 for Feed System and Powder Pick-up Modifications in UO₂ Plant, \$15 600 for design and purchase of sluice gate for an Interim Waste Crib - Purex, \$25 000 for preliminary design of Miscellaneous Improvements to UO₂ Plant, and \$14 200 for design and radiation monitoring services for drilling of Test Wells - 216 BC Crib Area.

Project closed during September and their closing costs were Crib Methods Selection Tests - \$39 596, and Improvements to Redox Plant Ventilation - \$171 043.

The Accrued Costs - Closed Projects August 31 account balance was \$229 383. This was a decrease of \$73 283 during August consisting of the following charges: (a) \$57 418 Hanford 4X Program - Metal Conversion Plant, (b) \$15 757 - Redox Contamination Control Facility and (c) \$108 to other project accruals.

The GWIP July cost reports - Changes of Plant and Equipment Work in Progress and Summary Cost and Estimate were delivered to Contract Administration as scheduled.

Plant and equipment balances at August 31, 1957 were:

<u>Plant and Equipment</u>	<u>Asset</u>	<u>Reserve</u>	<u>Net</u>
In Service	\$230 750 887	\$ 86 147 137	\$144 603 750
Held for Future Use	8 256 571	4 189 860	4 066 711
Not Used Nor Currently Useful	<u>74 747 064</u>	<u>74 747 064</u>	<u>-0-</u>
Total	<u>\$313 754 522</u>	<u>\$165 084 061</u>	<u>\$148 670 461</u>

August depreciation charged to product cost amounted to \$902 028 which is an increase of \$66 627 from the amount charged in July. This amount includes assessments of \$88 506 from R & UO, \$9 064 from LPD and \$18 767 from HLO. Depreciation expense charged to standby amounted to \$46 477 which is approximately the same as was charged for July.

Physical counts of movable equipment in custody of 200-E General Maintenance, 200-W General Maintenance and Shops Operation have been completed. Reconciliation of the physical counts of equipment in custody of 200-E and 200-W General Maintenance Operations have been completed. Reports covering these inventories are in progress.

Ninety-three voucher checks totaling \$268 939.03 were prepared in September, 1957 compared to only seventy-one checks amounting to \$236 604.62 in August.

HOO AEC audit staff completed an audit of all Travel and Living expense reports processed from September, 1956 through August, 1957.

A supplement to Travel, Living and Moving Expense Advice 5.4.4 was issued in September to cover the changes made regarding cancellation requirements for transportation and hotel reservations.

D. Auditing

Field work in connection with the following audits was completed during the month:

1. Management of Capital Assets
2. Payroll and Timekeeping
3. General Books
4. Project 691
5. Employee Good Neighbor Fund

Audit report covering the findings and recommendations in connection with Item 1 above was prepared and issued.

Audit reports covering the remaining items will be issued during October.

E. Procedures

Substantial effort was expended working with the Task Force for reconciliation of the Benefit Plans Accounts.

In cooperation with other HAPO Procedures Specialists, the study of plans for possible integration and automation of General Ledger and Product Cost was continued.

A new Business Training Recruit, Elwon Lance, reported to the Procedures Operation on September 4, 1957 for his first assignment in CPD Financial Operation. At month end, Mr. Lance was rotated to the Measurements Operation for a two months assignment.

F. Measurements

Cost and production analysis reports for Redox, Purex and Finished Products Operations, comparing actual costs and production with forecasts, were prepared and issued to interested level three management.

Preliminary work in connection with the issuance of the CPD Measurement Report, due December 1, 1957, was started.

Considerable effort was made toward the preparation of cost and production figures for use, by the General Manager, CPD, in the visit of General Electric and AEC personnel during September and the latter part of August.

III. Organization and Personnel

A. Safety and Security

A safety and security meeting for all Financial Operation's personnel was held on September 27, 1957.

No major or minor injuries were experienced during the month.

There were no security violations experienced during the month.

B. Reports Issued

HM-52262	Waste Scavenging Charges	B. M. Dobbs
HM-52383	Essential Materials Inventory and Consumption Report, August, 1957	S. R. Myers
HM-52394	CPD Operating Report, August, 1957	M. M. McDonald
HW-52462	Redox Cost and Production Analysis - August, 1957	G. H. Temple
HM-52463	Purex Cost and Production Analysis - August, 1957	G. H. Temple
HM-52464	Finished Products Cost and Production Analysis - August, 1957	G. H. Temple
HM-52470	CPD Unit Cost Information, August, 1957	K. G. Grimm
HM-52471	August Unit Cost Information-Redox	B. M. Dobbs
HM-52472	August Unit Cost Information - Purex	B. M. Dobbs
HM-52473	August Unit Cost Information - Finished Products	B. M. Dobbs
CMVI-79	CPD Cost and Production Performance - August, 1957	K. G. Grimm

Manager - Finance

October 8, 1957

CHEMICAL PROCESSING DEPARTMENT
FACILITIES ENGINEERING OPERATION

October, 1957

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I. RESPONSIBILITY

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

II. ACHIEVEMENTS

PUREX OPERATION

A. Research and Development

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B. Process Technology

1. Portable Waste Tank Circulators

Possible designs of portable waste tank circulators were conceived jointly with Purex Technology while considering the need for additional circulation in the present 241-A waste tank farm. Such circulators would supplement those already installed in the tanks in correcting the hydrostatic limitation that currently places half of the circulators in an inoperable position. Also, portable circulators would be needed in the event present circulators become plugged or upon failure of the air supply piping.

Two types of portable circulators were conceived: a fixed-height and adjustable-height type. The fixed-height circulator would consist of a weighted base, a flow tube of predetermined length consistent with hydrostatic head limits, and a lifting bail. The adjustable-height circulator would employ a telescoping flow tube and float device to maintain the liquid discharge at a constant and optimum level below the tank liquid level. A remote positioning technique was also outlined employing a mobile crane and a hydraulic cylinder for locating the portable circulator in the waste tank.

2. Prototype Pu Anion Exchange

Preliminary studies are being made on the modifications that will be necessary to convert the Prototype Plutonium Anion Exchange Unit into an acceptable manufacturing facility, following prototype testing and demonstration. For purposes of orientation, a process flow diagram was prepared, in cooperation with Purex Technology, showing the anticipated peak and average stream flows for initial runs. This diagram will reflect any changes in stream flow characteristics, as firm operating data become available.

3. Prototype Ionization Chamber

A prototype installation of an ionization chamber on a jumper in G cell is planned. The chamber will be placed next to G-G3 centrifuge. It is expected that this instrument will aid in determining the build-up of particulate matter in the centrifuge and in predicting the need for cleanout. A major problem in such an installation is the inadequacy of standard jumper electrical connectors for carrying the connections for ion chambers. It is not expected that good quantitative measurements can be made at low radiation levels; however, it should be possible to follow short time trends. Design has been completed for a jumper carrying an ion chamber with shielding to eliminate radiation from an adjacent centrifuge.

C. Plant Engineering

1. Manpower Standards

Preliminary scoping has been initiated to determine manpower requirements for the entire Purex Operation. This study was originally scheduled several months ago, but was postponed until an equilibrium condition could be reached after planned manpower adjustments. This has been accomplished, and the Purex Operation has indicated that the timing is correct for a very detailed study. Following IEO policy, it is the plan to not only establish the manpower standard, but to assist the various operations in meeting the standards being established.

2. Maintenance Management

A maintenance supervisor has been assigned the job of accelerating progress on the installation of the Purex maintenance management program. Although the program is well underway, it was felt that an individual from within the maintenance organization, working with the assistance of the plant industrial engineer, could materially contribute to the earliest possible acceptance of the newest and best maintenance management principles and techniques to the Purex program. The first item to be investigated is the method of communicating information regarding individual maintenance jobs.

D. Project Activities*

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

The 293-A facility was accepted by Purex Operation September 16 with minor known exceptions and with recognition that as yet satisfactory on-stream operation of the facility has not been demonstrated.

In all tests to date, only minor traces of nitrogen oxides could be detected in the 291-A Stack discharge, indicating good caustic scrubber operation despite the presence of sizeable quantities of nitrogen oxides in the scrubber feed gas.

Some difficulty has been experienced in meeting the acid recovery and product concentration criteria of the facility. This difficulty is ascribed to operation at the low end of the equipment rangeability; other contributing factors such as high initial reflux temperature and a dry bubble cap tray due to excessive liquid flow through the specific gravity chamber have been corrected. Studies to determine possible improvements in rangeability by circulation

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of product acid over the upper trays of the absorber are in progress. Other work on this project will be directed at refining the dissolver processing conditions so as best to integrate the operating characteristics of both the 202-A and 293-A Building equipment.

2. CA-719 - Additional Facilities for Tank Farm Vapor Wastes

A project proposal revision is being prepared requesting additional design funds and an extension of the scheduled design completion time. The increased design is due to changes in the criteria as a result of the increasing radioactivity in the condensable vapor and corrosive action of the non-condensable vapor. A preliminary estimate of the magnitude of the project cost is now \$1,300,000, including \$90,000 for design and a 25 per cent contingency.

3. CG-719 - Waste Tank Farm Condensate Disposal

A study was made of the Purex tank farm surface condenser installation to determine:

- (1) The maximum vapor production rate of the Purex tank farm as predicted from the current plant production forecast.
- (2) Maximum heat transfer duty, cooling water rate, and shell-side and tube-side pressure drops as a function of inlet cooling water source and temperature.
- (3) Recommendations on course of action.

It was concluded that two of the available condensers installed in parallel and using waste cooling water from the 202-A Building would be capable of handling the maximum vapor production rate of the Purex tank farm with the Purex plant operating at a capacity factor of 3.2.

4. CA-773 - Interim Waste Crib, Purex

Project proposal CA-773 was transmitted to the Commission on September 12. It requested \$150,000 total project funds for provision of an interim crib to replace the 216-A-8 crib which is expected to fail by January, 1958. Emergency measures were required to obtain authorization of the funds from Washington in lieu of the FY-1958 Financial Plan.

A directive and a work authority were issued by the Commission on September 23 and 24, respectively, authorizing this work. A

design order has been issued to Construction Engineering Operation to proceed with detailed design.

*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

REDOX OPERATION

A. Process Technology

1. E-Metal Processing

The definitive process design covering the annular dissolver systems required for the E-Metal processing program at Redox was completed. This design will serve as the basis for detailed design under Project CG-722, and will also be used in outlining necessary design verification tests to be conducted within the Hanford Laboratory concurrently with final design work. This two-fold approach is being used to meet the pressing schedules imposed by the E-Metal processing program.

2. Pumps

The first glass bearing pump installed in Tank F-1 failed after 5 months of service. This is the best service life obtained from a pump in this position for some time. The glass bearing pump in Tank D-14 failed after a month due to freezing in the pump. This is no better than service obtained with carbon bearings indicating that the freeze-up is due to solids in the system. A new pump is now being prepared in the shop for D-14 with increased internal clearances for solids handling. Other new features of this pump are: (1) a new type discharge head that permits better handling of seal leakage; (2) an extension on the shaft that permits the pump to be turned by the impact wrench if it becomes frozen; and (3) a larger motor.

3. Cask Car Contamination

Tests have been initiated to determine the need for lids on cask-cars. If it is found that elimination of the lids does not increase contamination control problems, it may be possible to materially reduce the capital cost required to solve the current cask-car contamination problem. The Industrial Engineering Operation will

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conduct the tests in cooperation with CPD and IPD Radiation Monitoring and Production organizations.

B. Project Activities

1. CG-648 - Off-Gas Treatment Facilities

A Physical Completion Notice was issued on September 16, 1957. As of this time there are several known exceptions for which money will be accrued in the Physical Completion Notice. The major known exceptions consist of: (1) Installation of control instrumentation on the reclaimed acid feed to the dissolvers; and (2) modification of the compressed air supply to the dissolver off-gas jets.

The 3-inch dissolver off-gas lines from the jets to the stack have been replaced with 6-inch lines. Tests have indicated that with the jet operation on steam, satisfactory jet performance will be attained. However, on motive air, the jets will not produce sufficient vacuum with the present air supply. It is believed that by modification of the air supply system to eliminate pressure drops, satisfactory operation of the jets will be obtained. A study of this problem is under way.

While there are several minor changes to be made, the facility is mechanically capable of going "hot". However, it is estimated that completion of necessary cold operability tests will require two weeks, and it is expected the facility will be placed on-stream approximately October 14, 1957.

FINISHED PRODUCTS OPERATION - "Z" PLANT

A. Research and Development

A new type rotary valve designed for immediate application on Project CG-691 to handle the fine, sticky powders that have been encountered is being tested, modified, and adjusted under an extensive design and development program. Designs have also been developed covering new bearings and packing glands for the rotary drum filter agitator. Development work is presently underway to improve the fluorinator off-gas system.

B. Plant Engineering

Industrial Engineering Report No. 119 indicates that savings of 0.8 man days per shift (3 shifts) can be accomplished by the installation

of relatively simple semi-automatic controls on the D-6 and D-7 tank transfer jets. It is estimated that installed cost of these controls will be substantially less than \$5000. A scope design is being prepared.

C. Project Activities

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

Since it was probable that the currently authorized funds of this project would be depleted prior to authorization of additional funds if all of the project work had been continued, a course of action was taken that would assure availability of funds for modification of the 9B hood. All field fabrication and installation work, except modifications and corrections on hood 9B, was suspended until additional project funds are authorized.

After having been shut down three weeks for modifications, hood H9B was started up on September 17. As a result of the modifications, satisfactory filter cake was produced. However, further difficulties were encountered with the fluorinator off-gas filter and vacuum, and the rotary valve powder handling problem has not been completely corrected. Continued combined efforts of Process Design and Development, Research and Engineering, Project Engineering, and Z Plant operations are being put forth to eliminate the difficulties from hood 9B.

2. CG-734 - RMC Button Line

The AEC has approved the design scope of Project CG-734. The detail design of this project is generally proceeding on schedule. It is estimated that overall design is 37 percent complete. Progress of the design work during the past several weeks has been affected by the startup difficulties on Project CG-691. Approvals have been received on all the architectural and structural drawings on most of the mechanical drawings associated with hood H-C7 and all the mechanical drawings for hoods H-C10, H-C11, and H-C12S. Mechanical design drawings for all the remaining process hoods have been started.

3. CG-756 - Fire Resistant Exhaust Filters, Z Plant

A directive was received September 20, 1957, authorizing total project funds in the amount of \$300,000.

The filter order has been delayed in the vendor's shop because of high priority work for Rocky Flats. Some filters have been shipped to Hanford, and the vendor promises completion of the order approximately November 15, 1957.

FINISHED PRODUCTS OPERATION - UO₃ PLANT

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A. Research and DevelopmentSegregation of Enriched Metal

A study of the use of UO₃ Plant equipment for segregation of E metal made preparatory to scoping the work resulted in the following conclusions:

- (1) In order to obtain maximum segregation on a minimum schedule, the initial E-metal should be processed through the batch pot system. Initial operation through the continuous calciners would cause costly downgrading due to the un-enriched bedding powder. Operation in the batch pots will allow the collection of enriched powder for use as bedding powder in the continuous calciners.
- (2) Because of the small quantities of E-metal to be processed, normally 50 to 75 tons per batch, it would be unnecessary to provide installed spares for any of the E-metal equipment other than allowing the selection of up to three continuous calciners.
- (3) Segregation should be handled by the following steps which may be completed progressively:

Step 1:

Completion of the following items prior to May, 1958, will permit processing of E-metal through the batch pot system:

- (a) Provide a new receiving and storage tank in the 203-U enclosure. Inventory and accountability regulations may require a separate receiving tank.
- (b) Adapt existing piping to permit feeding the 100 percent UNH concentrators from the new storage tank.

Step 2:

Completion of Step 1 will allow segregation through the UO₃ Plant; however, manpower and maintenance requirements make it desirable that the continuous calciners be incorporated into the segregation program at an early date. It is proposed that the following items be completed before January 1, 1959 in order to operate the calciners with the larger quantities of E-metal scheduled for production after that date. Following the completion of these items the continuous calciners may be used with the batch pot unloading system.

- (a) Provide necessary chemical addition piping and control system to permit sulfuric acid addition to tank X-19.
- (b) Provide a new feed loop header from the X-19 tank to the G, H, and J calciners.
- (c) Attach the powder unloading ducts from G, H, and J calciners individually to a new vacuum transfer line. This line will lead to the X-5 cyclone of the batch pot unloading system.

Step 3:

The continuous calciners may be used for E-metal after completion of Step 2; however, it may be advisable to provide a separate powder handling system for the E-metal. Maintenance expenses and operational manpower requirements may dictate placing the batch pot unloading system on a standby status.

Should this system be placed on standby, a new and separate unloading system will be required to handle E-metal through G, H, and J calciners. Installation of mechanical conveyors may be incorporated into the system.

A complete and separate study will be required to determine the economic advisability of a new and separate unloading system.

B. Process Technology

Continuous Calciners

Several improvements to the continuous calciners are being developed:

- (1) The agitator arms are being re-designed to provide for more strength. Recent failures appear to be caused by fatigue stresses.
- (2) The rotational speed of one hammer mill has been increased from 5,100 rpm to 6,900 rpm. Operation since the change indicates better conformance to particle size specifications.
- (3) Design work to evaluate the use of a replacement hammer mill cover has been initiated. This cover would provide closer clearances with the hammer and a short screw conveyor for more uniform feed to the mill.
- (4) A watt-meter is being installed on one calciner furnace to provide data for evaluation of heat input as a function of production rates.

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C. Project Activities

1. CG-712 - Reduction of Air-Borne Noxious Fumes

The physical completion notice was initiated on September 30, 1957. The project will be closed with an underrun of approximately 12 percent (\$7000).

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

The project proposal requesting \$135,000 (equipment budget) to improve the calciner feed system and powder pick-up equipment was transmitted to the AEC on August 16. Directive for the work was received on September 19, 1957.

Drawings approved for construction have been issued. The Adams filters to be used in the feed filter system have been removed from "G" cell and the cartridges rescreened. Removal of the abandoned Cuno filter system has begun.

GENERAL ACTIVITIES

A. Research and Development

1. Contracts

a. Contract DDR-10

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

A supplement to the contract for an additional expenditure of \$1,588.37 is being negotiated. The total contract price will be \$5,991.61. The supplement provides for material, tensile strength tests, for calibration of a Hanford impact wrench, and for other minor additions to the stud testing procedures.

b. Contract DDR-18

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

Work by Bird Machine Company under Contract DDR-18 for the development of a separate forced lubrication system for the centrifuges is nearly completed. Tests, witnessed by a HAPO engineer, performed on a prototype September 9, 10, and 11, 1957 indicated that the system will be entirely satisfactory. The prototype equipment is being shipped to HAPO at this time and further shop tests will be made before in-plant installation is started.

2. Sampling Process Streams

Procedures for sampling process streams which have in-line instruments are being reviewed for both Redox and Purex. In-line and manual sampling procedures should be the same for all process streams having in-line instruments, but this is not currently the case. By proper selection of equipment and procedures, sampling errors can be minimized. A proposed procedure which would be consistent for all instruments is being prepared for consideration by all the operations.

3. HAPO 25-3 Program Reactor

A study was made of Chemical Processing Department requirements for processing spent fuel elements of alternative designs from the HAPO 25-3 Program Reactor. New facilities required in each case would be a critically-safe dissolver facility in the 221-U (or 221-T) canyon, an underground pipeline to the Redox Plant for solvent extraction processing, and special cask cars, casks, and buckets for delivery of spent fuel elements. Project cost estimates, incremental operating costs, and total production costs were determined for each fuel element alternate and transmitted to Irradiation Processing Department for inclusion into the overall program reactor study.

B. Process Technology

1. Critical Mass Laboratory

The preliminary design study on the critical mass laboratory was completed and the summary report (HW-52441) issued. This report is being used by the Hanford Laboratories as design scope for project proposal action; design and construction cost estimates prepared with this design as a basis will appear in the project proposal for design funds.

2. Plastics Development

A new type laboratory size hood permitting a simplified standard

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design with greater accessibility and improved confinement for contamination was presented in a report (HW-51940) describing flexible box hoods. Construction of such a hood which features a flexible working panel with retaining bars is considered the next logical step in developing simplified paneling for large contamination enclosures.

3. Photographing Interior of Waste Tanks

Equipment for photographing the interior of waste storage tanks has been fabricated and tested in a non-contaminated area. With slight modifications, the equipment is ready for use in a contaminated zone. It is planned to photograph a portion of the interior of 115-SX. Photographing this tank will best simulate conditions of the reclaimed tanks while exposing the equipment to a minimum of radiation and contamination. Results of this test will dictate future procedures. It is planned to photograph the entire interior surface of a reclaimed waste storage tank.

4. Corrosion Problems - Purex and Redox

Investigations are being conducted into the feasibility of overcoming condensate trap corrosion in Purex and the steam pipe plugging in Redox by the use of filming amine type of steam additives.

A sample of "Permacol" has been received from Betz Laboratories, Inc. to be used for tests to determine the compatibility of this steam additive with both the Purex and Redox processes. Permacol is the Betz Laboratories trade name for a mixture of octadecylamine and octadecylamine acetate. Tests are currently underway but final decisions cannot yet be made. It is expected that an emulsifying agent used in Permacol may actually be more harmful than the active ingredients.

Filming amines have a tendency not only to prevent corrosion, but to cause corrosion products already in the system to be loosened and flushed out. For this reason, amine treatment of Redox steam would have to be accomplished gradually over a period of time in order that these loosened particles can be flushed completely out of the system rather than plugging equipment downstream from present deposits of corrosion products. It is also possible that this treatment will cause a rash of potential leaks to become evident because some of these leaks are probably presently plugged with corrosion products.

C. Project Activities1. Financial

Project Cost information as of September 22, 1957:

Total Authorized Funds - Active Projects	\$13,963,000
Total Cost-To-Date	9,726,000
Commitments & Open Work Releases	1,249,000
Unencumbered Balance	2,988,000
Costs Charged to Above Projects from 9-18-57 to 9-22-57	689,000

Projects dropped from active status during 5 weeks ending September 22, 1957 are:

<u>Project No.</u>	<u>Authorized Funds</u>	<u>Total Cost</u>
CG-655	\$100,000	\$ 39,596
CG-657	\$205,000	\$169,473

2. CG-686 - Redox and Purex In-Line Instrumentation

The process design revision for the FY 1957 in-line instrument program was completed and a summary report (HW-52503) issued. It was recommended that the FY 1957 program work, as revised, be performed under funds from Project CG-686 (Scope Revision No. 3). The total project cost for this revised FY 1957 program work was estimated to be \$140,000, including \$62,000 for Redox (no changes) and \$78,000 for Purex (a reduction of \$83,000 from the previous estimate). The resulting total cost for Project CG-686 was estimated to be \$550,000, the original amount allocated.

3. E-33526 - Tool and Die Shop Expansion, 272-W Building

It was recommended that the proposed project be rescoped to reduce costs. As a result of the rescoping, the estimated project costs were reduced from \$140,000 to \$94,000, a reduction of \$64,000.

III. ORGANIZATION AND PERSONNELA. Personnel

There were no significant personnel moves in the Facilities Engineering Operation during the month of September.

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B. Safety

Regular monthly safety meetings have been held by all operations. The favorable response to the all-girl safety meeting in August has led to plans being made for further meetings of this type.

C. Inventions

Name

Title

R. A. Ciccarelli and R. A. Kennedy	A Valve with Remote Removal of All Operating Parts - September 16, 1957
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D. Reports Issued

HW-52297	Purex Two-Cycle Conversion, 3.2 Capacity Factor Expansion, Definitive Process Design, J. R. LaRiviere and L. L. Zahn, September 9, 1957.
HW-52351	Surface Condensers, Purex Tank Farm, D. E. Braden, September 3, 1957.
HW-52441	Preliminary Design - Critical Mass Laboratory, W. A. Graf, September 12, 1957.
HW-52503	Process Design Report, In-Line Instrumentation, Redox and Purex - Fiscal Year 1957 Program, Rev. No. 1, R. J. Pence, September 27, 1957.
HW-52740	A Critical Review of Alternate Methods of Purex Solvent Treatment, N. R. Gordon, September 20, 1957.
HW-52845	Definitive Process Design, E-Metal Dissolving Equipment, Redox Facility, W. A. Graf, September 30, 1957.
HW-52423	Krypton-85 Recovery at HAP0, J. H. Warren, September 10, 1957.
	Confidential Undocumented letter, Separations Plant Requirements, 25-3 Program Reactor, L. L. Zahn, September 19, 1957.
	Letter, Additional Facilities to Handle Purex Tank Farm Vapor Wastes - Project CA-719, to H. H. Schipper, AEC from H. P. Shaw dated August 29, 1957.
HW-51940	Flexible Box Hoods, H. A. Moulthrop, September 12, 1957.
HW-52036	Project Proposal, E-Metal Dissolvers, Redox (Project CG-772), R. H. Silletto, August 27, 1957.

HW-52276 Project Proposal, Interim Waste Crib, Purex (Project CG-773),
L. W. Finch, September 4, 1957.

Budget Review, Chemical Processing Department, Plant Acquisition and
Construction Budget, FY 1958 and Prior Years, D. R. Gustavson, September
25, 1957.

E. Trips

M. E. Yates visited the plant of Manning, Maxwell and Moore, Inc.,
Muskegon, Michigan, on September 11, 12, and 13. The purpose of the
trip was to inspect and witness performance tests of the 40-ton remote
crane for Purex.

G. A. Conner attended a meeting of the American Welding Society in
Portland on September 10, 1957, to assist in presentation of a talk by
E. B. LaVelle of CEO.

R. C. Hollingshead visited the Bird Machine Company, Walpole, Mass.
September 9, 10, and 11 to witness tests performed on a prototype
Purex centrifuge oiling system, Contract DDR-18.

R. C. Hollingshead visited Washington State College on September 24,
1957, to discuss the progress on stud testing, Contract DDR-10.

F. Visitors

Mr. Norman Meyers of the General Electric Apparatus Sales Division of
Pasco visited the Plant on September 5 for the purpose of consulting
with J. F. Kane, G. L. Davis and R. F. Smith on the rectifier problem
in Purex.

Manager
Facilities Engineering Operation

HP Shaw:FC:mh

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HW-52864

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CHEMICAL PROCESSING DEPARTMENT
RESEARCH AND ENGINEERING OPERATION

SEPTEMBER, 1957

PUREX PROCESS TECHNOLOGY

Feed Preparation

Irradiated uranium with exposure rates of 2.8 to 6.2 MW/T (468 to 578 MWD/T) and cooling times of 103 to 122 days was dissolved and prepared as solvent extraction feed during the month. Two batches of off-standard solution were produced in the dissolvers. One batch contained 1.1 M uranium and 4.2 M nitric acid and resulted from a dissolver heel removal. The second solution was formed when coating removal solutions were combined with nitric acid which had leaked into a dissolver during shutdown. This latter solution, after acidification, had the following composition: 0.16 M UNH, 2 M NaNO₃, 1.9 M HNO₃ plus associated plutonium. Both solutions were blended with normal dissolver solution for processing.

Initial operation of the Backup Iodine Removal and Acid Absorber Facility has indicated that the two major problems which remain to be solved are: (a) low acid recovery (currently 25 to 75 per cent), and (b) unreliable performance of the instruments installed to measure pH of the solution used for iodine removal in the caustic scrubber.

Solvent Extraction

Typical performance of the solvent extraction cycles which operated 65 per cent of the month is tabulated below:

Cycle	Log Decontamination Factor, dF		Instantaneous Waste Loss, Per Cent	
	Uranium	Plutonium	Uranium	Plutonium
Precycle	2.5(a)	2.5(a)	(b)	0.19
Partition	1.8	1.9	(b)	0.23 (IBU=0.05)
Final	3.1	3.1	0.005	0.04
Overall	7.4	7.5	--	0.46

(a) Based on a calculated value of 2.5×10^6 uc/gal for HAF.

(b) No uranium analyses.

During the first portion of the month a planned shutdown was utilized to flush the 2B, 2D and 2E Columns. The 2B Column flush proved that the current increase in 2BX nitric acid concentration (from 0.01 M to 0.15 M) effectively reduced the plutonium holdup in that column to one-third the previous holdup.

After the effects of startup were overcome, the overall decontamination performance of the plant was excellent, despite the processing of large amounts

of off-standard solutions. At the time of the previous shutdown, gamma activity throughout the plant was high as a result of IWW rework; consequently, the 2AF and 2IF gamma activities reached a record high of 15 and 40-fold above normal, respectively, during the startup period. Although the first two batches of plutonium product exceeded gamma specifications, succeeding batches plus all batches of uranium product met specifications.

After the intercycle gamma activity of the plant decreased, one batch of 2WW, containing the 2B Column flushes, plus two off-standard batches of dissolver material (see Feed Preparation) were reprocessed by blending with normal dissolver solution to form HAF. The 2WW rework caused an increase of two to three-fold in the intercycle gamma activity, but neither of the solutions from head-end produced any adverse effect on decontamination. None of the material significantly affected the waste losses.

Two capacity increases (up to CF = 2.16, a new sustained, maximum rate) were accomplished with only slight increases in the gamma activity of the IAF and 2AF, but a three-fold increase in the 2IF resulted. No significant change was noted in the gamma activity of the final products, and operation at the higher rate has been smooth except for erratic 2A Column interface control.

Waste losses have remained satisfactory during the entire month except for a short-term, high-uranium loss in the ICW. A reduced L/V in the IC Column coupled with a temporary loss of heating steam for the ICX (temperature dropped from 30° to 22°C) was responsible for the ICW loss which peaked at four per cent (normal < 0.01 per cent). Operation at the higher production rate has tended toward an increased overall plutonium loss because of the erratic control of the 2A Column interface.

Performance of the 2D Column bottom-interface, float-type controller, which was installed during the last shutdown, has been excellent. Control of the interface to within $\pm 1/8$ inch is possible with this new instrument.

Plutonium Concentration

Conversion of the prototype plutonium ion exchange equipment to the anion process has been completed including the installation of a final plutonium concentrator with a titanium tube bundle. Ventilation balancing, hood maintenance feasibility and cold shakedown operation of the equipment is currently in progress.

Solvent Treatment

Continuous addition of 0.3 M KMnO_4 to the carbonate wash solution in the TK-G1 batch contactor of the No. 1 Solvent Treatment System was initiated at start-up during September. Concurrently the concentration of the wash solution for both the contactor and the IO Column was reduced from five per cent to 2.5 per cent Na_2CO_3 to increase the frequency of solution changes and thus maintain a minimum buildup of MnO_2 in the system.

Operation of the system has been satisfactory with the gamma activity of the solvent remaining significantly lower than previous run periods processing

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rework. Upon completion of rework and adjustment of the KMnO_4 flow (increased from 0.6 to 1.2 flows), the gamma activity of the solvent dropped to about 1000 uc/gal which is a new low for solvent activity since the original "hot" plant startup period. Further modification of flowsheet variables will be studied in an attempt to arrive at optimum flowsheet performance.

Fabrication of the turbomixer and jumpers for the TK-G7 continuous solvent contactor is nearing completion. Present plans are for installation of this equipment during the next shutdown period.

Operation of the No. 2 Solvent Treatment System has been satisfactory since the equipment was given a hot dilute caustic flush during the last shutdown period. The normal overall solvent loss of 0.3 per cent was increased to about 0.7 per cent by excessive solvent loss from a 200 pump seal plus an additional loss via the vent system while cleaning No. 1 Solvent System centrifuges.

Waste Treatment and Acid Recovery

The Waste Treatment and Acid Recovery sections of the plant processed the solvent extraction wastes satisfactorily during the report period. Approximately 219, 478 and 205 gallons per ton of uranium were added to the 241-A Tank Farm as neutralized IWW, carbonate washes and cell drainage, respectively. The increased IWW volume reflects the processing of an off-standard solution containing a large amount of sodium nitrate. Coating waste volumes averaged 269 gallons per ton of uranium and were split between 241-C Tank Farm and TK-241-A-101 when the line to the 241-C Tank Farm plugged. The excess caustic concentration in coating waste has been increased from four to five per cent in an attempt to minimize precipitation of aluminum hydroxide in this solution.

Overall waste losses for the month were 0.64 and 0.31 per cent for plutonium and uranium, respectively. Coating waste losses for plutonium and uranium amounted to 8 and 14 per cent, respectively, of the overall losses.

Self-concentration continued in Tanks 241-A-101 and 103 at rates of 5.0 and 6.8 gallons per minute, respectively. In order to reduce the rate of liquid level buildup in the 101 Tank, all solvent carbonate wash solutions have been routed into Tank 103.

REDOX TECHNOLOGY OPERATIONFeed Preparation

The dissolvers were in operation all but one day of the month, processing metal having exposures ranging from 463 to 731 MWD/T at power levels of 4.8 to 6.2 MW/T. The iodine-131 emission to the stack averaged 0.22 curie per day with metal cooling periods of 105 to 160 days. Because of low iodine removal efficiency, one silver reactor was replaced early in the month. The apparent efficiency of the silver reactors was 99.65 percent. The silver reactor inlet temperature for coating removal was raised from 250°F to 375°F to minimize the reaction between ammonia and silver nitrate during coating removal and thus reduce heat evolution from the subsequent nitration reaction at the start of dissolution. Since the inlet temperature was changed, the maximum reactor off-gas temperature at the start of dissolution has been approximately 425°F compared to a maximum of approximately 500°F before the change.

Further tests were made to determine the potential effects of nitric acid, recovered from the UO₃ Plant and the 293-S Redox Nitric Acid Recovery Facility, on Redox dissolver time cycles. Using 50 percent nitric acid for the initial addition and 53 percent for the incremental addition, time cycles were demonstrated equivalent to approximately 145 percent of Phase II in three up-draft dissolvers and equivalent to approximately 185 percent, in three down-draft dissolvers. With 50 percent nitric acid for the initial addition and 56 percent for the incremental addition, time cycles indicated capacities of approximately 150 percent of Phase II in three up-draft, and 190 percent, in three down-draft dissolvers. Since a lower initial acid concentration tends to reduce iodine emissions to the stack, use of 47 percent nitric acid for the initial addition and 60 percent for the incremental addition was resumed upon completion of the tests.

Testing of the use of concentrated extraction waste as a source of chromic nitrate for the catalytic reduction of permanganate ion during feed preparation was continued. The altered procedure was employed in the preparation of 88 percent of the feed batches and gave satisfactory process performance. Also, there was no apparent effect when the volumes of salt waste introduced at the catalytic reduction step were varied from approximately 11 percent to as much as 22 percent of the initial volume of the feed batches.

As a consequence of failure of the feed centrifuge tachometer, the final 20 HAF batches were processed without removing the centrifuge cake. The cake has normally been removed after every eight batches.

Approximately 20 percent of the HAF batches contained rework solution in addition to the salt waste used in the catalytic reduction step, and the additional volumes ranged from 10 to 50 percent. The rework material resulted from leakage from the throttle bushings of the 2AF and 1AFS pumps.

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Solvent Extraction

The solvent extraction system was operated at rates ranging from 72 to 120 percent of Phase II with interruptions caused by failure of the LAFS pump, failure of the HAIS pump, plugging of the 2HP chemical addition line, and flooding in the HA and HS Columns. Production requirements were met by September 27 and 60 percent nitric acid flushes of all major solvent extraction equipment were in progress at month end.

Although the HA and HS Columns were flushed with 10 percent nitric acid on two occasions earlier in the month, flooding in these columns limited combined rates to 102 percent of Phase II at the end of the operation. It appears that the 10 percent nitric acid flushes are inadequate in maintaining column capacities at the desired levels or that the extensive changes in feed preparation have had adverse effects. The former explanation, however, appears to be the more probable.

Twenty-eight percent of the 2EU batches contained excessive gamma activity, but ozonation and silica gel treatment brought all but five percent of the batches into specifications. The latter were blended to produce product meeting specifications. More than 96 percent of the 3HP batches met specifications and only two batches were reworked. The inadequate decontamination performance resulted from interface upsets in the 1A and 3A Columns, several processing interruptions, and difficulties in controlling the acidity of backcycle streams.

The seriousness of the problems of leakage past the throttle bushing and shaft seizure in deepwell turbine pumps has been emphasized by four pump failures during the month. The LAFS pump with glass bearings failed because of excessive leakage around the shaft and inadequate capacity after 1900 hours of operation. Two pumps in the HAIS position failed because of shaft seizure after operating less than 300 hours each. Study of this problem is continuing from a process chemistry standpoint in the laboratory, and tentative plans are being reviewed for testing a major flowsheet change, viz., the substitution of an alternate reducing agent in the 1B (Partition) Column for the currently used ferrous ion, which is known to cause the formation of a solid Fe-Cr-Al complex. This precipitate is believed to be a major contributor to the pump failures.

The failures this month are summarized as follows:

<u>Pump Position and Number</u>	<u>Operating Life, Hours</u>	<u>Cause of Failure</u>
D-8 No. 7 (Neutr. Waste)	497	Leakage and capacity loss
D-14 No. 10	270	Shaft seizure
D-14 No. 11 (HAIS Pump)	144	Shaft seizure
F-1 No. 12 (LAFS Pump)(glass bearings)	1900	Leakage and capacity loss

The average life of the deepwell turbine pumps has been approximately 500 hours in each of the positions listed. The 2AF pump developed a leak between the pump and tank flanges but is not listed as a failure because the capacity is still adequate and a baffle is being installed to contain the leakage material within the tank.

The use of glass bearings in place of graphite in the LAFS pump (F-1 Pump No. 12) may have been the cause for the prolonged service as compared to earlier deepwell pumps. In contrast, the last regenerative turbine pump (F-1 Pump No. 2) in the LAFS position operated almost 20,000 hours including over 2000 hours under flowsheet conditions similar to those now in use. The LAFS pump (No. 12) was replaced with the first of the deepwell turbine pumps which have been redesigned so that all throttle bushing leakage will be held within the tank. Containment of leakage is ensured in the new design by elimination of the annular discharge piping which greatly restricted the size of the slinger ring ports.

It is also planned in the near future to change the point of addition of the HAIS to the HA Column, from the midpoint of the scrub section to the feed point. This will permit increasing the acid concentration in the HAIS concentrator which will help suppress the formation of the above-mentioned precipitate.

Waste Losses

Over-all recoveries were 99.95 percent for uranium and 99.67 percent for plutonium. The losses resulted mainly from the 2AF pump leak and abnormal extraction losses from upsets caused by mechanical difficulties.

Waste Storage

The neutralized waste volume averaged 1060 gallons per ton of uranium, exceeding the flowsheet value by approximately 15 percent as a result of extensive waste rework and interruptions in the HAIS flow. Coating waste volumes for the period averaged 126 gallons per ton of uranium dissolved, representing a reduction of approximately 28 percent from the figure for the previous month. The test program on sludge temperatures and pressurizations in a tank whose contents are self-concentrating, was delayed due to interference by the project for transfer of non-boiling wastes, but should be started next month. The program is given in HW-50216.

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DECLASSIFIEDFINISHED PRODUCTS TECHNOLOGY OPERATIONURANIUM CONVERSION OPERATIONProcess Performance

A total of 11 carloads were shipped during the month. All carloads met product specifications. The total metallic impurities (TMI) averaged 69 parts per million parts of uranium. The gamma activity ranged from 7 to 17 percent of that of aged natural uranium. The reactivity ratio (925°C reduction and 600°C hydrofluorination) averaged 0.81.

Nine hundred eighteen pounds of nitric acid per ton of uranium processed (89% of theoretical) were recovered. The average concentration was 46 percent.

Intermittent production of powder which failed to meet the particle size specification was experienced. In an effort to improve hammermill performance by maintaining a constant feed rate, a 5-inch rotary valve of new design and a Stellited vane rotary valve (original 8-inch design) were installed and are currently under test. The speed of one hammermill was increased from 5000 to 6900 rpm and satisfactory product was obtained.

Continuous Calciners

Feed injectors modified with expansion joints were installed in two calciners during the month. There were no thermal stress failures of feed injector pipes on any of the calciners during this period.

Installation of wet separators on five calciners has been completed. Operation of the units was very satisfactory with only minor difficulties affecting calciner vacuum early in the month. Pluggage of the drain line on one unit resulted when the flow of acid was interrupted for a short time during calciner operation. After installation of the wet separator on the G-Cell calciner, the unit achieved an operating efficiency of 95 percent for the month.

Agitator damage was sustained in H, J, and M-Cell calciners during the month. Since the nature of these agitator failures indicates that the arm is inherently weak, it is planned to repair future failures with arms of stronger design. A prototype agitator has been designed to pilot replacement in all calciners.

The pick-up bin modification has been made in all cells. Operation has been satisfactory with no pluggage during normal operation.

METAL FINISHING OPERATIONTask I and II

Approximately 135 runs were processed in the continuous facility. Flow

FINISHED PRODUCTS TECHNOLOGY OPERATION

control of the feed and oxalic acid streams was improved for the continuous strike and supernate losses averaged 1.7% during steady state conditions.

Vacuum control on the fluorinator has been troublesome owing to the excessive inleakage of the hood atmosphere. About 20% of the runs processed required refluorination. All buttons produced were well within the required density specification.

Recuplex

Forty-six runs were processed through the SC hood including 23 combination powder and Task III crucible runs, 9 Task III crucible runs, 8 combination Metallurgical Laboratory waste and crucible runs, 2 Task IV crucible runs, and 4 clean-out runs. Slurry losses to the crib were 0.5% of the recovered plutonium in the SC filtrate solutions.

The neutron counter installed in the slurry receiver tank, D-11, was tested under operating conditions and compared with laboratory results. The following results were obtained:

<u>Total Pu. grams</u>			<u>Total Pu. grams</u>		
<u>Run</u>	<u>Counter</u>	<u>Laboratory</u>	<u>Run</u>	<u>Counter</u>	<u>Laboratory</u>
FP-25	16.0	15.6	CO-33	16.0	8.6
FP-28	14.5	15.9	Caustic Flush	2.5	2.8
Caustic Flush	2.0	3.8	FP-38	40.0	23.0
FP-27	9.5	7.7	CO-40	12.5	5.7
FP-30	1.5	-	Caustic Flush	10.5	5.4
Caustic Flush	5.5	3.4	FP-43	16.5	6.4
FP-31	9.5	9.6	FP-44	19.5	14.4
Caustic Flush	0	0.6	Caustic Flush	0.5	0.3
FP-34	7.5	3.8	Water Flush	0.0	0.0
Caustic Flush	3.0	1.7			

The slurry counting tests will be continued to reduce the number of laboratory determinations as an objective.

The solvent extraction columns maintained an average feed rate of 1530 liters/day at an operating efficiency of 78.4% giving an instantaneous rate of 1940 liters/day. Waste losses averaged 0.0096 g/l Pu or 0.75% of the plutonium fed to the columns.

The solvent extraction hood floor clean-up was completed during the month. The flush procedure entailed adding a controlled amount of floor material to a batch of fresh organic (in the Recuplex K-1 or K-2 organic feed tanks), followed by agitation and decanting of the aqueous to the dilute CAFB feed system. The remaining organic was then given successive washes with ferrous ammonium sulfate - sulfamic acid and sodium carbonate to remove

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FINISHED PRODUCTS TECHNOLOGY OPERATION

plutonium and organic decomposition products, respectively. The new procedure recovered approximately 3.6 Kg of Pu from the SE hot floor.

The H-2 teflon pulse bellows failed for the first time since Recuplex start-up in March, 1955.

PROCESS CHEMISTRY OPERATIONPROCESS ASSISTANCEPurex Process Studies

A laboratory study was made of the feasibility of processing a batch of plutonium-containing coating waste through the Purex plant. The data showed that high plutonium losses were to be expected unless the acidified coating waste solution were heated prior to solvent extraction.

Redox Process Studies

Laboratory work on the problem of deposition of plutonium in the scrub section of the Redox 1A column has been continued. In summary of the results to date, it may be said that the loss of plutonium from the hexone phase appears to be associated with the reduction of plutonium(VI) to plutonium(IV), followed by polymerization of the plutonium(IV) in the acid-deficient system. The plutonium valence change (plutonium(VI) to plutonium(IV)) is independent of the concentration of either dichromate or nitric acid in the aqueous phase in contact with the hexone. The plutonium valence change becomes significantly rapid only in the presence of uranium and with a plutonium concentration of 0.08 g/l or greater. The data do not as yet show whether the plutonium reduction rate varies directly or exponentially with uranium concentration.

Permacol (a water emulsion of a mixture of octadecylamine and octadecylamine acetate) has been proposed for use as a corrosion inhibitor in the 200 Area steam lines. Since this would result in the introduction of Permacol into the Redox and Purex process streams, laboratory work is being done on its effect on the Redox and Purex processes. The results thus far have shown that in the Redox system, as much as 1,000 ppm (volume) Permacol in the process streams has no effect on 1) physical behavior (foaming, emulsification, or disengaging times) in either an acid or an acid-deficient system; 2) waste losses or fission product decontamination; 3) cross-over oxidation; or 4) solvent treatment (hexone distillation). Tests with the permanganate head-end treatment showed that Permacol causes some permanganate reduction.

Waste Scavenging Studies

Scavenging procedures have been recommended for tanks 104-B, 106-B, 107-B, 108-B, 109-B, and 112-B. Laboratory data indicate that the recommended scavenging should result in cribbable material from all tanks except 104-B, which will require disposal by specific retention.

Silver Reactor Cleanout

A proposal has been made by Redox Technology personnel that the silver iodide-silver nitrate coatings be dissolved out of old silver reactors, to permit regeneration and re-use of the reactors. Three solutions have been tested, using a silver iodide-nitrate mixture prepared in a small laboratory

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reactor, with the following results: 1) ammonium hydroxide was ineffective; and 2) a 2-molar solution of either potassium cyanide or sodium thiosulfate readily dissolves the material at room temperature. Calculation of solution volumes required have shown that only about 170 gallons of 2 M KCN would be required per Redox-type reactor, as compared with about 1900 gallons of 2 M $\text{Na}_2\text{S}_2\text{O}_3$. This gives a decided operating and economic advantage to the cyanide system.

ANALYTICAL ASSISTANCE

Plutonium Standards

Uranium oxide (U_3O_8) spectrographic standards have long been used at HAPO as a stand-in for plutonium standards in the carrier concentration method for the determination of metallic impurities present in plutonium. However, it has been shown (by Process Chemistry and by Hanford Laboratories personnel) that the carrier distillation of metallic impurities from a U_3O_8 matrix is not the same as from a plutonium oxide (PuO_2) matrix. The work necessary to replace the U_3O_8 standards with PuO_2 standards in the 234-5 Control Laboratory has now been completed. Plutonium oxide standards were prepared from high-purity metal. From carrier distillations of these standards, standard films covering 26 metallic impurities have been prepared and placed in service.

Assay of Chalk River Dissolver Solution

The analytical methods used for the plutonium assay of the first two batches of Chalk River dissolver solution, which gave values 17 and 5.6 per cent lower than those predicted, have now been substantiated. Plutonium isotopic analyses were made by mass spectrometer in the Hanford Laboratories and the results used for "F" factor ("F" = grams Pu/alpha count/minute) calculation. These "F" factors agreed within one per cent with corresponding "F" factors calculated from chemical analysis and alpha activity determinations.

Evaluation of Alpha Scintillation Counters

Evaluation of the alpha scintillation type counter (ASC) as a possible replacement for the alpha Simpson proportional counter (ASP) was continued. Comparable results were obtained from both instruments on geometry controls, standard controls, duplicate counting of 222-S Control Laboratory samples, and linearity tests. Current efforts are aimed at determining the variation between counters (ASC) and the optimum instrument parameters as a function of the resolving time of the scintillation phosphor.

QUALITY CONTROL AND STANDARDS

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

234-5 DEVELOPMENT OPERATIONCeramic Development

Four-compartment I-4 vibration cast crucibles were successfully made by eliminating carbowax from the formulation and substituting magnesium sulfate solution. These crucibles were made of coarse mix magnesia plus 4 percent calcium fluoride, and were fired at 1300 C. They showed a few small cracks between the compartments, but were acceptable.

The shop was requested to fabricate four-compartment slip cast magnesia shells to be used in place of the bulky I-4 molds. A pattern for the shell, identified as CS-1, was designed and fabricated.

Work continued on the slip casting of calcium fluoride. The objective of making blister-free crucibles was achieved by de-airing the slip by means of an evacuated desiccator, and by lowering the sintering temperature from 1100 C to 1050 C or 1000 C.

After several trials, five LRS-2 magnesia crucibles were successfully impregnated with molten calcium fluoride. Some of the crucibles were treated with calcium fluoride slip, others were charged with calcium fluoride powder. All were brought to 1100 C in a resistance furnace. The molten salt apparently soaked into the pores. Crucibles thus treated were impervious to water in sharp contrast to ordinary magnesia crucibles.

Continuous Task I

Two runs were made in the Task I prototype during the month, demonstrating use of the newly-installed auxiliary precipitation vessel. This involves a stirred reactor, in which the precipitation is made, with a slurry overflow line into the drum filter pan. The possibility of unreacted feed short-circuiting through the drum filter to the supernatant receiver is eliminated.

Feed for the first run was made up from Redox product, prereduced with hydrogen peroxide. The cake was very good during most of the run. However, whenever the oxalic concentration varied appreciably from the desired 0.1 molar excess (due to poor flow control) the filter began blinding and the filtration rate would fall off, although cake quality usually remained quite good. When the streams were brought back under control the filtration rate returned to normal, with the cloth apparently opening up of its own accord. Supernate losses over the run were around 16 percent, due to several periods of insufficient oxalic flow.

For the second run the feed was made up from Purex PR solution, and was not prereduced. A test of simultaneous reduction-precipitation was made by adding 25 ml of 50 percent peroxide to each liter of 1 M oxalic acid strike solution. During the first few minutes of the run the slurry in the precipitator was a lighter color than normal, but during most of the run it was similar to pre-reduced slurries. The cake was again very good, but the filter blinded rapidly and normal filtration rate was never attained. Air blowback opened up the

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cloth but it would blind again almost immediately. Control was quite good during this run and waste losses were 2.5 percent.

Spectrographic results on plutonium oxide samples taken during the period of sustained operation in August are tabulated below. These analyses demonstrate the higher quality of the oxide produced in continuous processing equipment.

TABLE I

SPECTROGRAPHIC ANALYSIS OF PuO₂ PRODUCED DURING
SUSTAINED OPERATION OF TASK I PROTOTYPE -
AUGUST, 1957

	RUN NUMBER							
	6	9	11	11	12	14	18	19
Ag	--	--	--	--	--	--	--	--
As	--	--	--	--	--	--	--	--
B	<1	<1	<1	<1	<1	<1	<1	<1
Bi	--	--	--	--	--	--	--	--
Cd	--	--	--	--	--	--	--	--
Cr	10	10	20	20	10	5	10	10
Cu	10	10	20	10	10	5	5	10
Fe	269	61	161	<50	<50	73	57	<50
Ge	--	--	--	--	--	--	--	--
K	20	20	20	20	500	200	100	200
Li	1	<1	--	--	--	--	--	--
Mg	20	50	50	20	10	20	20	20
Mo	--	--	--	--	--	--	--	--
Mn	20	50	200	200	200	10	100	100
Na	100	100	50	100	200	50	100	100
Ni	200	20	200	200	50	20	20	100
P	<100	<100	<100	--	--	--	--	--
Pb	50	5	5	10	5	5	5	5
Si	5	2	2	2	5	2	2	2
Sn	<2	<2	2	<2	<2	<2	<2	<2
Tl	--	--	--	--	--	--	--	--
V	--	--	--	--	--	--	--	--
Zn	--	--	--	--	--	--	--	--
Ti	<10	<10	<10	<10	<10	<10	<10	<10

Recuplex Solvent Studies

Further work with dibutyl butylphosphonate (DBBP) has confirmed previous estimates of more favorable distribution coefficient for this compound than TBP in the recuplex extraction step. Satisfactory stripping could not be accomplished by acidity adjustments, however. Satisfactory stripping was accomplished with 0.1 M ascorbic acid in the stripping solution, but pre-

precipitates formed in the aqueous solutions of the first four stages. The precipitate was evidently a compound of plutonium and an ascorbic acid decomposition product. Further decomposition of the precipitate was evidenced by continued gas evolution. It is evident ascorbic acid could not be employed with the concentrations of plutonium and nitric found in the first four stripping stages.

Hydrazine sulfate in 0.1 M and 0.20 M HNO_3 resulted in a reddish-colored stripping solution. Distribution coefficients were slightly higher than desired for effective stripping.

Hydroxylamine sulfate, 0.1 M, with 0.2 M nitric acid resulted in satisfactory stripping in batch tests. Plutonium concentration was reduced to 0.00135 g/l in the organic phase in the seventh stage. Reduction of plutonium to the tri-valent state was slow; the stripping solutions changed to the blue color of plutonium(III) on standing. It is postulated that the formation of the aqueous favoring plutonium(IV) sulfate complex is important in effecting satisfactory stripping.

DBEP is also a more effective extractant of nitric acid, resulting in higher aqueous phase acidities in the first stripping stages than found with TBP. This higher acidity in the upper end of the stripping column will insure against polymer formation.

Further reduction in stripping solution acidity will be made to determine the optimum acid concentration with respect to stripping efficiency and solution stability (polymer formation).

Dissolution of Plutonium Metal With Sulfamic Acid

Sulfamic acid appears to have some value for plutonium dissolution, as shown at SRL. In two tests with 15 weight percent sulfamic acid, plutonium metal was completely dissolved. No sludge residues were left, as were obtained with nitric-sulfamic mixtures. This dissolution is not as rapid as the nitric-hydrofluoric treatment, but no refluxing is required. Concentrations of plutonium(III) up to 100 g/l have been obtained at acidities in range from 0.3 M to 1 M. The plutonium is stable in the tripositive state for up to three weeks, which is the time limit tested to date.

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INVENTIONS

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

A. Brunstad

Solvent Density Increasing Agent

BUSINESS TRIPS AND VISITORS

R. E. Tomlinson, Manager Advance Process Development Operation visited the General Electric Company, Schenectady, N. Y. on September 30th and October 1st to hold technical consultation on in-line instrumentation with Mr. J. L. Michaelson.

B. F. Judson of the Advance Process Development Operation visited Battelle Memorial Institute, Columbus, Ohio on September 24th, Stewart, Dougall and Associates, New York, N.Y. on September 26th, A. D. Little Company, Boston, Massachusetts on September 27th to initiate plans for survey of irradiation source markets.

Robert C. Smith of 234-5 Development Operation visited Dr. R. Vogel and Mr. L. R. Kelman of the Argonne National Laboratory, Lemont, Illinois on September 3rd to exchange technical information. Mr. Smith also visited Dr. J. W. Pringle and Mr. J. Willging of Dow Chemical Rocky Flats Plant, Denver, Colorado on September 4th and 5th to exchange technical information.

Manager, Research and Engineering
CHEMICAL PROCESSING DEPARTMENT

VR Cooper:jap

EMPLOYEE RELATIONS OPERATION

September, 1957

I. RESPONSIBILITY

There was no change in responsibilities during the month.

II. ACHIEVEMENTS

FIRE PROTECTION

A. Fire Responses

There were four fire responses during the month, in which no fire loss occurred. Three of these were in 275-EA Building in 200-E, CPD Production Operation. All three responses were attributed to roof leaking, and water getting into fire detector system.

One response was to 202-S Building, 200 W, for 200 Area Field Construction Operation. Fire was caused by welder sparks getting into sample box and igniting small amount of paper and cloth. Loss was nil.

B. Fire extinguisher service at 200-E, 200 W, Concrete Batch Plant, B Y Telephone Exchange, and Yakima Barricade.

During the month, 385 fire extinguishers were inspected, 7 installed, 3 delivered, 12 seals broken and not reported, and 35 services.

There were 24 gas masks inspected and 5 serviced.

Also during this period, 22 hand lines were inspected.

All fire hydrants within 200 areas were flushed and serviced.

C. Training of personnel in other operations

Artificial respiration training was given to 12 employees of Purex Operation, and extinguisher demonstrations given to 14 employees of Janitor Service and seven employees in 222-S building.

During the month 32 CPD employees completed evacuation bus driver training.

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EMPLOYEE COMPENSATION OPERATION

Organization analyses, position evaluations, and reconciliations were completed for the purpose of effecting numerous changes in the Power and General Maintenance Operation organization. Consolidations, redistribution of certain functions, and retitling are involved in the changes to varying degrees.

As a result of certain developments within the IPD, the question of advisability of reclassifying the Chief Operators (Separations) to exempt status has again been raised. Discussions with IPD Compensation representatives, Legal Counsel, and with CPD managers have ensued in effort to determine the proper course of action. Decision on this question has not yet been stated.

A letter to CPD managers was issued for the purpose of emphasizing salary administration philosophies in respect to trending the salaries of their personnel and to provide material with which they may demonstrate to their people that market trends are factored into the administration of salaries.

A salary plotting chart, a tool for use by managers in working market trend considerations into their salary administration function, was prepared and several discussions with third level managers have been completed regarding its use.

Tentative plans have been formulated for moving the Personnel Accounting Operation of Financial into the 222-B building. Through this move consolidation of certain functions of Personnel Accounting, Employee Compensation and Employment can be accomplished. A request for structural modifications upon which this move is contingent, has been submitted to the Landlord - Power and General Maintenance.

One clerical job was reviewed and the classification established during the month. Four secretarial jobs were reviewed for merit promotional purposes. Warranted promotional action has been completed.

In connection with the Redox reorganization suffix code number 6730 was eliminated. A multilith mass transfer was prepared and all 6730 nonexempt personnel reassigned to other organization codes.

Evaluation of the Chemical Dispatcher duties was completed and recommendations as to appropriate action were sent to the managers of Redox and Purex, with copies to others concerned.

Two Union Relations actions were investigated in detail from a wage standpoint; the Campbell grievance in which grievant alleged that he was performing Process Operator work while a Utility Operator, and the Pipefitter-Electrician agreement in which the Electricians claimed fabrication of electrical jumpers as their work and to which claim the Pipefitters agreed. Based on the investigations, Union Relations was advised by letter that from a wage standpoint the work which was the subject of the Campbell grievance appropriately falls within the Utility Operator responsibilities and in the other case fabrication of electrical jumpers should continue to be the responsibility of Pipefitters.

Extensive investigation was made concerning the proposed establishment of new classifications for ventilation balancing and control work. This involved detailed review of the work individually with G. McMillan, J. Palmer and G. Stoker and the subsequent preparation of detailed descriptions of the work. In addition the work was further investigated and discussed with IPD personnel familiar with work performed by CPD ventilation personnel for IPD. Definitions for the proposed classifications and a letter requesting authorization of the classifications by AEC which explains the proposed progressions and administration of the classifications, has been completed in draft form.

The draft of an explanation of the HAPO nonexempt wage structure and its administration has been prepared for use in connection with CPD Round Table meetings.

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

ADDITIONS TO ROLL

	<u>Exempt</u>	<u>Non-Exempt</u>
New Hires	-	1
Reactivations	-	6
Transfers from Other Departments	2	3
Reassignments from Exempt to Nonexempt	-	2
Reassignments from Nonexempt to Exempt	-	-

REDUCTIONS FROM ROLL

Terminations	-	-
R.O.F.	-	-
Deactivates and Leaves	-	-
Transfers to Other Departments or Divisions	3	12
Reassignments from Exempt to Nonexempt	2	-
Reassignments from Nonexempt to Exempt	-	-

CHANGE IN STATUS (NO SALARY CHANGE)

Intra-Departmental Transfers	3	18
Reassignments - Title Change	-	-
Level Changes - Increase	4	-
Level Changes - Decrease	-	-
Location Change	1	-

CHANGE IN SALARY

Promotions	1	10
Demotions	-	6
Merits - (Salary Review)	27	-
Merits - Interim	1	-
Automatics	-	33
Temporary Reclassifications	-	9
Salary Adjustments	-	-

REQUISITIONS

	-	10
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SUGGESTION PLAN

	<u>AUGUST</u>	<u>SEPTEMBER</u>
Suggestions Received	45	55
Acknowledgments to Suggestors	48	40
Suggestions Pending Acknowledgment	3	15
Suggestions Referred to Operations for Investigation	45	40
Suggestions Pending Referral to Operations	3	15
Investigations Completed and Closed	127	52
Adopted Suggestions Approved by Board	83	1*
Adopted Suggestions Pending Approval by Board	45	58
Total Net Tangible Savings	1066.97	0
Total Cash Awards Paid during Month	647.50	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.	233	193
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PARTICIPATION IN BENEFIT PLANS

	<u>AUGUST</u>	<u>SEPTEMBER</u>
Insurance Plan	99.7%	99.8%
Pension Plan	99.1%	99.1%
Stock Bonus Plan	57.8%	58.2%
Good Neighbor Fund	64.1%	63.5%

One General Manager's Information Meeting was held during the month of September with a total of 24 supervisory, exempt, tech grads, business grads, and chief operators in attendance.

The Specialist - Employee Benefits, at the request of Redox - Analytical Operation Management, held a meeting in 222-S on September 6th, with 40 Laboratory people for the purpose of discussing Employee Benefit Plans and Social Security.

MILITARY SERVICE RECORDS

1. Our records now reveal that C.P.D. has a total of 131 employees who are subject to military training through Selective Service or Armed Forces Reserve actions. They are categorized as follows:

	<u>Exempt</u>	<u>Non-Exempt</u>
Ready Reserve	13	13
Standby Reserve	12	8
Non Veterans		
1A		13
2C	1	
3A	6	42
4F	8	2
1S		1
*Selective Service		
1A	1	0
2A	<u>11</u>	<u>0</u>
	52	79
		<u>131</u>

2. Deferments

Deferments Requested (September)	1
Deferments Granted (September)	1
Deferment requests pending	3
Routine	3
Appeal	0

3. Standby Reservist Category 2R Requests

(No Activity during the month of September)

STATUS - PERSONNEL DEVELOPMENT PROGRAM FOR NON-EXEMPT EMPLOYEES

<u>Month</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>Sept.</u>	<u>Total</u>
Number of appraisals scheduled	132	76	108	96	412
Number delinquent as of 10-4-57	4	3	16	52	75

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HEALTH AND SAFETY OPERATION

<u>Chemical Processing Department</u>	<u>September</u>	<u>August</u>	<u>Year to Date</u>
Disabling Injuries	0	0	1
Serious Accidents	1	0	7
Medical Treatment Injuries	43	52	491
Overexposure Incidents	0	0	3
Potential Overexposure Incidents	0	0	3
Radiation Occurrences	25	36	245
Fires	0	0	14
Security Violations	2	3	25

Comments on Statistics

Trend in all statistical areas was favorable with the exception of Serious Accidents.

Programs

On September 6 the Department achieved its second Safety Council Award. This accomplishment represents 182 days (1,643,000 hours) without a Disabling Injury. At month end prizes had been selected and store orders placed for all eligible personnel.

Emphasis was placed on better safety meetings through the Safety Program Council. Safety meetings in three components were audited. Safety meeting publicity in the OE News was arranged through the Specialist, Communications.

HAPO publicity for Fire Prevention week was coordinated by the Specialist, Accident Prevention. A cartoon and program flyer was prepared for distribution to all CPD personnel. Pamphlets and posters featuring home fire hazards were procured. Arrangements were completed for fire demonstrations and fire drills. Through the Safety Program Council each Operation was encouraged to provide a display and to make inspections for fire hazards.

Posters on eye protection and pamphlets featuring Ten Commandments of Fire Arm Safety were distributed.

New safety flags were procured for use at Yakima and Prosser barricades.

Training and Education

The lecture on Current Radiation Protection Problems was attended by three people.

A Foreman's Safety Training Program was developed and scheduled for October.

Advice and Counsel

Redox - Fire extinguisher and gas mask requirements and location - 293-S
Improved fire protection of 202-S Cable Room

- Purex - Safe entry to 202-A trap and pump pits
Procedure for welding of sodium nitrate tank
Cleaning of canyon crane with trichlorethane
241-A condenser vent header work procedure
- P & GM - Handling of chemical drums in 202-A and 275-EA
Scaffold bracing and side rail standards
Installation of compressed gas piping - 272-E and 277-W
Type of heat for 275-W
- Finished
Products - Filter support platform installation - 224-UA
Installation of CO₂ fire fighting equipment - 224-UA
Eye protection regulations - Recuplex
Respiratory requirements for work in acid fume areas
- Financial - Revision of AEC Manual 5170-1411 - Internal Auditing
- Facilities
Engineering - Cesium Recovery Plant Shielding
- General - HAPO architectural standards on fire doors and installation
of fire extinguishers
CPD responsibility for radiation monitoring of minor
construction work

Inspection, Investigation and Audit

The Redox audit was issued. Audit of Metal Finishing and Product Recovery Operations was started.

Third party inspection of Purex elevators and pressure vessels was completed by Travelers Insurance inspectors.

Serious Accident CPD 57-7, Purex Operation, was formally investigated and reported. There were no injuries; three workmen narrowly escaped acid burn. Failure to fully comply with the Lock and Tag Procedure was the cause.

A study group reviewed Accident Prevention Bulletin #C-5, Lock and Tag Procedure. Several changes were made to clarify responsibility and improve practical application. The C-5 Bulletin was revised for printing and distribution to all CPD exempt personnel.

One case of absence following a reported fume inhalation was investigated and classified as personal.

Reports Issued

Serious Accident - CPD 57-7

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COMMUNICATION

A. Statistics

GE NEWS items	13
Priority message	2
General Manager's meetings with exempt employees	1
Management News Bulletins	8
Employee News Letter	1
Employee Location Records mailed out	13

B. Comments on Statistics

Thirteen items from CPD were carried in the GE NEWS during the month. These included a picture and cut-line in connection with the Employee Attitude story; a picture and cut-line of CPD's Safety Council Awards; two retirement stories; two attendance award stories; a service award story; a story concerning the fall and winter courses given in the Power & General Maintenance non-exempt training program; a two-page feature on the Redox Integrated Maintenance Improvement Program; the McGraw Hill chemical award story; an advance story on a speaking engagement by CPD Manager; a picture and story of an analytical lab achievement in Safety and Radiation of working conditions; and a picture and story of a 15-year-service employee.

Two priority messages were initiated during the month. One concerned the Department's winning the Safety Council Award, and the other concerned approval of the 100-200 Areas Circle Tour.

The Acting General Manager was provided with a list of items for discussion submitted by the men who attended the Management Information Meeting September 12.

C. Other Employee Communication Activities

Work was started on accumulation of cost figures for the various communication programs.

The Round Table publication for October-November was prepared and distributed during the month. The Round Table distribution list now contains 109 names. A pre-printed letterhead has been prepared and will be available for the next publication.

The local AEC office approved the 100-200 Areas Circle Tour on September 10. The only qualifications of the approval were: 1) that it would not be likely that an open house could be held in either IPD or CPD in the future; 2) that the AEC wants to see the detailed plans and arrangements prior to the tour; 3) that there be only limited publicity of the tour. To date, detailed plans for the tour are proceeding according to schedule. Dates for the tour are October 19-20 and 26-27.

Replies have been received from every operation in CPD concerning the purchase and routing of 35 "High Use" periodicals being discontinued by the library. This material has been tabulated and is being discussed with Financial auditors to determine reimbursability and to discuss distribution methods.

Four safety meeting pictures were taken during the month for use in a safety meeting feature for the GE NEWS in October.

The approved Chemical Processing Department Objectives were printed and distributed to all exempt personnel during the month. A special distribution was made to the three PEM classes.

Supplement pages for the booklet on General Electric's Savings & Stock Bonus Plan, which gave the new table of redemption values, were mailed to the homes of all CPD employees along with a letter promoting the Savings Plan, signed by the Employee Relations Manager. The mailing was timed to coincide with an item in the October-November round table publication on the Savings & Stock Bonus Plan.

A Check List of Employee Benefits prepared by Communication and modeled after the Company's Check List was distributed to all CPD exempt personnel.

D. Public Communication

At the request of the Acting General Manager, the master of ceremonies for the North West Shippers Advisory Board Meeting was provided with a biography and two portraits.

Items from CPD for the annual issue of the GE REVIEW were routed through the Department for approvals and returned to Public Relations, R & U.

Arrangements were made for the Specialist - Training to act as a tour guide for one of the busses in connection with the educator's tour of the Hanford Project on September 28 and October 12.

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A request was received from the editor of CHEMICAL AND ENGINEERING NEWS regarding a possible staff article on the effect of automation on the availability of technical personnel. The request and the editor's questions were referred to the Manager, Research and Engineering and the Manager, Facilities Engineering for answer.

A request was received from the Perkin-Elmer Instrument Company asking for information about how Hanford uses a zoom lens recently purchased for the Company. The Manager, Redox Maintenance had already received an earlier request by the same company and had sent them some information through one of the purchasing representatives.

The editor of MONOGRAM is being queried to determine if he is interested in having a picture and story of a GE employee at Hanford who has furnished her home with over \$3,000 worth of GE major and traffic appliances.

It is expected that the GE Theater will again present their "Christmas Honor Roll" on their show of December 22. With this in mind a letter was sent to all level three managers requesting that they supply candidates to be sent to New York for consideration. Last year's candidate for CPD is being held over by New York and will be considered for this year's program.

UNION RELATIONS OPERATION

The Labor Relations Conference series was resumed during the month. Six sessions were held covering the Taft-Hartley Act, Wage and Hour Act, and other labor legislation.

The Superior Court hearing on the arbitrability of the Wonacott (radiation monitoring jurisdiction) grievance was held on September 25. The Court's opinion was that the matter was arbitrable under the provisions of the HAMTC-GE contract. The formal written opinion has not been delivered by the Court. At month end no decision had been reached relative to appeal or, alternatively, proceeding to arbitration.

Two grievances were scheduled at Step II during the month.

At month end, in view of continuing ROF layoffs, the crafts are doing all in their power to consolidate their positions, jurisdictionally speaking, to minimize the effect of layoffs on their individual groups.

The present situation in the HAMTC, with the Chemical Workers and Operating Engineers banned from Council activities, placed the Company in a hazardous position with respect to administration of the grievance procedure. The removal of stewards of the locals as agents of the Council left the two groups without steward representation. The Council recognized the position of the Company in this situation and appointed members of the Council Grievance Committee as "stewards-at-large" as an interim measure. Supervision was advised of the situation and reminded that the Company is obligated to notify a "steward-at-large" so that he may be present at the Step I discussion of a grievance.

Relative to the question of steward representation for the Chemical Workers, the Company has been advised that the Chemical Workers will seek reinstatement of their steward list independent of the HAMTC and demand that the Company recognize them despite contract provisions to the contrary. The Chemical Workers are taking this action upon advice of their International representatives in Akron, Ohio. The position of the Company, of course, must be that outlined in the HAMTC-GE contract which stipulates that the Council is the sole bargaining agent for the groups concerned.

The Council has not yet taken action on the Carlisle grievance (Union maintaining that routine checks on continuous calciners is Process Operator work) which they had declared intent to take to arbitration.

	<u>September</u>	<u>August</u>
Bargaining Unit Employees in CPD	926	936
Bargaining Unit Employees utilizing check-off	620	615
Percentage of Total Bargaining Unit Employees utilizing check-off	66.95	65.4

There were no check-off cancellations filed during the period provided for this purpose by the HAMTC-GE contract. (September 20 to October 1) To the contrary, check-off authorizations increased.

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

	<u>Unit</u>	<u>Nonunit</u>
Grievances received year to date	115*	1
Grievances pending at Step II on 8-31-57	3	0
Grievances received during the month	14	0
Satisfactorily answered at Step I	4	0
Settled at Step I through expiration of 90-day time limit	2	0
Processed at Step II	2	0
Pending at Step II on 9-30-57	9	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.

PERSONNEL DEVELOPMENT AND PLACEMENT

<u>A. Employment</u>	<u>Exempt</u>	<u>Non-exempt</u>	<u>Total</u>
<u>Additions to Payroll</u>	1	8	9
New Hires	0	1	1
Reactivates	0	3	3
Rehires	0	1	1
Transfers into CPD	1	1	2
Changes from exempt to nonexempt	0	2	2
 <u>*Removals from Payroll</u>	 7	 24	 31
Dropped	0	1	1
Illness	0	3	3
Leave of absence	0	1	1
Transfers out of CPD	4	10	14
Resigned	1	9	10
D-5-U Summer employment temp. completed	0	1	1
E-2-U Home responsibility	0	2	2
E-9-U Other employment	1	0	1
E-10-U Back to school	0	4	4
E-16-U Illness in family	0	1	1
E-22-U Climatic condition	0	1	1
Changes from exempt to nonexempt	2	0	2

* During September, four persons were shown in the daily reports as "Former Deactivates - will not return". These persons were counted in former monthly reports as removals.

Requisitions for Personnel (Non-exempt)

Number on Hand 9/1/57	7
Number Received	8
Number Filled	6
Number on Hand 9/30/57	9

Requests for Transfer (Non-exempt)

Number on Hand 9/1/57	176
Number Received	8
Number Transferred	6
Number on Hand 9/30/57	178

Service Pins

A total of 42 pins were issued as follows:

15 Yrs. service	1 Male	0 Female
10 Yrs. service	27 Male	3 Female
5 Yrs. service	11 Male	0 Female

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Attendance Awards

Pass folders were issued to 11 persons for perfect attendance as follows:

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

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

As the result of necessary manpower adjustments during September, ROF notices were given to six Separation Utility Operators and one Boilermaker Jrn. Although notices were given in September the last date worked will be October 11.

In addition to the crafts and operation personnel that have been declared excess, four personnel in the clerical and stenographic field have been made available for placement elsewhere.

As a result of an opening which occurred in the office of Manager, Power and General Maintenance, two lower rated secretaries were promoted.

Eight Supervisor Selection Tests were given during the month.

Requests for Transfer (Exempt)

Number on Hand 9/1/57	26	
Number Received	0	
*Number Transferred	1	* This transfer was not
Number Closed Out	1	due to a request.
Number on Hand 9/30/57	25	
Number of Interview Trips	1	

Applications for Employment (Exempt)

Applications received during Sept.	2
Hired	0
Closed Out	2
Invited for Interviews	0
Applications on Hand 9/30/57	0
Open Requisitions	2

A list of candidates was submitted for separate job openings in R&U, HLO, and IPD during the month.

Relations and Utilities was advised of CPD's needs for rotational personnel from the Hanford Personnel Development Program for fiscal year 1959, also the number estimated to be placed from this program in permanent assignments in this same period. It was estimated that ten rotational assignments would be available during each quarter and that eight persons would be permanently assigned to the Department during FY-1959.

A proposal was submitted to the General Manager, CPD, that the Department offer permanent assignments to six technical graduates from the Development Program by the end of this calendar year and was approved. A list of technical graduates presently available for assignments has been sent out to the Level 3 Managers to enable them to select the personnel desired in their respective organizations.

B. Personnel Training and Development

Participation in Training Courses - Monthly Personnel

Data Processing	4
Labor Relations	94
Understanding People (Conant)	20
PBM-I (Enrolled)	54
Value Analysis	56
Management Orientation	2
Process & Equipment Orientation	1
Craft Training	6
Projectionist & Visual Aid Training	3

Participation in Training Courses - Weekly Personnel

Process and Equipment Orientation	1
Craft Training	38
Non-exempt Personnel Development	17
Projectionist & Visual Aid Training	6
Labor Relations	4

G. E. Supervisory Selection Program - Number Completed	5
G. E. Supervisory Selection Program - Revaluation	2
Technical Graduates on Rotation	4
Technicians in Training	5
Employees counseled in self-development	2
Films Shown	24
OPGs Issued (Two new, ten revised)	12

Conference #2 of the Labor Management Series was started. The Taft Hartley Act is the principle topic in this conference.

Dr. Conant started his six-week course "Understanding People" with two groups of ten each attending.

A one-hour appreciation session of Value Analysis, the first in CPD, was presented by D. A. Snyder of Facilities Engineering.

Three groups of 18 each started the twenty-week PBM-I Course. Level 3 Managers are course advisors.

The Summer Employment Program was completed. Professor Homer Grant and six college juniors returned to their colleges.

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An information report was issued to CPD management personnel on available visual aid equipment, films, film services, and routine procedure for assigning equipment in CPD. The information curtailed a large number of phone calls and improves general flexibility of our equipment use in scheduling programs.

Nine contacts were made with operating management relative to training needs and programs.

C. Office Services

Duplicating

Orders on Hand 9/1/57	11
Orders Received	789
Orders Completed	769
Orders on Hand 9/30/57	31
Total Copies Produced	197,811
Embosograf Signs Made	165
Verifax Copies Produced	476
Ozomatic Copies Produced	14,573

Mail

Total Pieces of Mail Handled	61,649
Registered Deliveries	360
Library Mail, Pounds	533

Addressograph

Pick-up Truck Incident	65
Fire Prevention Bulletin	1,667
CPD Round Table	116
Union Relations Bulletin	830
Visual Aid Equipment & Services	415
Third Quarter Safety Program	453
Management Check List Booklets	453
CPD Serious Accidents	425
Information Bulletin	850
News Bulletin	3,561
CPD Training Bulletin - September	1,321
CPD OPGs	1,974
Instrument Charts Imprinted	8,608

To provide complete addressograph service for the CPD, multiple mailing lists have been set up on the machine through the medium of tabulating the plates. We are now set up to provide the following mailing lists: 1) All CPD exempt personnel plus Chief Operators and Dispatchers, 2) Level 3 and 4 Managers, 3) CPD - OPG list, and 4) CPD Round Table list.

An audit of the imprinting of instrument charts has been completed and the total has been revised to 8,608 per month. At the same time the cost of charts and the manhours consumed has been forwarded to the CPD Cost component and a study is now in progress with a view toward making a charge for this service to the chart customers.

III. ORGANIZATION AND PERSONNEL

A. Meetings

Over 100 meetings were attended by personnel of the Employee Relations Operation. These included:

Meetings to discuss the Savings and Stock Bonus Plan

A discussion of the sensitivity survey and the attitude survey.

Regular grievance meetings with the HAMTC

CPD Industrial Relations Council

Meetings with HAMTC representatives

Discussions with counterparts in other departments on matter of mutual interest and responsibility.

Meetings to develop consolidation of payroll and employee compensation records.

Staff, Security, and Safety meetings

B. Personnel Activities

The Specialist, Technical Personnel Placement attended a training session on the new intensive interview which will be used during the current recruiting season.

The Training Specialist participated in conducting a guided tour of the Hanford Project on September 28.

Two members of Personnel Development and Placement Operation attended the PBM briefing course conducted by Ernest Vogel of Crotonville.

The Fire Protection Operation conducted 60 outside drills and 31 inside drills. In these drills 8500 feet of hose and 413 feet of ladder were used. During the month 365 man hours were spent in training.

C. Safety

One medical treatment injury for Employee Relations Operation was reported by Fire Protection Operation.

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

END

**DATE
FILMED**

11 / 4 / 92