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MONTHLY REPORT
CHEMICAL PROCESSING DEPARTMENT
FOR
SEPTEMBER 1956

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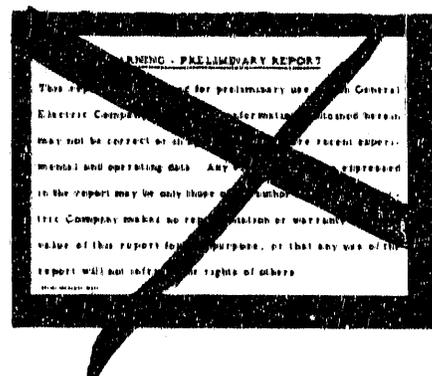
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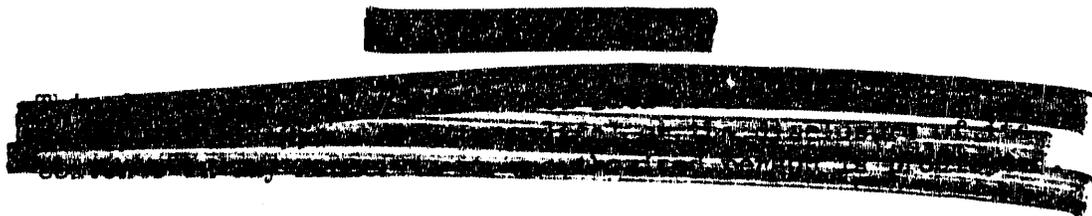
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October 18, 1956



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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MONTHLY REPORT
CHEMICAL PROCESSING DEPARTMENT

SEPTEMBER 1956

GENERAL SUMMARY

PRODUCTION

The production of plutonium from the Purex and Redox plants was 112% and 123% of the forecast, respectively. Purex plant production reflects a new record high for individual primary plant plutonium production, and the total primary plant plutonium production reflects a new record high for combined primary plants.

The Purex plant operated continuously at a 12 ton per day rate on high exposure feed material except for a four day period when a shutdown was required to replace a failed plutonium concentrator tube bundle.

Redox plant experienced an abnormally large number of equipment failures during the month; however, the continuity of operations was not significantly affected until the latter part of the month when flooding of the extraction columns necessitated a four day shutdown of the plant for equipment flushing and cell maintenance.

Operation of the TBP plant was steady with 131% of the forecast being achieved.

UO₃ production was 97% of the forecast. Because of start-up difficulties with the new powder handling facilities, the continuous calciner produced UO₃ was unable to be milled and loaded and therefore did not contribute to production.

The fabrication of plutonium metal, encompassing three different models, established a new record which was 30% higher than any previous month. The forecast quotas on two of the models were met or exceeded, and the production of one model was 95% of the forecast. The forecast quotas of unfabricated plutonium metal and plutonium nitrate were achieved.

ENGINEERING

A study has been made of the costs and feasibility of processing up to 20 tons per month of slightly enriched uranium (0.94%) to be employed for fringe enrichment in the reactors. Blending with normal metal might result in a "degradation" penalty of the order of \$500 - \$700,000 per year. Segregation costs might balance some of this penalty. The determination of the proper economic balance must await further studies.

In the area of finished products, an intensive program was initiated to improve the precision of the present "direct assay" analytical method for the determination of plutonium in coatings. This program is coupled with one of "statistical analysis" of the control data to arrive at a method for assuring Los Alamos that the requirements of the specifications are being met.

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The prototype continuous UO_2 calciner was operated to produce about 85 tons of material for test in the Paducah fluidized bed reduction reactor. Difficulties in bearing and seal operation were rectified somewhat by closer control of furnace temperatures so as to minimize distortion of the reactor bed.

Effort was concentrated on the application of titanium for separations plant process equipment. A titanium concentrator is being prepared as a replacement for the Purex plutonium concentrator.

GENERAL

One possible case of plutonium deposition was experienced during the operation of loading sample cans with plutonium nitrate.

Efforts for the month were directed toward establishing complete Salary and Wage records for all Chemical Processing Department employees. By month end this was accomplished. In addition, wage records for all non-exempt employees in the Chemical Processing Department were adjusted to reflect the three percent general increase, effective October 1, 1956.

In anticipation of a shut-down of TBP about January 1, 1957, a meeting was held with the Hanford Atomic Metal Trades Council to acquaint them with the reasons for such shut-down and the mechanics of accomplishing it.

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A-2

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. MacCreedy
 Manager, Production Operation J. H. Warren
 Manager, Purex Operation O. C. Schroeder
 Manager, Redox Operation C. T. Groswith
 Manager, Finished Products Operation W. N. Mobley
 Manager, Power & General Maintenance Operation T. G. LaFollette
 Manager, Financial Operation K. G. Grimm
 Manager, Facilities Engineering Operation H. P. Shaw
 Manager, Research and Engineering Operation R. B. Richards
 Manager, Employee Relations Operation D. S. Roberts

CHEMICAL PROCESSING DEPARTMENT
NUMBER OF EMPLOYEES
SEPTEMBER 30, 1956

OPERATION	EXEMPT		OTHER		TOTAL	
	9-1-56	9-30-56	9-1-56	9-30-56	9-1-56	9-30-56
GENERAL MANAGER'S GROUP	10	10	1	1	11	11
PRODUCTION OPERATION	6	6	4	4	10	10
PUREX OPERATION	45	44	287	279	332	323
REDOX OPERATION	55	53	302	302	357	355
FINISHED PRODUCTS OPERATION	68	68	442	439	510	507
POWER AND GENERAL MAINTENANCE OPERATION	41	42	283	277	324	319
FINANCIAL OPERATION	21	21	50	50	71	71
FACILITIES ENGINEERING OPERATION	84	76	28	29	112	105
RESEARCH AND ENGINEERING OPERATION	85	83	22	23	107	106
EMPLOYEE RELATIONS OPERATION	<u>30</u>	<u>31</u>	<u>42</u>	<u>57</u>	<u>72</u>	<u>88</u>
GRAND TOTAL	445	434	1 468	1 461	1 913	1 895

CHEMICAL PROCESSING DEPARTMENT

PATENT SUMMARY
FOR
MONTH OF SEPTEMBER, 1956

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

<u>INVENTOR</u>	<u>TITLE</u>
E. C. Clawdus	Crane - Swivel block for hook or tools. Remote operated. Positive position.
H. L. Poole	Thumb Wheel Adaptor

W. K. MacCready
 GENERAL MANAGER
 CHEMICAL PROCESSING DEPARTMENT

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CHEMICAL PROCESSING DEPARTMENT
PRODUCTION OPERATION

September, 1956

I. RESPONSIBILITY

With the formation of the Chemical Processing Department under the general reorganization of the Hanford Atomic Products Operation, the Production Operation was established September 1. Although all positions in the organization were not filled, the Operation was adequately staffed to carry on the initial activities required.

The objectives established for the Production Operation are:

1. To provide for the Chemical Processing Department sound, advanced production planning.
2. To provide short and long range production schedules.
3. To provide for the Department both routine and special reports relating to production, planning and scheduling.
4. To develop, in conjunction with the other Operations, satisfactory relationships with Department customers.
5. To maintain official liaison with the Atomic Energy Commission on matters pertaining to production scheduling and commitments for the Hanford Atomic Products Operation.

II. ACHIEVEMENT

A. Production Statistics

Major efforts during the month were spent in establishing and developing statistical records and reports to enhance production control and permit more effective operation of the production facilities.

1. Purex Operations

	<u>September</u>	<u>August</u>
Tons Uranium delivered to storage	315.0	339.5
Average Production Rate per operating day (tons)	12.1	10.2
Average Daily operating rate for the month (tons)	10.5	7.7
Average yield, %		
Uranium	98.2	99.99
Plutonium	96.0	93.5

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B-1

1. Purex Operations (Continued)

	<u>September</u>	<u>August</u>
Total Waste Loss, %		
Uranium	0.34	0.95
Plutonium	1.30	1.26
Average cooling time (days)	118	135
Minimum cooling time (days)	109	116
Percent down time	13.3	24.2

2. Redox Operation

	<u>September</u>	<u>August</u>
Tons uranium delivered to storage	241.3	105.0
Average Production rate per operating day (tons)	9.75	6.2
Average Daily operating rate for the month (tons)	8.04	3.4
Average yield, %		
Uranium	100.4	99.8
Plutonium	98.1	103.7
Total Waste Loss, %		
Uranium	0.67	0.70
Plutonium	0.56	2.16
Average cooling time (days)	148	134
Minimum cooling time (days)	121	97
Percent down time	17.5	46

3. 231

	<u>September</u>	<u>August</u>
Batches started	168	31
Batches completed	164	31
Batches awaiting processing	1	0
Average yield, %	94.0	72.6
Average purity, %	98.8	98.0

4. 234-5 Operations

	<u>September</u>	<u>August</u>
Batches completed through Task I	321	388
Batches completed through Task II	320	394
Runs completed through Task III	175	226
Waste Disposal (units)	195.48	349.37
Reduction yield, %	98.65	97.91

5. UO₃ Operations

	<u>September</u>	<u>August</u>	<u>To Date</u>
Uranium drummed (tons)	486.24	397.96	16,239.84
Uranium shipped (tons)	449.49	405.19	16,178.31
Average cooling time (days)	154	140	
Minimum cooling time (days)	127	103	
Waste Loss, %	0.02	0.02	

6. TBP Operations

	<u>September</u>	<u>August</u>	<u>To Date</u>
Tons received from Metal Removal	179.57	161.45	7,672.10
Tons shipped to UO ₃ Plant	176.62	161.57	7,414.82
Average Production rate per operating day (tons)	5.89	6.06	
Average daily operating rate for the month (tons)	5.89	5.26	
Average yield, %	99.34	99.34	
Total Waste Loss, %	0.66	0.86	
Percent down time	0	13.13	

7. Power

	<u>200 East</u>	<u>200 West</u>
Raw water pumped, gpm	8,460	6,572
Filtered water pumped, gpm	761	1,124
Steam generated, lbs/hr	143,000	203,000
Maximum steam generated, M lbs.	81,865	110,184
Coal consumed, est. (tons)	4,978	7,211

8. Waste Storage

	<u>Equivalent Tons U</u>	
	<u>September</u>	<u>August</u>
Redox Waste reserve storage capacity	1,945	2,127
Purex Waste reserve storage capacity	1,998	2,243

B. Production Planning and Scheduling Operation

Since the official commitment schedule issued for HAPO to the Commission in August was still in effect during September, all schedules developed by the Operation during the month were internal and of a routine nature. Considerable effort was spent by schedulers in becoming better acquainted with detailed problems existing within the various production facilities and in developing bases for future scheduling of these facilities.

C. A.E.C. Liaison

Two letters were developed and officially transmitted to the Commission. One asked concurrence in the lay-away of the Bismuth Phosphate Plants. The other letter, issued at the request of the Commission, indicated feasibility, timing, costs and conditions under which recovery of products from irradiated uranium supplied from Chalk River can be undertaken in the primary separations plants at HAPO.

D. Essential Materials

A program of reducing nitric and caustic soda inventories in anticipation of shut down of the Metal Removal and Metal Recovery Operations early in 1957 was initiated.

Because of production difficulties experienced by the vendor, RCDS-1303 crucibles, used in the 234-5 Building became seriously depleted. It was necessary, therefore, to air express crucibles as produced to HAPO throughout the latter part of the month in order to maintain production continuity.

E. Reports and Documents Prepared

Routine (Prepared and Issued)

- HW-45180 Essential Material Consumption TBP - Separation Section for August, M. A. Thress, 9-6-56
- HW-45181 Essential Material Consumption Redox - Separation Section for August, M. A. Thress, 9-6-56
- HW-45182 Essential Material Consumption Purex - Separation Section for August, M. A. Thress, 9-6-56
- HW-45183 Essential Material Area Report to Cost and Purchasing, Production Planning and Scheduling, Separation Section, M. A. Thress, 9-6-56
- HW-45184 Essential Materials Production Operation, Chemical Processing Department - September, D. E. Peterson, 9-6-56
- HW-45185-RD TBP-UO₃ Building Production Schedules for Month of September 1956, B. F. Campbell, 9-6-56
- HW-45186-RD Redox Plant Production Schedule for Month of September 1956, D. McDonald, 9-6-56
- HW-45187-RD Purex Plant Production Schedules for Month of September 1956, D. McDonald, 9-6-56
- HW-45188 Z Plant Production Schedules for Month of September 1956, B. F. Campbell, 9-6-56

Non-Routine (Prepared for signature and issuance)

HW-45175 Special Recovery Operation, W. E. Johnson, 9-27-56

XX-1697 lay-away of B and T Plants, W. K. MacCreedy, 9-20-56

III. ORGANIZATION AND PERSONNEL

A. Force Summary

	<u>Personnel on Roll</u>	
	<u>Beginning of Month</u>	<u>End of Month</u>
Exempt	7	7
Non-exempt	<u>4</u>	<u>4</u>
Total	11	11

Effective September 1, 1956 F. H. McLain was promoted to the exempt roll as Specialist, Process Material Scheduling.

B. Safety

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

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CHEMICAL PROCESSING DEPARTMENT
PUREX OPERATION

September, 1956

I. RESPONSIBILITY

Concurrent with the HAPO reorganization, the Purex Operation was established in the Chemical Processing Department. The Purex Operation is composed of the Processing, Product and Material Handling, Maintenance, Analytical Control and Radiation Monitoring Operations.

II. ACHIEVEMENT

1. Processing Operation

1. Normal Processing

The Purex Operations continued on high MWD production during the month. There were no scheduled outages; however, a forced ninety-hour outage was encountered when the plutonium concentrator tube bundle failed due to corrosion. Operating efficiency for the month was 87 per cent. Production was 12.5 per cent over that scheduled for the month. Specification plutonium was produced throughout the month with the exception of one batch which was recycled through Purex and one batch which was processed through Recuplex. Both batches were of questionable plutonium, nitric acid, and solids concentration and were a result of the startup following the tube bundle failure. Approximately ninety per cent of the uranium produced required silica gel treatment to bring it within shipping specifications. The low acid precycle flowsheet adopted for test in August, and which was continued throughout September, failed to provide the expected improvement in decontamination although a 15 per cent reduction in acid consumption was realized in the plant. Waste losses for the month were somewhat high for plutonium (approx. 1.3 per cent), but were normal for uranium (approx. .30 per cent). The plutonium losses were not attributed to short periods of unusual loss, but represent a condition that prevailed throughout the month. Inability to prevent flooding in the #1 organic wash column (TG-2) continued during the month. At present the column is affecting precycle and partition cycle decontamination by its failure to clean up the organic and is a deterrent to higher capacity tests within the building. The column will be replaced during the October outage with a new column containing an improved cartridge and relocated interface probe.

2. Special Processing

Two batches of plutonium were given special handling following

the mid-month startup. One batch was processed through Re-cuplex and one was reworked through Purex. All out-of-specification uranium production was successfully processed through the Purex silica gel facilities.

B. Product and Material Handling Operation

The mechanics of material handling, metal dissolving and feed preparation continued uninterrupted during the operating periods. Two 15-ton (vice normal 12 ton) charges were made to the A-3 dissolver and one 15-ton charge to the B-3 dissolver to stabilize heels as dissolution times for the second cut exceeded normal cycle times. When I^{131} emissions increased to the control limit of one curie per day, both A-2 and B-2 silver reactors were regenerated. Although less than 300 tons - the arbitrary limit set for regeneration - had been dissolved in each unit, iodine removal efficiency had decreased to 98.5 per cent when processing 107-day-cooled metal.

Decontamination of the E-4 centrifuge, which failed in August, has been completed. Following fabrication of a shielding shroud which may permit motor removal, an attempt will be made to inspect and, if necessary, repair the centrifuge motor. If this is successful, the original E-4 equipment piece will be returned to the canyon for similar repair.

Silica gel operation for cleanup of second cycle uranium product had processed an estimated 300 tons of uranium to provide specification material for shipment before the beds were regenerated on September 15. Erratic decontamination has been experienced since that time, however, which has necessitated a second regeneration currently in progress.

Early in the month boiling waste solution in the 241-A-103 tank caused eruptions or pressure surges at approximately eight-hour intervals. At least one of these surges resulted in sufficient pressure to blow the vapor line water seal, which by-passes the contact condensers, and permits discharge directly to the 241-A stack. Although only one localized area of contamination was detected, it was considered advisable to operate the low-level liquid recirculators in the tank to avert further spread of contamination. Since the installed compressors had not as yet been accepted for operation, a portable compressor is currently on loan to perform the necessary service. Use of the recirculators has resulted in complete elimination of the pressure surges to date and has permitted reduction in raw water flow to the contact condensers with a consequent reduction in load on the A-3 crib.

Since late August the exhaust air samplers from the downstream side of the Purex fiberglas ventilation air filter have shown measureable amounts (200 to 400 millicuries per day) of activity discharged to the 291-A stack. On two occasions, fallout of very low level contamination in the immediate vicinity of the stack has

been noted. The activity represents the general spectrum of fission products available in the process. No correlation between this discharge and activities other than general plant operation is apparent. A priority engineering study will be requested to study the problem and recommend remedial action.

C. Radiation Monitoring Operation

1. Radiation Occurrence Experience

a. Radiation Incidents

No incidents requiring formal investigation were incurred during the month.

b. Radiation Occurrences

Two radiation occurrences were informally investigated during the month, a five-fold reduction over the previous months experience.

The first occurrence was low level ground contamination (3,000 c/m) outside of the 291-A radiation zone resulting from an uncontrolled 291-A stack emission noted above. The second occurrence was a minor plutonium contamination spread in the Radiation Monitoring Counting Room, resulting from a poor counting technique.

2. Personnel Exposure Experience

There were 14 cases of skin contamination incurred during the month, two less than last month. In all cases the contamination was readily reduced to non-detectable levels.

Radiation levels of 50 rads/hr at one inch and 3 rads/hr at three feet were encountered when repairing sampling valves. The use of water and lead for shielding reduced the levels to 5 rad/hr and 300 mr/hr, respectively. The maximum dose rate to personnel was kept to 3 rads/hr and the average dose rate was 500 mr/hr.

3. Other Contamination Experience

Extensive contact maintenance was performed on the plutonium concentrator equipment in L and M cells. Although this equipment is contaminated externally in excess of a million d/m per Juno window area, only one minor case of skin contamination (5,000 d/m) was incurred, and no cases of contamination spread beyond the immediate work location were encountered.

Extensive cell work involving numerous jumper moves has resulted in canyon deck contamination in excess of 20 rads/hr. Decontamination efforts are in progress.

Pressure surges in the 103 waste storage tank contaminated the

electrode reel box internally to greater than 20 rads/hr and the ground under the box to 600 mrad/hr. This is the first contamination outside the waste tanks encountered in this area.

D. Maintenance Operation

1. L Cell Package

It became evident on September 7 that the tube bundle of plutonium stripper (L-3) or concentrator (L-4) was leaking. Subsequent tests performed September 10 proved the concentrator bundle defective. This 304-L tube bundle had been in service six weeks. Original plans to install a titanium tube bundle in the L-4 location were deferred when the titanium unit failed to pass pressure tests prior to installation. A replacement bundle fabricated from 309 SCb (heat treated) was installed September 13.

2. Spare L Cell Package

Modification of the original L cell package stored in M cell is complete except for the installation of two one-fourth (1/4) inch diaphragm operated valves and the L-4 tube bundle. Installation of the bundle has been deferred pending the development of a titanium unit. One 309 SCb and two 304-L tube bundles are currently available as replacements for the spare package or for the package in service.

3. Centrifuge Failures

Investigation by CPD engineering personnel of Purex centrifuge failures to date pointed to the use of low thermal strength metal in the motor rotors as a probable cause of failure. Accordingly, the vendor agreed to supply rotors of improved design for the six motors carried in spare parts. One of two such rotors now on hand will be used to repair the motor from the installed E-4 centrifuge if radiation levels, with shielding in place, permit inspection and rotor replacement.

E. Analytical Control Operation

The nitric acid analysis on the various precycle stream and batch samples was brought under close scrutiny when it became apparent that analytical results were inaccurate. When preliminary efforts indicated that the difficulty could not be resolved simply by a selection of one method over another, the problem was forwarded to Research and Engineering Operation for resolution.

F. Improvement Experience

1. Process Tests and Revisions

The revised Precycle flowsheet, which reduced the acidity of HA column feed from 2 M to 0.5 M and the scrub acidity from 2 M, was designed to improve the zirconium-nickel decomposition with a minimum ruthenium break-through. The antifer

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results have not been realized to date; however, decontamination equivalent to the previous flowsheet was sporadically obtained.

Reduction of the plutonium concentration in the final product concentrator feed reduced the acid molarity of the product by 20 per cent and the corrosion impurities by 50 per cent. This was accomplished by increasing the 2B column scrub flow and decreasing the 2BP acid addition.

A 24-hour test to determine key variables in operation of the acid fractionator as an absorber was conducted. Results indicated that there were too few plates in the unit to produce 30 per cent acid and that the maximum concentration which could be expected with reasonable losses is closer to 20 per cent. The information obtained will aid in establishing the type of unit (absorber or absorber-fractionator) required in conjunction with the vacuum fractionator now being installed.

2. Inventions and Discoveries

No inventions or discoveries were reported during the month of September, 1956.

G. Events Influencing Cost

Secondary benefits gained from the Precycle low acid flowsheet include an approximate 25 per cent reduction in acid consumption in the extraction portion of the process, which in turn increases the capacity factor of the TF-5 acid fractionator from 1.5 to 2.0.

Driver service for delivery of UNH product to the UO₂ Plant is now being obtained from Power and Maintenance Operation forces. Although particular savings will not accrue to the Purex Operation, the Chemical Processing Department should realize the equivalent saving of one man per year.

"Pencil Type" pH meter electrodes were replaced in the laboratory with standard Beckman electrodes. An annual savings of \$250 is indicated by this change.

Changing work load in the analytical laboratory and in the janitor service function has permitted reassignment of five persons to other locations in CPD. These people will not be replaced.

One pickup truck was released for reassignment in CPD.

H. Plant Development and Expansion

The spare L-0 column is being modified to obtain greater capacity and to improve column control. The stainless steel cartridge plates will be replaced with fluorothene plates and the capacitance probe will be relocated near the center of the column.

The prototype dual-pass silver reactor has been installed in C cell, along with a revised heater vessel and three of eight new jumpers. Installation of the remaining jumpers has been delayed pending receipt of special thermohms or need for rejigging where the jumpers would not fit readily.

I. Reports Issued

HW-45147- Separations Section - Purex Subsection Monthly Report August 1956, by V. R. Chapman, dated September 1, 1956

III. ORGANIZATION AND PERSONNEL

A. Force Summary

	<u>Exempt*</u>	<u>Non-Exempt</u>	<u>Total</u>	<u>Net Change</u>
September 1, 1956	46	287	333	0
September 30, 1956	45	279	324	-9

* Includes Manager - Purex Operation

B. Safety

There were no major or sub-major injuries, and only four medical treatment cases were reported during the month.

C. Personnel Activities

Three college Juniors completed summer training at Purex and were terminated. One Technical Graduate and one Rotational Trainee were in training during the month.

Training programs were inaugurated in the Product and Material Handling Operation for purposes of process instruction and review of procedures. In connection with this activity, revised operator check sheets have been issued to supervision for certification of abilities to perform the varied assignments within the Operation.

O. Schneider

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CHEMICAL PROCESSING DEPARTMENT
REDOX OPERATION

SEPTEMBER, 1956

I. RESPONSIBILITY

In accordance with the reorganization change in the Hanford Atomic Products Operation, effective September 1, 1956, the 222-S Laboratory and the Redox Radiation Monitoring Unit were integrated into the Redox Operation. The Process Engineering Unit was dissolved and the responsibility for the technical aspects of the operation were officially accepted by the Research and Engineering Operation. Concurrent with the above changes, the Contact Engineering Unit became a part of the Redox Maintenance Operation.

With the reorganization change September 1, 1956, the office accommodations of both the T and B Plants have reverted to various components of the Chemical Processing Department. With this change, the landlord responsibility for the office areas and grounds at the two plants was transferred this month from the Redox Operation to the Power and General Maintenance Operation.

II. ACHIEVEMENT

A. Processing Operation

1. Production Rates and Operating Continuity

The Redox Operation production commitment for the month of September was exceeded by 5%, with an operating efficiency of 85% during this period. Mechanical operation was continuous from the first of the month through the 25th, except for a period of 14 hours on 9/6/56 when the process was shut down to replace the F-1 pump which had failed due to a seized shaft.

During the latter part of the month, considerable trouble was experienced with flooding in the 1st cycle columns and on 9/26/56 the columns were shut down for acid flushing. Flushing and cell maintenance, which was accomplished during this same period, was completed on 9/29/56 and metal feed was again started to the columns on 9/30/56.

Except for a brief period during start-up at the beginning of the month, all product solutions produced were well within specifications. The out-of-specification material was blended with subsequent production to produce acceptable material.

The process waste material discarded to 241 during the month was well within normal throw-away limits. A total of 42 units of product was discarded to 241 as a result of the acid flush and sump cleanouts made during the month.

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Intermittent trouble was experienced in the drainage of the J-6 filter vessel during the 25 day operating period. This trouble was corrected on 9/27/56 with the installation of a newly designed drain line jumper with a 48 inch seal loop.

During the period, operation of the facility at rate 12 was performed, while metal feed was available, to further determine limiting factors affecting the process at this rate. Although the periods of operation at this rate were limited, it was noted that G-3 (organic stripper) operation was not satisfactory during these periods due to flooding of the system. Further check-out of this system at the increased rate will be performed during the coming month.

2. Equipment Experience

a. D-2 Agitator

The D-2 agitator installed on 8/31/56 again failed due to a frozen gear box on 9/1/56 and was replaced with new agitator on 9/5/56. The new installation is currently operating in a normal manner. The reason for the failure of the agitator installation on 8/31/56 could not be determined due to the high radiation level of the agitator even after extensive decontamination efforts.

b. F-8 Pump

A leak at the shaft seal on the F-8 pump necessitated replacement of this unit on 9/11/56. To date, the replacement unit has operated satisfactorily.

c. F-1 Pump

On 9/5/56, the F-1 pump (installed on 8/30/56) failed due to a seized shaft. Replacement was made on 9/6/56 and the new unit is now operating satisfactorily.

d. Sump Drain Header

On 9/4/56, the sump drain header to the D-1 jumper became plugged at the dip leg on the D-1 tank. All efforts to unplug the jumper were unsuccessful and the jumper was replaced on 9/5/56.

e. B-2 - B-1 Jet (BG-9)

On 9/12/56, the B-2 to B-1 jet failed to pick up and all efforts to render the jet operable were unsuccessful. The jet was replaced on 9/29/56 during the shutdown for column acid flushing and subsequent operation of the new unit has been satisfactory.

f. A-2 Dissolver Pot

On 9/12/56, the coil in the A-2 pot was found leaking. The dissolver metal heel was subsequently removed and a series of HF

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flushes were processed through the A-2 pot to reduce the radiation levels. On 9/24/56, the pot was removed and transferred to T Plant for storage and a new dissolver pot with a down-draft tower was installed. Operation of the new dissolver pot since installation has been satisfactory.

g. A-2 Sample Jumper (AG-22)

During the reinstallation of the jumpers on the new A-2 dissolver pot (item f.), the sample jumper wall head fell apart due to corrosion. A new sample jumper was installed on 9/29/56.

h. D-14 Pumps

During the month considerable trouble was experienced with D-14 pump failures. The first failure occurred on 9/17/56 and the unit was replaced on 9/18/56. The replacement unit failed on 9/23/56 and as yet has not been replaced due to a lack of spare pumps. All failures at this location appear to be due to seized shafts and back flushing with water, steam and acid have failed to relieve the seizure. At month end, it had not been definitely determined whether the failures were of a mechanical nature or due to plugging by process solutions.

i. H-4 Tube Bundle

On 9/18/56, a leak was detected in the H-4 tube bundle. As the leak became progressively worse, a new unit was installed on 9/26/56. The replacement was made without incident and the old H-4 tube bundle was stored in J Cell for a cooling period prior to burial.

j. 1-A Back Cycle Jumper (FT-6-5)

On 9/19/56, following the backcycle shut down on the 1-A and 1-S columns for the installation of the D-14 backcycle pump, the 1-ABS jumper was found plugged. Flushing did not dislodge the plug and a new jumper was installed on 9/20/56.

k. H-5 Recirculation Jumper

A significant drop in the flow indication on the H-5 recirculation jumper was detected during the early part of the month. By the September shutdown on 9/26/56, the unit was totally unreliable and a new jumper was installed. Since the trouble was traced to a low return signal from the DP-Cell, the new jumper which was installed was designed and fabricated with a shorter top on the DP-Cell and an air filter in the air supply to the DP-Cell. The newly designed unit is currently operating satisfactorily.

1. F-5 Steam Trap Jumper (FT-83)

During the month, the boil-up rate in the F-5 concentrator became very erratic. The trouble was traced to a defective trap in the steam coil discharge line and on 9/26/56 a new jumper was installed. Following this change the boil-up rates returned to normal.

m. J-6 Drain Line

Until the newly designed drain jumper from the J-6 filter vessel was installed on 9/27/56, considerable difficulty was encountered with drainage from this vessel. The new drain jumper has a deeper seal loop (48 inches) and since installation the J-6 filter vessel drainage has been excellent.

n. D-8 Pump

On 9/29/56, the D-8 pump failed because of worn bearings. The pump was immediately replaced and to date has operated satisfactorily.

o. FG-121 Air to 1-SF Control Valve

Following the installation of the F-8 pump on 9/11/56, it was found that the tank end of the air to control valve jumper on the 1-SF valve was so badly bent that it could not be reinstalled. Installation of a new jumper was necessary.

B. Product & Material Handling Operation

1. Production and Operating Continuity

Product concentration of low MWD material in the 233-S Building began on 9/2/56 and continued uninterrupted through 9/26/56 when the scheduled September shutdown in the 202-S Building was effected. All UNH received from the 202-S Operation during the month met shipping specifications.

2. Equipment Experience

During the scheduled shutdown from 9/26 to 9/30/56 in the 202-S Building numerous maintenance jobs were accomplished in the 233-S Greenhouse. Significant items accomplished included regasketing of the L-3 weight factor line, replacement of a leaking flange on the L-2 to L-3 line, regasketing of a leaking flange on the L-1 to L-2 jet, and relocating of the L-16 recycle jet to the top of the L-16 tank. All of these installations were accomplished using "plastic man" and "plastic barrier" techniques and contamination control was very good.

An improved capillary type bayonet sampler was obtained from the TBP Operation and installed on the L-6 tank. The new sampler is designed to give a more representative sample of uniform volume and to improve contamination control. The new method of sampling will also be much

less hazardous than the previous method of sampling the PR cans and simplify the equipment handling problems in the laboratory.

The two plugged waste lines from the 240-S diversion box to the 153-U diversion box were cleared this month by steam and water purging and restored to service on 9/6/56. All three waste lines are now clear and in operation.

Replacement of the control dampers for the No. 1 ventilation unit, which supplies fresh air to the canyon, was started at month end and should be completed on or about October 10. The replacement dampers have been designed to effect a more positive control on the individual louvres and thus should reduce the chances of future ventilation failures which have previously occurred because of malfunctioning dampers.

3. Bismuth Phosphate Plant Standby

1. Standby Operations T & B Plants

At T and B Plants standby operations continue, but shift coverage of these plants was discontinued this month. The eight men formerly assigned to shift are being used to expedite T Plant lay-away activities inasmuch as formal AEC approval to abandon the plants is considered imminent.

Since the office accommodations of these two plants are now in use by various components of the Chemical Processing Department, Security Patrol has discontinued locking the area gates. The operating areas of the plants have been secured by locking all entrances. Concurrent with these two changes, the landlord responsibility for the office areas and grounds at T and B Plants was transferred from the Redox Operation to the Power and General Maintenance Operation.

2. T Plant Lay-Away

All flushing operations for product removal and cell vessel decontamination were completed this month and lay-away activities are being expedited. The steps being followed in the lay-away program are listed below:

- a. All chemical and service lines are being drained, water flushed, air purged, capped, and left disconnected.
- b. Scale tanks, chemical storage and makeup tanks are being flushed clean, and incoming and discharge lines disconnected and capped.
- c. Scale tanks are being blocked up and the scales removed and serviced for lay-away.
- d. Instruments are being disconnected, drained, cleaned and greased, and left in position.

- e. All lines to the cells are being flushed, blanked at the gallery wall and the strainers cleaned and inverted.
- f. All electrical equipment in the cells (except the 224 cell exhaust fans), operating galleries, and pipe galleries will be de-energized by pulling the fuses.
- g. All pumps are being drained, flushed, and greased.

C. Maintenance Operation

1. Operating Continuity and Equipment Replacement

An abnormally large number of equipment failures during the period resulted in an operating efficiency of only 85%. The following is a listing of the major equipment pieces which failed during the period and were replaced: The A-2 dissolver coil, two D-2 agitators, two F-1 pumps, an F-8 pump, a D-14 pump, 1-A backcycle feed jumper, a D-14 sample jumper, a B-2 to B-1 transfer jumper, an H-5 recirculation jumper, an F-5 steam trap, a J-6 precondenser drain line, the H-4 tube bundle, a D-8 pump, an A-2 sample jumper, and the sump collection header to D-1.

In addition to the canyon replacements noted above, 12 shutdown contact maintenance items out of the 20 scheduled were completed. The most notable of these was the work done in the 233-S Building in relocating the RC jet to the top of the L-16 tank and the inspection of the L-2 and L-3 lines for gasket leaks.

2. Inspection and Maintenance

A total of 240 inspection cards were issued during the month, of which 110 were returned by the respective foremen, leaving a balance of 130. Efforts are being directed toward the elimination of some of these inspections to allow foremen to more promptly complete those which are considered necessary from a safety and operating efficiency standpoint.

On 8/26/56, a blow-back occurred on the E-5 pot. The aneroid on the Taylor weight factor instrument, the magnehelic pot pressure gauge and most of the associated copper tube lines were contaminated. It was necessary to replace the aneroid and the magnehelic gauges and also to replace about 100 feet of copper tubing.

Considerable trouble has been encountered in maintaining the H-3 weight factor instrumentation. Material in the tank causes constant plugging of the dip tubes. At one time, the plug was so solid that it was necessary to fabricate and install a pot for adding acid to the lines. The addition of acid opened the lines but it is impossible to keep the lines open for any extended period.

Because of excessive maintenance requirements, one Five-Fold hand

counter was removed from the 202-S Building lobby to the instrument shop for a complete overhaul. New Sodeco Automatic reset registers were installed in the unit while the overhaul was being performed.

The air pressure relief valve on the H-Cell air purge line to the tank coils was replaced with a side discharge type valve. The discharge line was repiped to wall nozzle H-G-90, where it will discharge directly into the cell. This was a preventive measure against a possible contamination spread due to a blow-back from one of the H-Cell vessels.

A spare breathing air compressor was installed in the #1 blower room to operate in parallel with an existing compressor which has given considerable trouble due to working beyond its capacity. The new compressor is not exactly ideal for this work, but it was obtained in the excess of 221-B equipment and it will provide badly needed relief for our other compressor. The principle reason for its not being 100% suitable for the purpose is that it is only capable of developing 38# pressure, which is below the automatic cut out pressure of the system. Thus it has to be operated manually or run continuously.

A clamp holding the electrical cable for the right hand cell wrench broke, and was replaced remotely by devising extension handles on conventional tools so that the craftsmen were far enough removed to effect time limits compatible with available electrical manpower.

D. Analytical Control Operation

1. Control Statistics

<u>Month</u>	<u>Samples</u>	<u>Determinations</u>
August	4139	8769
September	3622	7756

2. Building Maintenance

Principal 222-S Building maintenance included the change of 49 dust stop filters in various hoods and room ventilators, a change of wet filters and installation of new preheat coils in the No. 2 air supply unit and installation of additional methane lines in the counting room (B-1-A) to accommodate instruments of the Standards Group.

3. Waste Disposal

6,033 gallons of 222-S Laboratory waste were transferred to 202-S for storage. 6,036 gallons of low level 222-S Laboratory waste and 65,000 gallons of 300 Area Laboratory low level waste were sent to the 216-SL crib. 450,000 gallons of 222-S Building retention waste were transferred to the 222-S Building swamp.

E. Radiation Monitoring Operation

1. Radiation Occurrence Experience

Seven radiation occurrences were reported in the Redox Operation during the month, reflecting a significant increase in the frequency of occurrences over the previous three month period. Two of the occurrences involved process backups into the 202-S pipe galleries, with no personnel exposure involved. One occurrence was reported in the 222-S Laboratory and involved a chemical reaction in a waste trap which spread contamination throughout the Laboratory hood and the surrounding floor area. However, no personnel exposure resulted.

2. Personnel Exposure Experience

Extensive work in the 233-S Building Greenhouse using the "plastic man" was accomplished this month with excellent contamination control. Since low dose rates permitted long time limits, the possibility of worker fatigue developing has been recognized. Some discussions on this problem have already been held and a maximum exposure limit to conditions inside the "plastic man" is being seriously considered.

Work on the Redox 60T Crane was performed in average dose rates of 1.5 rads/hr, including 500 mr/hr for most maintenance work. Contamination levels on the crane have increased perceptibly over the past three months, mainly due to the manpower requirements of other contamination problems in the Redox Plant. A methodical decontamination program is being planned to regain our position of several months back and to improve further on the crane contamination problem where possible.

3. Contamination Experience

Ground contamination increased significantly during the month at the 216-S-5 crib overflow pond when the A-2 dissolver and H-4 cooling coils failed. Contamination levels increased from an average 50 to 100 mrad/hr along the pond edge to an average 350 mrad/hr and maximum spots up to 1.7 rads/hr. This condition was further intensified for a short time when the water level receded due to the building shutdown, exposing a much larger contaminated area than originally observed. This condition should be corrected when the cooling water segregation project is completed. Completion of the project is currently scheduled for the latter part of October.

The 233-S Building has experienced excellent contamination control in those areas where only fixed contamination was painted over after the June 18, 1956 incident. This condition is particularly encouraging in view of Purex's contamination control problems which have developed as a result of painting over loose plutonium contamination in their pipe and operating galleries last March. Our stand in Redox, to eliminate all smearable contamination prior to painting is a difficult one, but from a long term operational standpoint, there is no better solution.

F. Improvement Experience

1. Processing Operation

In conjunction with the acid flush at the beginning of the month, a comprehensive sampling program was conducted to determine the source of product build-up in the respective vessels experienced in two previous acid flushes. Sample results from the extensive sampling program did not reveal large product build-up in the system indicating the absence of any unknown processing difficulties. Previously experienced high product build-ups are attributed to extended building shutdown periods prior to performance of acid flushes. Nevertheless it will be necessary to make another extensive flush about the end of October to assure adequate control of critical mass conditions.

Inasmuch as the rash of pump failures, in the Redox Plant have coincided rather closely with the process change to complete back-cycling of all waste streams, it is conceivable that this is the cause of the failures. It has been postulated that if the feed through the pumps were less acid deficient, the wastes would have less tendency to crystallize and freeze the pumps. Consequently, the Research and Engineering Operation, assigned to Redox, is preparing a procedure to test this theory. This will have to be a very fine adjustment because there is a very sharp break in the decontamination performance of the columns as the acid deficiency reaches the neutral point.

The dissolver charging operations were altered this month whereby seven buckets instead of six are normally charged to each dissolver. This change in procedure was instituted in an effort to provide a sufficient quantity of metal feed to meet the increased production schedule with a minimum of charging operation being performed on the 8-4 shift. By keeping charging operations at a minimum on the 8-4 shift, maximum utilization of Minor Construction forces engaged in project work in the building can be achieved.

2. Maintenance Operation

Installation of four, 70 CFM, rotameters in the inert gas loop, in the pipe galleries, has been completed. The rotameters are located so that by valving in and out various sections of the loop and reading the gas flow on the rotameters for the various conditions, leaks in the system can be localized.

3. Laboratory Operation

No down time was experienced with the mass spectrometer during the month. This was the first trouble free month since January and was due in part to two modifications made to prolong filament life: (1) installation of a yoke to reduce assembly vibration, (2) reduction in ionizing current during stand-by periods so that filament is operated at a lower temperature.

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4. Product & Material Handling Operation

Relocating of the L-16 recycle steam jet to the top of the L-16 tank was accomplished this month and two potentially hazardous conditions in the 233-S Building eliminated. First, the transfer line from the recycle hood through the loadout room will now operate as a vacuum rather than a pressure line, eliminating an extremely hazardous contamination potential. Secondly, the L-6 to L-16 jet was removed, and the gang valve and steam piping used for the L-16 recycle jet operation. Removal of the L-6 to L-16 jet has eliminated the only dangerous connection whereby solution from a critically safe tank could be jetted to a tank that is not critically safe.

5. Inventions and Discoveries

A report of invention was filed this month for H. L. Poole, Instrument Maker, W-2953-6740, entitled "Thumb Wheel Adaptor".

G. Plant Development and Expansion

1. Design Liaison, Construction Checking

CG-621 Redox Contamination Control

E-Cell Ozonization:

Painting and identification of lines and equipment is complete. An operability check and adjustment of controls on the compressed air system will be required before the ozone generators can be placed in service.

Equipment for the E-13 continuous gamma monitor is on order. Design of the sampling system is being changed to provide gravity feed to the sample box instead of pulling the sample by a jet.

J-6 Precondenser:

Lagging of service piping remains to be completed. A new drain line jumper is being designed to provide deeper seal loops and improve the drainability of the system.

Contaminated Equipment Replacement:

Replacement equipment for H-4, H-5, H-6, and J-1 is on order. These units will not be installed until the cell ventilation units are in operation.

Canyon Wash-Down Facility:

Piping sections and assembled spray riser have been moved to the canyon roof and installation is in progress. The spray header control panel has been mounted on the east end of J-Cell panel board. Installation of the spray pump is complete and fabrication of supply piping is in progress.

CG-624 Redox Railroad Tunnel Ventilation Barriers

Installation of the door control system in the crane way is about 85% complete. Dissolver charging, cell maintenance work, ventilation control and short working time limits have impeded the installation of the door support rails in the railroad tunnel. Cold side electrical work is progressing satisfactorily.

CG-648 Redox Auxiliary Iodine Removal and Nitric Acid Recovery

Construction of the 293-S Building is proceeding satisfactorily. Floor slabs have been poured and forms for the concrete walls are being erected. Excavation of the trench for the raw water and chemical sewer lines has been started.

CG-653 Waste Water Segregation

Pipe installation between the utility outlet header in the field and a new control box was made this month. Two hot tie-ins, fabrication of five cell jumpers and jumper installation remains to be done before beneficial use.

CG-692 Modification to 233-S Concentration Building

Approval of the project proposal has not been received from the A. E. C. in Washington DC.

H. Events Influencing Costs

It is anticipated that essential material costs will be above the monthly forecast because complete backcycling was achieved only during part of the month. Backcycling was discontinued for extended periods because of two D-1⁴ pump failures and plugging of the 1-ABS backcycle jumper.

Hexone usage will probably be high this month because the J-6-E precondenser could not be effectively used due to improper drainage of the J-6 filter vessel. However, a newly designed drain jumper from the J-6 filter vessel was installed on 9-27-56 and normal operation of the precondenser has resulted.

Cell maintenance costs are expected to be higher this month because of an abnormally large number of equipment failures. An operating efficiency of only 85% was attained during the month.

I. Significant Reports Issued1. Routine

HW-45203, "Monthly Report Redox Operation, August, 1956", by C. T. Groswith.

HW-45489, "Monthly Report, T Plant Subsection, August, 1956, by C. B. Foster.

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2. Non-Routine

HW-45635, "Plutonium Contamination Status of 233-S Building Following a Process Blowback In An Instrument Air Line", by G. C. Loud, dated September 21, 1956.

III. ORGANIZATION AND PERSONNEL

A. Force Summary

	<u>Beginning of</u> <u>Month</u>	<u>End of</u> <u>Month</u>	<u>Net Change</u>
General	3	3	0
Maintenance Operation	64	64	0
Product & Mat'l Handling			
Operation	96	93	-3
Processing Operation	77	77	0
Radiation Monitoring			
Operation	27	27	0
Analytical Laboratory			
Operation	91	92	+ 1
	<u>358</u>	<u>356</u>	<u>- 2</u>

B. Safety

There were no disabling injuries, serious accidents or incidents, in the Redox Operation during September.

The cage on the 233-S Building manlift was modified and installation completed this month. However, it now appears that the upper portion of the door, which swings upwards and fastens to the ceiling of the cage, may present a head bumping hazard to tall men. Further modifications to correct this condition are now being considered. However, any corrective action taken will be only of a temporary nature since the need for the manlift will be eliminated with the completion of the project for the expansion of the 233-S Building.

C. Security

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

D. Personnel Activities

The reorganization was effected in Redox with a minimum of confusion and a harmonious cooperative atmosphere has prevailed. The integration of the various groups such as the Laboratory and RMU into the organization was started a month prior to September 1, 1956. Also, the responsibility for the Technical aspects of the Operation had been unofficially accepted by the Research and Engineering people by August 1, 1956. Consequently the transition went rather smoothly. Naturally, there are many minor points of responsibility, etc. to be

ironed out, but taking everything into consideration, the Operation is functioning very well.

The recent announcement concerning the plans to complete the Tank Farm and TBP Operation has naturally caused a considerable amount of unrest and has been damaging to morale. It will be necessary for members of supervision and management to be more alert than ever in order to forestall adverse effects on the Safety, Radiation Protection and overall operation.

A redistribution of the men in the various crews of the Maintenance Operation was made this month. This move was made in an effort to provide closer supervision, more efficient use of manpower, and better safety and radiation protection performance.

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CHEMICAL PROCESSING DEPARTMENT
FINISHED PRODUCTS OPERATION

DEL

SEPTEMBER, 1956

I RESPONSIBILITY

Effective September 1, 1956, as a result of reorganization, the Finished Products Operation assumed responsibility for the operation of those facilities and services which formerly made up the Z Plant and Metal Recovery Sub-Sections of the Separations Section. One exception was that the radiation monitoring responsibilities for the 200-W Laundry and the Transportation facility at Riverland was relinquished by the Radiation Monitoring Operation and was assumed by the Radiation Protection Operation of the Hanford Laboratories Operation.

II ACHIEVEMENT

A. Metal Finishing Operation

231 Processing

The 231 Building processed low MWD/T plutonium which originated from Redox. This material is isolated and loaded to sample cans for shipment offsite as plutonium nitrate. Although the production load was significantly higher during September than it has been in previous months, schedules were met without difficulty. The production schedule for September was exceeded significantly and this fact made it possible to satisfy the quarterly commitment.

234-5 Processing

Operations generally progressed satisfactorily during the month. However, production schedules were 39% higher than any that previously prevailed, and while operating at the accelerated rate many of the difficulties which ordinarily are of a minor nature have a very significant effect on accomplishments. It was necessary, due to a combination of circumstances, to revert to overtime to assure good progress.

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B. Product Recovery Operation

A total of 15.8 Kg's of high MWD/T Plutonium metal scrap was recovered in the Product Recovery Operation, thus eliminating all of the backlog of recoverable material in this inventory account. 4.9 Kg's of low MWD/T metal were also recovered.

Three Teflon pulser bellows failed on the first extraction column (H-1), two of them after only three days operation each. These latter two were of new design and more pliable than the regular bellows and their failure was a surprise. As a result, representatives from Facilities Engineering Operation and research groups were requested to assist in a new design of equipment for this function.

Column feeds were extremely dirty, due principally to clean-ups from bellows failures, and frequent inversions and slow rates resulted. A caustic-water-acid-water flush was made on both H-1 and H-2 columns which allowed rates to increase from ca. 1000 to 2000 liters/day immediately. The net result for the month was the purification of 11.4 Kg's of plutonium, comprised principally of recycle material from Purex. There was no gain in the recovery of plutonium from the slag and crucible account. Operating efficiency approximated 56.5%. There was an average flow rate of 833 liters/day. Waste losses totaled 0.7%.

RCDs 1103 casting crucibles for the RMA Line were in extremely short supply due to manufacturing problems at Norton Co., the vendor. Only by air expressing each batch as they were prepared was a plutonium fabrication shutdown averted. The situation was easing at month-end.

Power and ventilation work in the Z Plant continued on a routine basis. The most significant maintenance items involved the repair of preheat coils in 231 and 234-5 Buildings and the repair of a leak in the 225 lb. steam header, which caused a two-hour shutdown in the 234-5 Building.

C. Maintenance Operation (Z)

In Task II considerable difficulty was experienced with an important piece of major equipment, the hood 9 carriage. The carriage became inoperative when the thrust bearings in the cross feed drive mechanism failed. The failure was not caused by lack of lubrication as these are sealed bearings. The bearings were replaced, and in conjunction with this repair job the shaft bearings in the floating support blocks on the drive shafts to both horizontal and cross travel were replaced. The carriage is now operating properly.

In Task II clutch yokes were fabricated and installed on the overhead slip clutches to the two Hood #9 carriage drives. This will permit the resetting of the overload clutches without removing the electrical motor drive covers. This is a definite safety improvement as it eliminates the possibility of an electrical shock when resetting the overload clutches.

In Task II, because of hydrofluoric acid corrosion the door of Furnace "E" failed at the point where the door face plate is welded

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C. Maintenance Operation (2) (Cont'd.)

to the insulating portion of the door. By improvising a special male seal ring and welding it to the insulating portion of the door it was possible to repair this door and to return it to service.

In Task IV the vertical lift to Unit #2 failed after approximately two years of service. A complete inspection revealed that this remote mechanical lifting device was in a generally poor condition and it was not feasible to make repairs. A complete new lift was installed.

In Task IV two electrical failures were experienced on the #1 casting unit. One Stupokoff electrical connector and the diffusion pump heating element failed causing this unit to be inoperative. Repairs were made by replacement and the unit returned to service.

In Recuplex a newly aligned and balanced L-3 agitator was installed to replace a bent agitator which possibly resulted from operation when liquid level was below the impellor.

In Recuplex it was necessary to replace the bellows on the H-1 (first solvent extraction) column three times during the month. All of these failures occurred in the contour of the bellows. The reason for failure has not been determined. It was hoped that the latest bellows (which were more pliable than formerly) would have been satisfactory.

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C. Maintenance Operation (Z) (Cont'd.)

The problem is being studied and Facilities Engineering and Research are endeavoring to assist. Eight to twelve hours downtime is required for replacement of this piece of equipment.

In 234-5 Building the expansion of the helium manifold area at the rear of the building is scheduled by Minor Construction to start October 1, 1956. Completion is forecasted for the end of November at an estimated cost of \$2,425.00.

D. Analytical Control Operation

A total of 5,940 determinations were made on 1,897 samples during the month. This exceeds the record number received in May, 1956 by 236. The monthly average for the year is 4,123.

Means of improving the analytical precision in the measurement of plutonium by direct assay received particular attention during the month. R. J. Kofoed made a trip to Rocky Flats to observe the ceric sulfate potentiometric method as they perform it and upon his return to Hanford, he and two other chemists from the Process Chemistry Operation, J. W. Handshuh and L. A. Bray, worked very closely with the Analytical Control Operation performing analyses and collecting data for precision studies. By selection of personnel and exercising very close control over the procedure and equipment, an improvement in the precision was indicated. It was clearly apparent that this is no ordinary control procedure and steps were taken to set up the determination on a specialized basis for the coming quarter.

E. Metal Recovery Operation

A record net production (since series operation was started) was achieved by the Metal Recovery Operation during the month of September when 176.6 tons of uranium were processed. This production represents 119% of goal for the month. Gross production was 190.7 tons which included 8.1 tons of uranium in 224-U rework (C-2 waste) and 5.9 tons in recovered nitric acid.

Operations within the Metal Recovery Operation were essentially trouble free during September with rates being limited only by feed availability and a periodic excess of low quality rework material from the Uranium Oxide Operation. Adoption of a new procedure calling for addition of phosphoric acid to the RA and RE column scrub streams of the extraction towers has resulted in improved decontamination. Equipment failures were unusually few, with none occurring which affected production. There was no down time on either extraction battery. Except for a very brief period at the first of the month following a shutdown late in August, the product stream has been in good control with gamma content low (105% ANU) and waste losses nominal (.66%).

F. Metal Removal Operation

Sluicing operations continued in the 101-U and 107-TX tanks during the period with satisfactory recovery rates.

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F. Metal Removal Operation (Cont'd.)

The dual sluicing operation continued during the period in the 102-104TX and the 102-T tanks. Preliminary sample results of the 101 TX accumulator tank material indicate satisfactory progression of this program.

The in-farm scavenging program was again started on 9-22-56 with satisfactory progression to date. A total of 183 tons of uranium was blended during the period. This represents 122% of the production goal forecast.

Operating efficiency was 96.6% and 95% for UR and TXR farms respectively.

Approximately 60,000 gallons of uranium slurry was received from 300 Area and stored in the 105-U tanks for processing at the end of the waste metal recovery program.

Phase II ditches were completed on 9-28-56. This provides space for 8,750,000 gallons of TBP and scavenged waste.

Nagle pump #64, being used for dual sluicing, was dropped to the bottom of the 104-TX tank when the control switch on the raising and lowering device failed. Extent of damage to tank had not been determined at month's end.

G. Uranium Oxide Operation

Overall production was 97.2% commitment. No continuous calciner Uranium Oxide was counted as produced. Even though the engineering personnel had produced the full commitment on the continuous calciner it could not be milled and loaded because of startup difficulties with the new powder handling facilities. Production commitments for decomposition pot UO₃ powder were exceeded by 8%. Powder equivalent to 486.24 tons of uranium were produced by this method.

The uranium oxide continuous calciners in the expansion facility were being modified, the feed point and adjacent thermowell were being segregated, based on prototype experience and using Minor Construction forces. Faults were uncovered during acceptance tests on the UA powder handling system circuitry. While trying to load calciner powder freezing of the star-type unloading valves was the major problem. Plant maintenance forces were seeking to make these function at month end.

One Luckey pot (#20) was out of production from September 7th until 25th due to a bent shaft. This failure is primarily attributed to heating problems occurring at the critical mastic stage of decomposition. The X-3 and X-11 powder handling filters and system caused ten occasions of production losses ranging from one and one-half hours to eight hours. This affected production because the powder system in the 224-U building is not paralleled.

H. Maintenance Operation (U)

One new Nagle sludge pump was installed in the TX tank farm during the month. One new sluice pump was installed in the 244-TXR vault and one new blend pump was installed in the 244-UR vault. Frequent periscope moves were made to expedite tank clean out and inspection.

One pump failure occurred in the 221-U canyon, a spare pump was installed and the faulty pump repaired. The repair of the 004-WR feed sampler gear reduction assembly was completed. Installation of the lifting bail remains to be done. Minor repairs to two ACA pulse units were completed.

Major repairs to gas fired pot #20 has kept this unit out of service the greater part of the month. One electric calciner required major down time for replacement of heater elements. Regasketing of the 224-U building electric calciner furnace pots was completed.

Startup of the new UA building and the 4X calciner has required a great deal more service from maintenance forces than was originally expected.

I. Radiation Monitoring Operation

One radiation incident which occurred in the 231 Building was formally investigated (CPD #1). A chemical process operator incurred possible internal deposition when he received plutonium contamination in his mouth and on his person. He was attempting to force a gasket on a sample can plug which apparently had some plutonium bearing solution in the air vent. First results received from analysis of urine samples indicated that some deposition occurred.

Twenty-one radiation occurrences were noted during the month of September, eleven occurring in Z Plant, seven in UO₃ and three in TBP. Failure to follow established procedures, lack of care, and inadequate or improper use of equipment accounted for 80% of these occurrences. The Metal Removal Operation in the Tank Farms had no occurrences during the month.

Thirteen cases of skin contamination were detected in Z Plant, fifteen cases in UO₃ Plant, two cases in TBP and three cases in the Tank Farms for a total of thirty-three. The recent trend in the number of skin contamination has been highly undesirable. This trend has been publicized, and all Finished Products Operation are working to reduce the number of skin contamination cases.

Surface contamination control for the cribbing of TBP waste in the Tank Farms was greatly improved when permanent type trench covers were used. Air samples and surveys taken around the cribs failed to reveal any significant contamination.

Housekeeping and contamination control improved considerably in the UO₃ Plant. The number of areas visibly contaminated with UO₃ have been reduced significantly. In an attempt to reduce the number of radiation occurrences and skin contamination cases, a training program was started for maintenance personnel at the UO₃ and TBP Plants.

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J. Improvement Experience

1. Process Tests and Revisions

Information relating to this item will be covered in the Research and Engineering Operation portion of the Department report. Other information containing Weapons Data will be covered in a separate report to be written later.

2. Miscellaneous Improvement Items

In the Metal Finishing Operation a vise with nylon jaws has been adopted in order to eliminate a portion of the manual handling of plutonium pieces and thereby reduce personnel exposure.

In the Uranium Oxide Operation the nitric acid TA-3 absorber tower system, a part of the Uranium Oxide expansion, was placed in use on September 1st to relieve fuming conditions in the pot room, 224-U Building, by increasing pot vacuum. Also, regasketting of all electric pots was completed in September. These two items have materially improved working conditions in the UO₃ Plant.

Bulk containers for the shipping of Uranium Oxide powder were placed in use by month-end. The last carload of Uranium Oxide shipped in drums was September 27.

3. Inventions and Discoveries

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

I. Events Influencing Cost

The use of overtime by the Metal Finishing and Analytical Operations in order to meet the high production schedule for September will result in significantly higher labor charges for these operations.

In the Metal Removal Operation due to the start of the in-farm scavenging program during the month, the instrument maintenance and chemical consumption costs will show an appreciable increases.

In the Uranium Oxide Operation, significant expenditures were made when work orders were written during September to make repairs and improve the status of the electric decomposition pots, and to improve house-keeping, safety and work conditions in the 224-U Building. These costs were primarily required by the revised production requirements call for maximum hot powder output for at least another year.

In the Uranium Oxide Operation a test program leading to the shutdown of the TD-4 acid fractionator column was initiated upon the recommendation of the process group and is in progress at month end. Steam has been shut off, saving significant expenditures. Natural acid accumulations are being measured and analysed for acid recovery and uranium content.

K. Events Influencing Cost (Cont'd.)

A substantial net savings is indicated as the end point of this test. The steam costs are disproportionately high for acid for uranium recovery.

L. Plant Development and Expansion

1. Project CG-691, Continuous Task I and II, 234-5 Building

why

Detail design is proceeding on a six-day week and is approximately 25% complete at month end. Requisitions for critical equipment are being prepared. A target date of August 1, 1957 has been selected as the beneficial occupancy date of the first producing Unit.

2. Project CG-613 - UO₃ Expansion

Performance testing on the three calciners accepted by the Manufacturing Department on August 23, 1956, will be delayed one to three weeks pending the relocation of feed point thermowells. Work continues by Minor Construction forces on the installation of the remaining calciners with completion scheduled for October 5, 1956.

Alterations to the seals on the powder screw conveyor for the existing loadout facility have been completed and the installation of the conveyor is scheduled for September 26, 1956. Product loadout will utilize bulk containers and discontinue drums upon completion of the conveyor installation.

Prototype produced powder is being milled in the 224-UA powder unloading system.

Hoffman Construction Company was low bidder at \$95,200 for the construction of a new maintenance shop. The work has not been released pending a review of the bid package, with a view to reducing the cost of constructing the installation.

3. Project CG-603 - In-Farm Scavenging - West Area

Project CG-603 is complete except for minor punch list items.

4. Project Request - Reduction of Air Borne Noxious Fumes - 224-U Bldg.

The project proposal is being circulated for Departmental approvals. The schedule for beneficial use is thirteen months after project authorization.

5. Project CA-688 - Additional Waste Facilities - 216-BC Crib Area

The completion of the Phase II portion of the project is expected during the week ending September 30, 1956. Activation of the Phase III portion of the project for six additional ditches has been requested by the Manufacturing Department, with beneficial use of one ditch scheduled for December 15, 1956, and one ditch each week thereafter.

L. Plant Development and Expansion (Cont'd.)

6. Engineering Study - Compressed Air and Venting Facilities

An Engineering Study to determine the feasibility, cost and equipment required to provide compressed air and venting facilities for U Area, completely independent of the 221-U facilities, as compared with the cost of maintaining existing facilities in the 221-U Building has been issued and is being reviewed by the Finished Products Personnel.

7. Project Proposal - Nitric Acid Transfer Facilities

Comments on the Project Proposal rough draft are being received by the Engineering Department for consideration in preparation of the final draft of the project proposal.

8. Engineering Study - Supplemental Product Unloading Facilities 224-U Building

An Engineering Design Study has been requested to investigate supplemental facilities for the calciner pot unloading system in the 224-U Building, and to examine the feasibility of project action for such facilities.

9. Engineering Study - Redesign of Calciner Pot Agitators, Shafts and Seals, Building 224-U

An Engineering Study has been requested to correlate the available agitation information, and with this information, redesign the electric calciner pot agitators, shafts, and seals.

10. Request For Project Proposal - Installation of Product Rework Facilities - Oxide Operation

The preparation of a Project Proposal for the design, construction, and installation of all necessary equipment to allow rework of off-standard finished product has been requested of the Facility Engineering Department.

M. Reports Issued

HW-45701 Operational Plan For Product Recovery Operation,
September 26, 1956, by L. M. Knights

HW-45129 Separations Section, Z Plant Sub-Section Monthly Report,
August 1956, by L. I. Brecke

III ORGANIZATION AND PERSONNEL

A. Organization Changes

Organization of the Finished Products Operation is essentially the same as that formerly designated as the Z Plant Sub-Section plus the Metal Recovery Sub-Section. However, responsibility is now under

A. Organization Changes (Cont'd.)

one head, the Manager, Finished Products Operation. Minor changes have taken place, as follows: (1) The Contact Engineers who formerly reported to the Process Engineering Unit now report to the respective Managers, Maintenance Operations (Z & U); (2) the Utility Services personnel who formerly reported to the Superintendent, Process & Plant Services, Metal Recovery Sub-Section, now reports to the Manager, Metal Recovery Operation; and (3) Chief Operators were added on the various shifts in the Uranium Oxide Operation after having been relinquished by the Metal Recovery Operation.

B. Force Summary

	<u>End of Month</u>		
	<u>Exempt</u>	<u>Non-Exempt</u>	<u>Total</u>
General	2	1	3
Metal Finishing	7	51	58
Product Recovery	6	51	57
Maintenance (Z)	8	44	52
Radiation Monitoring	7	29	36
Analytical	9	39	48
Metal Recovery	7	58	65
Metal Removal	7	36	43
Uranium Oxide	6	52	58
Maintenance (U)	<u>10</u>	<u>78</u>	<u>88</u>
Totals	69	439	508

C. Safety Experience

No Disabling Injuries or Near-Serious Accidents occurred in the Finished Products Operation during the month. Seventeen (17) Medical-Treatment Injuries were experienced. No significant trends were apparent.

D. Radiation Experience

All significant information relative to the Finished Products Operation is covered in Item II - L. (Radiation Monitoring Operation) and in the formal Report of Radiation Incident CPD #1.

E. Security Experience

No security violations were experienced during the month.

F. Personnel Activities

The bulk of all personnel activity during the month centered around informing the individual employee of the new organization concept. Every effort was made to show the reasons behind the changes and to express each employee with the importance of his assignment.

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F. Personnel Activities (Cont'd.)

The Analytical Laboratory has started on-the-job training of all shift personnel in order to improve techniques and to improve flexibility of the various crews.

In the Uranium Oxide Operation training of the shift personnel on the continuous calciner equipment was started during the month.

On anticipation of the problems inherent in the shutdown of the Metal Recovery and Metal Removal Operations, an analysis of the needed manpower movements of the Bargaining Unit #4 (Chemical Workers) personnel has been made. It is planned to start these moves by mid October in order to effect an orderly and gradual transfer of the senior men to the permanent jobs in the plants which will continue operations.

CHEMICAL PROCESSING DEPARTMENT
POWER AND GENERAL MAINTENANCE OPERATION

SEPTEMBER, 1956

I. RESPONSIBILITY

A new position, Specialist, Plant Liaison, was established in Power and General Maintenance Operation during September. The prime function of the position will be to administer Power and General Maintenance activities directly involving services within process plants and to serve as principal liaison in process plant relations. The ventilating and balancing group formerly associated with Separations Manufacturing Engineering will continue their services under direction of this position.

Responsibility for performance of janitorial services in all 200 Area buildings, except active process buildings, was assigned to this Operation on September 1, 1956, and plans have been completed to move the personnel engaged in this work from day to swing shift effective October 1, 1956 in order that efficiencies inherent in servicing office space while vacant may be realized.

II. ACHIEVEMENT

A. Maintenance Operation

1. Operating Continuity

There were no outages of steam, water or electrical services that affected continuity of operations in the 200 Areas during the month.

2. Inspection, Maintenance and Replacement

The No. 5 Boilers in 200-E and 200-W Power Houses were inspected by the third party (J.A. Kronin, Travelers Ins. Co.) on September 17. The boiler sections of each unit were found to be in good state of repair; however, other work was found necessary which included in West Area replacing the re-injection nozzles on the cinder return systems, installing new pedestal bearings on the induced draft fan, replacing the refractory brick on the rear fire wall and the replacement of fifteen grate segments. In addition, a modified Hilliard type clutch was installed on the stoker line shaft as a replacement for the vendor's original clutch which was rendering unsatisfactory performance.

Limitations imposed by the "filling up" of the 231-Z burial garden necessitated excavating a 300' x 40' x 15' deep trench for use in the future burial of dry waste. Location of the new dry waste burial garden is west of, and adjacent to the existing industrial burial grounds in 200-W Area. In 200-E Area, immediately north of C Tank Farm a 600' x 20' x 10' deep trench was excavated for use by the Hot-Semi and Purex Facilities in the burial of dry waste.

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The Northern Pacific RR Car (NP 1147) that was involved in a train wreck while transporting UO₂ was buried in 200-E Area September 19. Site of the burial was in the maintenance burial pit north of the B Facility.

A total of twenty two (22) electric motors ranging in size from 1 hp to 800 hp were rewound and/or repaired for various HAPO components during the month.

Major services rendered the process plants by the Shops Operation included the making ready and/or fabrication of a silver reactor column, an off-gas heater, a jib crane, a dissolver pot and tower, an off-gas absorber column, a cyclone separator and twenty-four cell pipe jumpers.

The full capacity of the tool and die shop plus approximately 40% of the machine shop was involved during the month in the preparation of tools, dies and special items for the Z Facility and its experimental components.

Principal liaison relations with the prime separations facilities consisted of coordinating shops activities in replacing failed equipment at the Redox Operation and equipment required to meet a schedule shut-down. P&GM activities in support of the scheduled October shutdowns of the Purex Operation were coordinated to meet scheduled commitments. A review was made of failed Nagel pumps to determine course of action necessary to restore this equipment to operating status.

Approximately 21,000 sq. ft. of office space plus common facilities is being renovated at the B Plant to accommodate personnel affected by the organizational changes that were placed in effect during September. This work was 70% complete at month end. Target completion date is November 16.

III. ORGANIZATION & PERSONNEL

A. Force Summary

1. Number of Personnel on Roll

	<u>Beginning of Mo.</u>		<u>End of Mo.</u>		<u>Difference</u>		
	<u>Weekly</u>	<u>Monthly</u>	<u>Weekly</u>	<u>Monthly</u>	<u>W</u>	<u>M</u>	<u>T</u>
P&GM General	1	1	0	1	-1	0	-1
Administration	9	6	8	6	-1	0	-1
Power Operation	58	10	56	10	-2	0	-2
Shops Operation	92	9	93	10	+1	+1	+2
East General	78	9	65	7	-13	-2	-15
West General	45	7	52	7	+7	0	+7
Plant Liaison	0	0	3	2	+3	+2	+5
	<u>283</u>	<u>42</u>	<u>277</u>	<u>43</u>	<u>-6</u>	<u>+1</u>	<u>-5</u>
		325		320			-5

B. Safety

The operation experienced no disabling injuries during the month. Medical treatment cases total 19 for a frequency rate of 3.91. There were no incidents reported in which a lapse of radiation control was allowed to occur.

C. Personnel Activities

A total of six first level supervisors were reassigned to different positions in the Operation for further training and development. Two of the moves involved upgrading to positions of greater responsibility.

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CHEMICAL PROCESSING DEPARTMENT
FINANCIAL OPERATION

September, 1956

I RESPONSIBILITY

Effective September 1, 1956, concurrent with the reorganization of the Hanford Atomic Products Operation, the Financial Operation of the Chemical Processing Department was established and assigned the responsibility for providing various types of accounting services necessary for sound and informed performance of the Department's business. This responsibility includes the fields of measurements, S. S. Accountability Service, contract counseling and office methods and procedures studies in addition to normal cost and general accounting activities.

II ACHIEVEMENT

A. Product Cost

A Chemical Processing Department Work Order Authorization listing was prepared and issued to personnel of CPD and other interested Department's.

Instructions covering Methods and Procedures for Capital Addition and Retirement were prepared and issued to CPD personnel.

Cost ledgers were established and Operating Cost report forms were revised in order to detail controllable and non-controllable costs for the Department, Sections, and Sub-sections.

Budget work was directed toward revising the budget allocation of funds to the Section and Sub-section level. Each Level 3 Manager was contacted and his budgeted funds for FY 1957 were reviewed with him. Present plans are to have budget control figures, on at least the Section level, for the September Operating Reports.

The monthly Shop Tools and Supplies report for August was issued. Beginning in October this report will be issued on a weekly basis since it is felt that a weekly report will afford CPD management a more timely control over the cost than the monthly report.

Precious Metals and Special Materials inventories were begun and are in the process of being reconciled.

B. Personnel Accounting

In September, the first full month under the new decentralized organization, the Personnel Accounting Operation paid 1886 employees.

The segregation of the Pension Plan by the new organizational components was not completed as scheduled due to programming and scheduling.

difficulties encountered by Computing and Procedures. It is expected that this segregation will be completed by mid-October.

Statistics:

1. <u>Number of CPD Employees</u>	<u>Monthly</u>	<u>Weekly</u>	<u>Total</u>
Employees at Beginning of Month	439	1 466	1 905
Additions and Transfers In	1	6	7
Removals and Transfers Out	4	17	21
Transfers from Weekly to Monthly	0	5	5
Transfers from Monthly to Weekly	0	0	0
Employees at End of Month	436	1 450	1 886

2. Overtime Payments During Month

Non Exempt Employees	\$15 066.66
Exempt Employees	5 603.87
Total	<u>\$20 670.53</u>

3. Gross Payroll for Month

	<u>Monthly</u>	<u>Weekly</u>	<u>Total</u>
	\$ 311 001	\$ 666 080(a)	\$ 977 081

(a) Payments to non-exempt employees covers a four week period.

4. Participation in Benefit Plans at Month End

	<u>Number Participating</u>	<u>% Participation</u>
Pension Plan	1 802	98.6
Insurance Plan		
Personal Coverage	1 879	99.6
Dependent Coverage	1 457	77.3
Stock Bonus Plan	1 047	55.5
Savings Plan	252	13.4
Total Both Plans	1 173	62.2

5. Pension Plan

Number Retired	0
Number who became eligible for participation	12
Number who elected to participate	12
Number who elected not to participate	0
Replies not received	0

6. Insurance Claims Paid

Employee Life Insurance	0
Employee Accident and Health	67
Dependent Accident and Health	90

7. <u>Good Neighbor Fund</u>		
Number participating	339	
Percentage of participation	71%	
8. <u>Suggestion Awards</u>		
Number of Awards	0	
Total Amount of Awards	0	
9. <u>Preferential Rates</u>		
Number (eliminated) or added	0	
Number currently in effect	56	
10. <u>Number of Military Allowance Payments</u>	0	

C. General Accounting

Chemical Processing Department property custodians are being contacted by Plant Accounting in order to expedite the reassignment of Plant Record Unit Control cards.

The locator file, by HEW number, for movable equipment has been verified to the History Record Cards, and work directed toward bringing the custodian file up to date is progressing satisfactorily.

Depreciation expense chargeable to product cost for the month of September totaled \$1,262,188.00.

Balances at September 1, for CPD completed Plant Accounts are as follows:

	<u>Asset</u>	<u>Reserve</u>	<u>Net Book</u>
Plant and Equipment in Service	\$263,080,715.55	\$107,381,469.00	\$155,699,246.55
Plant and Equipment held for future use	47,400,287.00	30,420,036.00	16,980,251.00
Plant and Equipment Not used nor Currently Useful	3,188,619.00	3,188,619.00	-0-
Total	<u>\$313,669,621.55</u>	<u>\$140,990,124.00</u>	<u>\$172,679,497.55</u>

A partial transfer of General Ledger Account balances at September 1, 1956 has been made to the Chemical Processing Department book of account. This transfer represents a net investment of \$174,862,807.31, and is detailed below:

	<u>Debit</u>	<u>Credit</u>
Local Working Funds	\$ 5,000.00	
Essential Materials		
Inventory	\$ 1,562,122.66	
Less Reserve	<u>77,660.78</u>	
	1,484,461.88	
Precious Metals and		
Special Materials		
Inventory	188,312.80	
Deferred Charges - Misc.	25,658.26	
Cash Advances	1,081.19	
Plant and Equipment		
in Service	263,080,715.55	
Less Reserve	<u>107,381,469.00</u>	
	155,699,246.55	
Plant and Equipment		
Held for Future Use	47,400,287.00	
Less Reserve	<u>30,420,036.00</u>	
	16,980,251.00	
Plant and Equipment Not		
Used or Currently		
Useful	3,188,619.00	
Less Reserve	<u>3,188,619.00</u>	
	-0-	
Equipment Work in		
Progress	232,878.82	
Costs - Depreciation	422,250.00	
Gov't Cost Unbilled		\$ 75,074.22
Miscellaneous Accrued		101,258.97
Liabilities		174,862,807.31
Net Investment		<u>\$175,039,140.50</u>
	<u>\$175,039,140.50</u>	<u>\$175,039,140.50</u>

The transfer of Work in Process Inventories and Cost Current Fiscal Year accounts has not been made by Relations and Utilities Operation.

Twenty-eight Second Class Invoices totaling \$92,400 have been transmitted to other HAPO Departments; eleven of these invoices totaling \$61,540, were to transfer to the responsible department, plant and equipment erroneously applied to CPD during the recast for reorganization and miscellaneous expense items coded to CPD in error.

The responsibility for servicing the sanitary napkin vending machines in the 200 Areas has been assigned to CPD - Financial Operation. Billings Operation has been delegated the responsibility for performing this service and controlling the napkin inventories and cash.

During the month standard liquidation rates, \$74 per Engineering and \$58 per Drafting man-day, were established for the Facilities Engineering Operation.

D. Auditing

A review of the physical safeguards provided for the CPD cash fund was made.

A procedure for distribution of Purchase Requisitions by originating personnel was established which provided for distribution to Financial and Purchasing on a parallel basis.

With the assistance of the Product Cost Operation, a list of Chemical Processing Department personnel authorized to approve requisitions was prepared and forwarded to the Manager - Purchasing Stores.

A list of persons delegated the authority to authorize store orders, stock adjustment requests, and stores stock requests was prepared and submitted for approval.

E. Measurements

During the month the major activity centered around the establishment of OPG system for the Chemical Processing Department which would provide for adequate dissemination of policy information to members of management. An acceptable system was established and approved, and CPD OPG 1.1 outlining the system was issued. Currently, there are 32 additional CPD OPG's and Advices in process.

The Separations Section Cost and Production Analysis for August was prepared and issued in the form of Document No. HW-45599-RD. The information contained in this document was incorporated in the "Financial Summary - Manufacturing Cost - August, 1956" report issued by R.E. Thomas.

In the field of measurements, contacts were made with the representatives of Power and General Maintenance Operation and Facilities Engineering Operation. All information presently available was discussed with these individuals and the manuals issued by Measurements Service were routed to them for information. The establishment of a profitability system for CPD was the basis of several meetings with Measurements personnel of other Departments. At the present time the status of this important area of measurement is at a complete standstill since the development of a price for feed material from IPD has not been firmed up.

III ORGANIZATION AND PERSONNEL

<u>Force Summary</u>	<u>Exempt</u>	<u>Business Graduates</u>	<u>Non-Exempt</u>	<u>Total</u>
Financial Operation - General	1	0	1	2
General Accounting Operation	6	0	15	21
General	1	0	2	
General Books	1	0	4	
Billing	1	0	3	
Plant Accounting	2	0	6	
Projects	1	0	0	
Product Cost Operation	6	4	16	26
General	1	0	1	
Costs Accumulation	1	1	13	
Budgets	1	0	1	
Cost Analysis	2	3	0	
Inventories	1	0	1	

	<u>Exempt</u>	<u>Business Graduates</u>	<u>Non- Exempt</u>	<u>Total</u>	<u>DATE</u>
Measurements	1	0	1	2	
Auditing	2	0	0	2	
Procedures	1	0	0	1	
Personnel Accounting	5	0	13	18	
General	1	0	2		
Weekly Payroll	1	0	4		
Monthly Payroll	1	0	2		
Benefit Plans	1	0	4		
Records and Reports	1	0	1		
Total	<u>22</u>	<u>4</u>	<u>46</u>	<u>72</u>	

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CHEMICAL PROCESSING DEPARTMENT
FACILITIES ENGINEERING OPERATION

September, 1956

I. RESPONSIBILITY

The Facilities Engineering Operation became existent as a part of the Chemical Processing Department under the new HAPO reorganization plan effective September 1, 1956. Responsibilities of the new operation include the following functions:

Engineering Administration
Maintenance and Industrial Engineering
Project Engineering
Project Design and Development

II. ACHIEVEMENT

A. FINISHED PRODUCTS OPERATION

Chemical Processing and Reduction

Design and development studies were completed which investigated the possibility of installing the process hoods which is planned for temporary installation in the RG line area as part of CG-691 into a permanent location in the RG line. Results of this study confirmed that the temporary RG line location of this hood as presently planned is the more practicable and suitable. *well.*

Design and development studies have been started on improvements to the pulse generating system of the H-1 column in the Recuplex facility. Repeated failures of the bellows seal in this pulse generator has seriously interfered with the continuity of the Recuplex operation.

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Work orders for fabricating a prototype briquetting press and a prototype material transfer can have been given to the 200-West shops.

A small amount of design and development work on methods for mechanically de-jacketing the coated pieces was performed during the month. The preliminary results of this work, although inconclusive, have been disappointing.

Project CG-691 - Task I and Task II

The end of the two level exposure program at Hanford has made it desirable to process the entire plant production through the button line portion of the RMA line in the 234-5 Building. Since the existing Task II equipment does not have sufficient capacity to handle the forecasted loads on a sustained basis, substantial savings in operating costs can be realized by early installation of the continuous Task I and Task II equipment. By the end of the month detail design on this project is estimated to be about 32% complete.

UO₃ Plant

Requests were received during the month from Finished Products Operation for performing engineering studies on the three separate UO₃ Plant problems. The studies requested are:

1. Scoping the necessary facilities to allow recycle and rework of off-standard UO₃ powder.

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2. Development of methods to avoid loss of production and shutdown of the calciner pot unloading system during replacement of or maintenance on the filter bags in the primary bag filter (X3).
3. Correlate the available agitation information, experience, and history and, with this information, redesign the calciner pot agitator shafts and seals.

Preliminary scope work on item number one has progressed sufficiently that cost estimates are now ready to be requested. The recycle facilities would provide means for transfer of finished product from the shipping containers to the cyclone separator for rework through the hammer mills or to vessels for subsequent dissolution and reshipment to the other separations plants. Engineering studies on items two and three above were started during the month but have not yet been completed.

Engineering studies were also started which relate to the UO₃ Plant stack and the problem of reducing the NO₂ vapors in the surrounding atmosphere. The two-fold objectives of these studies is to investigate alternate methods for performing the work described in the project proposal that is being prepared for the installation of the new UO₃ building stack. Also, interim solutions to the NO₂ vapor problem are being investigated to determine what relief may be provided between now and completion of the project work.

Project CG-613

Over-all construction progressed 6 per cent during the month to 93 per cent completion.

Close design field liaison was maintained throughout the month in order to follow the acceptance tests and the general problems arising from run-in of equipment. Actual performance tests on the calciners has been delayed due to relocating the feed point temperature elements.

A request was initiated during the month to develop alternate designs for the calciner agitator shaft seals. This request was based on continuous calciner prototype experience in which the calciner end plates were deformed under the thermal stresses to the point that trouble was encountered in the shaft seals.

The unloading room in the 224-U Building was shut down September 25, 1956, for installation of the new screw conveyor.

Malfunctioning of star valves provided by Pulverizing Machinery Company has been experienced. Corrective action is under way after consultation with Design Engineering and the supplier.

Waste Storage Tank TK-104U

Photographs were taken of the inside of the 75 foot diameter waste storage tank

TOP SECRET

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TK-104U which had been previously reported to be ruptured. The photographs showed a definite bulge in the bottom of the tank with stagnant liquid between the bulge and tank wall. No rupture was detected by the photographs.

B. Redox Operation

An engineering study was completed and a report, HW-45105, issued covering Redox Capacity Increase - Phase IV. The study indicated that an assured capacity of 400 tons per month at Redox can be obtained for a capital investment of approximately \$3,100,000 assuming a successful development of dissolver slug chutes and extractor-still units as replacements for C type columns.

A study report, HW-45910, was issued covering the use of calcium nitrate as an alternate to the ANN salting agent used at Redox. The study indicated that a potential savings of approximately \$240,000 per year is available through the use of calcium nitrate assuming equivalent salting strength, HW #5 flowsheet, and Phase III rates.

Since August 29, 1956, five Redox deepwell turbine pumps have failed in service. Three have apparently failed because of solidification of the process liquid somewhere within the pump, and two apparently because of excessive seal leakage causing the pump to lose the required head capacity. Two modifications have been incorporated in the replacement pumps to prevent seal leakage; a number of pump bowls have been moved to the upper part of the shaft and a slinger ring has been installed below the liquid bushing. Replacement spares now on order have been redesigned for additional improvements.

Projects

CG-621 - Contamination Control Facilities

Field progression advanced 3 per cent during the month to 63 per cent completion.

Project Proposal, Revision 3, was returned for revision of format and provision of newer required supplemental data. This proposal is being revised for early resubmission. It requests a schedule extension of eight months, from December 31, 1956, to August 1, 1957, for the portion of the project "Contaminated Equipment Replacement." Major reasons for these schedule revisions are (1) the recent decision that Project CG-657 - Improvements to Redox Plant Ventilation, must be completed before equipment replacement can proceed; and (2) late delivery of certain engineered equipment.

Fabrication of the E-13 gamma monitor sample jumper and piping has been deferred pending an evaluation of suggested changes consisting of elevating the surge pot to permit gravity flow to the sample gallery and providing a by-pass around the sample cup.

Difficulties in procuring type 304L schedule 80 stainless steel pipe will delay delivery of the replacement H-4 tube bundle approximately five months.

Radiation calculations based on readings and data supplied by the Redox Operating personnel indicate that the presently designed concrete burial boxes for the H-4 and H-5 vessels will not provide adequate shielding. These vessels will have to be stored in the plant for 2 to 5 years before they can be safely removed for burial.

In-Cell Ozonization

This phase of the work is essentially complete. Outstanding work includes fabrication of the ozone gamma monitor equipment and miscellaneous clean-up items.

Modifications to the J-6 Vent

Design was completed for a new jumper to eliminate the trouble experienced with drainage of this vessel. A work order has been issued to the 200-W shop to perform this work.

Contaminated Equipment Replacement

Requisition for pipe connectors was prepared on June 13, 1956. The first bids were received on July 24, 1956. Unit prices were higher than anticipated. HOO-AEC combined this connector order with a spare parts order and requested rebid in an effort to obtain a lower unit price. New bids are due October 8, 1956.

One process vessel is on order from Pacific Coast Engineering. The order was placed on September 5, 1956, with delivery promised January 2, 1957. It has been determined that the vendor will not have the necessary tubing material until about April 1, 1957 with later on-site delivery.

Canyon Wash-Down Facilities

Building shutdowns and operational work in the canyon cells have retarded this phase of the project. Piping on the roof has been laid out and piping supports installed. Work is continuing on the roof when permitted.

CG-624 - Railroad Tunnel Ventilation Barrier

Field work progressed 15 per cent during the month to 45 per cent completion.

A revised directive dated September 26, 1956, extends the directive completion date from September 1, 1956, to December 1, 1956. Cinch anchors to support the door rails have been driven in the railroad tunnel. The short-time limits in the tunnel and lack of access to the area continue to retard this job. Information has been provided to the plant personnel to allow them to schedule their canyon

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work so as to provide more time for Construction Operation forces in mounting the door.

CG-643 - Capacity Increase, Phase III

Authorized field work was completed on the project within authorized funds and schedule. Further scope additions to this project are planned, and a project proposal, therefore, is in preparation.

CG-644 - Silica Gel Tail-End Treatment Facilities

Design only is authorized on this project with design being performed by an Architect Engineer under A.E.C. Contract. Technical direction of the design work is being performed by Process Design and Development.

CG-648 - Iodine Removal and Nitric Acid Recovery Facility

A scope drawing, SK-2-7162, showing rerouting of recovered acid in the 202-S Building was completed, approved by Project Representatives, and forwarded to Project Engineering for use in making the necessary changes to the final design.

Work Order B-99270 - Transfer of Non-Boiling Wastes at Redox

A scope drawing was prepared for the transfer of non-boiling Redox wastes to old tank farms in 200 West Area. The drawing will be used to prepare a cost estimate for the Project Proposal.

Plant Prototype, Redox F-4 In-Line pH Meter

Plant prototyping of a pH instrument has been planned. The experience to be gained with the prototype is needed for the FY-57 in-line application problem. Chemical Development had earlier initiated drawings for the auxiliary piping and sample box work which is required. This group will be following the progress of modification and installation cooperatively with the Laboratory people. It now appears that it may be the end of the year however, before the installation can be made, due to problems in scheduling the work.

Evaluation Study - Redox SWP Service Facilities - Project Proposal

The Project Proposal, "Redox SWP Service Facilities" is currently being reviewed by the Industrial Engineering Operation as requested by the Department General Manager. An evaluation is being made to determine the need for the facilities in light of recently revised production requirements. Since it is obvious that some additional facilities are necessary, the study is being conducted to determine if the cost can be reduced through the use of Industrial Engineering techniques.

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Maintenance of Standards

The Analytical Service Standard for the Redox Plant was revised. Redox Processing and Product standards are being revised to take into account changes in responsibility of each Operation. Total manpower of the combined units is not being altered.

C. Purex Operation

A previously issued document presented the results of a survey conducted on the existing Purex Acid Fractionator system to determine the need and design requirements for a new spare T-F5 vessel. Changes in flowsheet and additional operating information subsequent to the publication of the above document have obviated some of its conclusions. For example, the quoted capacity factor of T-F5 as an absorber is now questionable; plant data indicates a capacity factor on the current plant flowsheet, PFFS II, of only about 2.0. Also, capacity calculations made on the T-F5 vessel while operating as an acid fractionator under PFFS II Flowsheet conditions indicate its capacity to be considerably less than that presently being demonstrated. Since all information points to the lack of an accurate material balance around T-F5, a test program was proposed and set up to verify the present flowsheet conditions. When the flowsheet has been satisfactorily resolved, design calculations will be repeated, and a study made, to determine the most satisfactory approach to providing spare equipment for the T-F5 position. This work will consider both the interim operation of T-F5 as an acid fractionator and the future use of T-F5 as a rectifier column in conjunction with the vacuum fractionator.

A preliminary report including cost estimates and a nuclear safety review has been completed for changes to the Purex 2B Column which would improve some of the present operational limitations of the L Cell package. This work would be aimed at the elimination of organic materials from the L Cell plutonium stripper bottoms by the following means:

1. The addition of a diluent scrub stream to the bottom of the 2B Column to remove TBP from the 2BP stream.
2. The installation of a 2BP decanter to eliminate gross carry-over of organic into the 2BP stream to the stripper.
3. The installation of a 2BP preheater to improve stripping efficiency in the T-L3 Stripper.
4. Rerouting of the 2B Column jet-out line to the waste system instead of the T-L3 stripper as now installed.

Satisfactory disposition of this information will not be apparent until the overall plutonium processing picture is complete, as work on other facets of the L cell problem may be pre-emptive.

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Recent favorable maintenance experience with the Purex Plant L Cell package, has altered the philosophy of the recent design study made for a remote L Cell installation. The cost for the remote cell installation and the accompanying downtime required have been considered to be excessive on the basis of this experience. A new design study has been initiated for contact-maintained L Cell equipment to meet the current and near-future needs of the Purex Plant. Two approaches are being considered:

1. Replacement of maintenance-prone equipment in the present L or M Cell package, or both, with equipment of improved material and/or design.
2. Provision of a new L Cell package of improved design and materials on the basis of contact maintenance.

Centrifuge Failures

An extensive study is underway on the causes surrounding the failure of the Purex centrifuges. A rotor has been shipped to the Reliance motor manufacturers through the Bird Centrifuge Company, for evaluation. Shielding has been designed and fabrication is estimated for completion October 1 to enable an examination of a currently failed unit. The manufacturers have been alerted and will send representatives to aid in establishing causes and to recommend corrective measures.

241-A Tank Farm

Progressively increasing tank farm heat evolution and decreasing crib capacity indicates the following interim measures are required for emergency operation of the 241-A tank farm prior to installation of contemplated new equipment:

1. Fresh raw water should be substituted for tempered raw water in the waste tank farm contact condensers by about the end of October, 1956. With the use of fresh raw water into the contact condensers, 216-A8 Crib overflow is expected by about April, 1957.
2. Emergency facilities will be required for surplus waste tank farm condensate disposal from April, 1957 until completion of the contemplated surface condenser facility.

Design alternates which will be evaluated for this interim are:

- a. A supplemental crib to handle surplus waste tank farm condensate.
- b. A decanter for the 216-A8 Crib overflow together with a crib for disposal of the organic and an open pond for disposal of the aqueous constituents, the pond to be backfilled when no longer required.

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An open pond for disposal of the gross 216-A8 Crib overflow.

Waste tank circulators have been in service in the Purex 241-A Waste Tank Farm since September 6, 1956 with portable compressors supplying the motive air. Waste tank heat evolution since the initiation of circulation has been remarkably smooth with complete absence of burps.

CA-513-A - Purex Facility, Expansion of 200 Area Facilities

Design and construction are reported complete. Work of a clean-up nature remains. Design is nearing completion for electric heaters in dissolver off-gas streams. Modifications of steam heaters, removal of electrical equipment from 221-T Building, and electric work in the Purex switchgear room was started.

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

Detailed design advanced 18 per cent to 94 per cent completion. Field work advanced 1 per cent to 50 per cent completion.

Installation of in-line gamma monitors was completed. Remaining field items include spare pulse column, T-J-2, and installation of the second remote crane. An order for this crane was placed with Shaw Box, Division of Manning, Maxwell, and Moore, in the amount of \$315,000. On-site delivery is estimated at September 1, 1957.

Radiation readings taken at the east end of the Purex Building during charging ranged up to 50 mr/hr. This is too high for occupancy by a Fixed Price Contractor for erection of the second crane. It is intended that the work be performed by a Fixed Price Contractor with provisions made for his evacuating the zone when radiation levels are too high.

Tank Farm 241-AX

Contact has been made with four consulting engineering firms to review their qualifications for consultation on new reinforced concrete tanks for the storage of high-level radioactive Purex process wastes. Of these four, one consulting firm will be contacted to perform a structural and economic evaluation of designs presented by General Electric. Preparation of the contract and performance of the work is expected to take approximately four months.

CG-683 - Cooling Water Swamp Relocation

In light of new data presented by the Earth Science Personnel the scope of this project is being reviewed. It now appears that it will be necessary to construct two or three large effluent lines to permit controlled dumping of this water in several swamps. Eventually relocation of the Purex cribs will be necessary to adequately control the ground water contamination.

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CG-598 - Acid Fractionator

Construction progressed 11 per cent to 85 per cent of completion.

An AEC Directive No. 339, Modification 3, dated September 26, 1956, authorized a new completion date of March 1, 1957, for this project.

All vessels are in place. Piping in the acid vault is complete. Vessel insulation has been started.

During placement of the fractionator, an acidic solution was discovered in the vessel. Some of the solution leaked from the vessel into the work area where it was quickly detected and the condition corrected. There were no known personnel injuries. A safety investigation was held on September 14, 1956.

Capacity tests on the 216-A9 Crib for the vacuum fractionator, which were started on July 18, 1956, were terminated on September 19, because of the interference of the tests with installation of the Tail Tank, TK-U8, by the lump sum contractor. The crib was designed to handle 600 gpm. During the last six weeks of the test the crib handled 700 gpm at a constant liquid level of 9-10 inches. At present the percolation capacity of the crib is about 125 gallons per day per square foot of bottom area, or about 103 gallons per day per square foot of projected area at the 10 inch depth.

CG-644 - Silica Gel Facility

The design package formally submitted by the Architect-Engineer, W. C. Nickum and Sons, for approval was reviewed. In general, the drawings conform to scope requirements and are satisfactory from a final design standpoint. However, the specification is not sufficiently comprehensive or detailed to permit proper control of equipment procurement and construction for the required quality of work. Detailed comments will be solicited from Design Engineering and transmitted to the AEC for their action in prosecution of the contract.

Rotameter Flow Control Equipment

The Purex Operation has been experiencing trouble with certain Fischer-Porter flow instrumentation equipment. There are apparently several basic difficulties, both in electronics and mechanical design. Recommendations are being assembled on future work which should be done to solve the problems.

Standards

The Analytical Service Standard for the Purex Plant was revised to comply with the most recent sampling schedule and to take into consideration the effect of building downtime and startups.

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D. General

A preliminary study is being made to delineate the equipment and mechanical problems that would be encountered in the scoping and design of a facility for the packaging of fission products segregated from separations plant wastes.

At the request of the Research and Engineering Operation, preliminary designs and cost estimates were developed for equipment necessary to introduce a small quantity of Chalk River slugs in the separations plants dissolvers.

Plastics Development - Electronic Hand Press Sealer

The hand press sealer designed for making long seals in plastic sheeting has been proven satisfactory. Each seal is of excellent quality and requires only five seconds to complete. A seal can now be made across a five foot wide tunnel for plastic men in approximately one minute.

The sealer will be used to develop the already demonstrated principle of detaching from its access tunnel a plastic suit with the worker inside. The worker who will then be free to move except for air supply limitations can with the new device be reattached to his tunnel for contamination free entry into the outside working area.

In-Line Alpha Monitor

The Model III instrument design (for the CG-686 project) was carried nearer completion. Comment prints were checked and needed changes noted. The information was given to Design during the month.

The faulty prototype digital-analog converter equipment for indicating and recording radiation levels is back at the vendor's plant for correction. This type of system is being compared with log count-rate-meters for performance and cost.

Alpha Scintillation Screens

Work has continued to obtain better alpha scintillators. Improvements in sensitivity are desirable, and greater resistance of the screen and its light-tight covering to acid fume attack is required.

Equipment Decontamination - 224-T Inspection Shop

A need exists for an area in which inspections can be made on equipment with gross alpha contamination. Investigation is currently underway to determine the feasibility of sealing the F and G cells of the 224-T building for such inspection work.

Materials Engineering

Effort was concentrated on the application of titanium for separations plant process equipment.

1. Data is being gathered on metallurgical and fabricating characteristics of this material; a representative attended the National ASTM meeting in Los Angeles and visited several fabricator's plants. Further, a guide specification containing basic fabricating criteria is in preparation with copies being submitted to suppliers and fabricators for their comments.
2. A concerted effort on the part of the Materials Engineering group is being made to ascertain the cause of weld and tube cracking which occurred on the Titanium Prototype Pu Concentrator Tube Bundle. Testing procedures, welding techniques, and overall fabrication procedures are presently being studied, with dismantling of the prototype currently underway.

Cask Car Contamination Problem

As part of the overall cask car decontamination problem, an informal request for funds to install jet-out facilities in the remaining 11 well cars has been submitted to the AEC for approval. This work, if approved, will be a big step in the contamination control by providing a tool for easy clean out each trip, thereby reducing the potential for spread. Other aids to the same problem are under study.

CG-686, In-Line Monitoring Instruments - Redox & Purex

The comment copies of schematic drawings for the instrument installation were received from Instrument Design, Construction Engineering. A number of comments were made. Two items remained for consideration when the drawings were submitted by Project Operation for approval. These were the changes from the Design Criteria, (1) substitution of log count-rate-meters for digital-analog recording system on the two Purex alpha monitors, and (2) deletion of high radiation alarm signals on the Redox alpha monitor.

A meeting was held by Project Engineering Operation to review the problems. Process Technology and Operation personnel are satisfied with the CRM system. However, the need was expressed for a CRM which could go to lower range. We extend to procure a new instrument which reputedly will have a lower range, and final action may still be contingent upon the results. The deletion of high level alarm was requested by Redox people.

200 Area Files

Removal of the 200 Area Files from the 2704-Z to 271-T Building was completed during September. Arrangement of the files in the new location has been



accomplished and service is being rendered as required.

Boiler Inspections

The third party boiler inspections were completed in the 200 areas on September 17, 1956 by a representative of the Travelers Insurance Company.

III. ORGANIZATIONAL AND PERSONNEL

Facilities Engineering Operation became existent as of September 1, 1956. This report is on the first month's activities of this component of the HAPO re-organization effective on that date. Total assigned manpower is as follows:

	<u>Exempt</u>	<u>Non-Exempt</u>	<u>Total</u>
Management	3	2	5
Engineering Administration Operation	7	6	13
Maintenance & Industrial Engineering Operation	18	10	28
Project Engineering Operation	22	6	29
Process Design and Development Operation	<u>27</u>	<u>5</u>	<u>34</u>
	77	29	106

Organization and Personnel Changes

H. E. Ralph, exempt, transferred to Hanford Laboratories Operation 9-1-56.

U. L. Upson, exempt, transferred to Irradiation Processing Department 9-1-56.

C. A. Munro, exempt, transferred to Irradiation Processing Department 9-1-56.

C. C. Thiesen, exempt, transferred to A.P.E.D. San Jose, Calif. 9-28-56.

D. E. Braden transferred into Extraction Design & Development from the Purex Operation on September 17, 1956.

J. O. Ludlow, J. L. Weeks and E. D. Waters transferred to the Hanford Laboratories Operation on September 28, 1956.

F. W. Rusho, college junior, terminated on September 18, 1956 to return to school at the University of Idaho.

G. L. Hower, Rotational Trainee, completed his assignment in the group on September 26, 1956 and transferred to a second assignment in the Fuel Preparation Department.

Safety

Special attention is being given to safety during this period of readjustment to the new organization. It is realized that many of our people are in new and strange surroundings and that the chances for injuries are greatly increased. It will be a part of our objective in the Facilities Engineering Operation to make all of our people conscious of the fact that safety is an integral part of the job.

Security

One security violation occurred in the Process Design and Development Operation on September 14, 1956. The violation resulted when a rough draft copy of a classified document was left unattended over the weekend.

Major Reports Issued

Letter, "Contract for Stud Testing," R. C. Hollingshead to W. P. Ingalls, September 26, 1956.

HW-45105, "Engineering Study Report - Redox Capacity Increase, Phase IV," by G. K. Carpenter, R. N. Donelson, and J. O. Ludlow, dated August 29, 1956.

HW-45558, "Interim Operation of the Purex 241-A Waste Tank Farm Condensate Disposal Facility," by L. R. Michels, dated September 14, 1956.

HW-45514, "Pit 65 Fabrication Study" by J. W. Kolb and H. J. Bellarts, September 12, 1956.

Letter, "Progress Report - Vacuum Pickup - Drawing SK-2-6428" by H. J. Bellarts, September 25, 1956.

Letter, "Progress Report - Vacuum Cleaner - Drawing SK-2-6436," by H. J. Bellarts, September 25, 1956.

Inventions

All persons in the Facilities Engineering Operation 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.

There were no inventions during the month.

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Business Trips

R. D. Switters attended the National Meeting of the American Society for Testing Materials on September 17 and 18, 1956. This visit was to obtain information about Titanium and included a visit to the Laboratories to discuss fabrication of Titanium process equipment.

E. T. Hildreth attended the 11th Annual Instrument Automation Conference and Exhibit in New York City from September 17 through September 21, 1956. This visit was made to gain further information on analysis instrumentation and data handling. A visit was also made to the Taylor Instrument Company in Rochester, N. Y. on September 22, 1956 to examine an instrument data display system.

H. W. Stivers visited four Consulting Engineering Firms in Chicago, Illinois from September 26 through 28 to review their qualifications for consultation on new reinforced concrete tanks for the storage of high level radioactive Purex process waste.

CHEMICAL PROCESSING DEPARTMENT
RESEARCH AND ENGINEERING OPERATION

September, 1956

ADVANCE PROCESS DEVELOPMENT - R. E. Tomlinson

E Metal Processing

The irradiation of "E" metal (aluminum-jacketed uranium containing 0.94% U-235) is scheduled to commence January, 1957, with the irradiated metal being available for chemical reprocessing nine months later. A starting rate of 6 tons per month is planned, rising to 12 tons per month after twelve months and to 20 tons per month after eighteen months. Other plans may be effected concurrently, with a possible doubling of the rates quoted above.

Preliminary cost estimates indicate that the blending of the irradiated "E" metal with the depleted metal during chemical reprocessing would result in degradation costs of about \$1.00 to \$1.50 per pound of "E" metal. This degradation is essentially independent of the U-235 content of the blend material, so long as it remains in the range of depleted metal. At the 20 tons per month rate foreseen in 1959, an annual degradation cost of about \$500,000 to \$700,000 is apparent. If the amortized capital plus operating annual costs of segregating the E metal through the solvent extraction and oxide facilities were less than \$500,000, then segregation would appear warranted. The accuracy of the costs quoted above is questionable, since some apparent discrepancies exist in the present billing prices of uranium products. Clarification is being sought in these areas.

*omit UV3
equipped for
segregation
at about 2
concentrations*

Studies are in progress to determine the optimum method of dissolving the E metal, whether the product is to be blended or segregated. The limits imposed by nuclear safety considerations are being factored into the dissolver studies.

Waste Storage

The air-powered waste recirculators in the Redox and Purex waste storage tanks have been very successful in the prevention of "bumping" in these tanks. It was therefore recommended that the next Purex waste storage Units be designed without regard to the "hydrostatic head limitation". This limitation was imposed on the pessimistic assumption that sensible heat could be stored in a static aqueous system until each increment of liquid reached its boiling point. It would then be theoretically possible for the bottom layer of liquid to be suddenly transported to the top of the mass and exert a vapor pressure equal to the hydrostatic head to which it was subject prior to its movement.

Program Studies

Studies are in progress to define the areas of most probable benefit from research and development programs supported by Chemical Processing funds. These studies include the possibilities of the manufacture and sale of new products, the improvement of existing processes, the construction of new facilities to replace obsolete or inadequate facilities, and the processing of power fuels prior to the availability of privately owned facilities to do the job.

PUREX TECHNOLOGY OPERATION - E. R. IrishSummary

The Purex Plant operated continuously at a nominal capacity factor of 1.44 for the entire month except for a shutdown (September 9 to 13) due to a plutonium concentrator tube bundle failure. A low-acid Precycle flowsheet was inaugurated on August 29 to increase the capacity factor of the acid recovery system and the over-all uranium decontamination. However, unstable operation, probably resulting from crud buildup within the HA Column, caused frequent bursts of activity to escape the column, and the anticipated increase in uranium decontamination failed to materialize. Partition and Final Uranium Cycle decontamination factors increased several fold to minimize the product uranium activity. However, the gamma ratio of all the uranium produced during the month exceeded specifications; therefore, silica gel treatment was required. Plutonium decontamination remained adequate during the entire processing period. The nitric acid concentration in the final plutonium product was reduced from greater than 8.0 M to 6.4 M HNO_3 by flowsheet modifications. Installation of the prototype ion exchange facility for plutonium concentration was started this month by site preparation. Demonstrated by plant test, a maximum concentration of 20 weight per cent nitric acid can be produced by the present F5 Acid Fractionator with reasonable waste losses when operated as an absorber only. The air-lift circulators in TK-241-A-103 were turned on after sufficient pressure was developed in the tank to blow a 60-inch water seal and discharge steam to the atmosphere; no bumps have occurred with the circulators operating.

Solvent Extraction

Irradiated uranium with an exposure of 3.3 to 6.7 MW/T (125 to 890 MWD/T) and cooling times from 105 to 176 days was processed. A nominal Purex Plant capacity factor of 1.44 was maintained throughout the month except for a four-day shutdown (September 9 to 13) which was necessitated by the failure of the L4 Plutonium Concentrator tube bundle. The following table summarizes the typical performance of the solvent extraction cycles for September:

<u>Cycle</u>	<u>Log Gamma Decontamination Factor, dF</u>		<u>Per Cent Waste Loss</u>	
	<u>Uranium</u>	<u>Plutonium</u>	<u>Uranium</u>	<u>Plutonium</u>
Precycle	3.3	3.3	--	0.16
Partition	2.2	2.1	--	0.26 (IBU 0.03)
Final	1.2	3.3	0.04	0.08
Overall	6.7	8.7	--	0.53

On August 29 the Precycle was changed to the low-acid Purex Plant Flowsheet IIA as shown below:

<u>Stream</u>	<u>Flows*</u>	<u>Composition</u>
HAF	75	U, 3.57 lb./gal. HNO_3 , 0.5 lb./gal. Sp.Gr., 1.61
HAS	56.2	HNO_3 , 1.05 lb./gal.

<u>Stream</u>	<u>Flows*</u>	<u>Composition</u>
HAX	355	30 vol.% TBP
HAW	120	HNO ₃ , 0.49 lb./gal. Sp.Gr., 1.03
ECX	488	HNO ₃ , 0.005 lb./gal. Sp.Gr., 1.0
HCW	355	30 vol.% TBP

* Based on Purex Plant Flowsheet II, HAF = 100. (HW-43391)

After the Precycle change, adjustments were made to determine the optimum operating conditions for the HA Column. Rapid attainment of optimum conditions was hampered by (1) uncertainties in the calibration of flow instruments, (2) uncertainties in the HAF analyses, and (3) a conservative approach which was adopted in order to maintain acceptable HAW losses and Precycle decontamination. During the entire period the HA Column exhibited instability as characterized by unusual bursts of gamma activity in the HCP and erratic interface control. (The bursts of activity are attributed to the presence of radioactive solids present in the plant equipment which is scheduled for a chemical flush in October.) Gradually the HA Column frequency was reduced from 86 to as low as 52 cycles per minute in order to stabilize the column. No increase in gamma activity in the HCP was noted as a result of the reduced frequency, and recovery continued to be excellent. A second variable studied during this operating period was the effect of HAF acidity (varied from 1.0 M to 0.5 M HNO₃). The final condition arrived at month end was an HAF nitric acid concentration of 1.0 M HNO₃ and a frequency of 68 cycles per minute. Further evaluation of the HA Column stability and performance will be made after the column has been flushed to remove the buildup of solids in the equipment. The IA and IBS Columns also demonstrated some instability which required a reduction of two in the pulse frequency of each.

The expected increase in decontamination due to the low-acid precycle flowsheet was not evident, probably because of the unstable HA Column operation. During periods of HA Column instability when bursts of activity became evident in the HCP, the uranium decontamination load was partially picked up by the Partition and Final Uranium Cycles with decontamination factors ranging up to 1900 and 30, respectively. In the case of plutonium decontamination the majority of the decontamination beyond the Precycle was still effected in the Final Plutonium Cycle with only a slight increase above normal in Partition Cycle decontamination factor. The plutonium remained within gamma specifications throughout the month. The 2EU uranium product remained 2 - 4-fold above the gamma specification throughout the month except for a brief period following start-up when the gamma activity peaked at about 10-fold specifications.

Uranium Processing - Silica Gel

During the month the silica gel facilities satisfactorily processed all uranium product which had gamma ratios that varied from 2.5 to 10. The beds were regenerated early in the month, but at month's end it appears another regeneration may be required. However, the decline of decontamination performance may be caused

by the increased storage time prior to processing and a silica gel feed of higher gamma ratio (10-20).

Plutonium Concentration

A gradual increase of the L-Cell Package inventory during the period of September 1 to September 6, coupled with increased steam demand and reduced nitric acid concentration in the final product indicated the failure of either the L3 Stripper or L4 Concentrator tube bundle. On September 9, the steam leak became intolerable, and the entire plant was shutdown. Flushing of the package yielded twice the normal holdup of plutonium, but no organic material was detected. When pre-installation testing showed that the titanium tube bundle, intended as the replacement for the failed 304-L concentrator unit, had several process side leaks, a heat-treated, type 309 SCB tube bundle was installed. The 304-L tube bundle, the third to fail, had been in service 41 days at the time of shutdown.

After processing was again resumed, failure of the valve between the L4 Concentrator and L6 Receiver to seat properly and partial plugging of the line between the L6 Receiver and L9 Sample Tank was apparently caused by a solids carry-over from the flushing operation. Two batches of plutonium had to be recycled and one batch sent to Recuplex because of solids in the solution.

The acidity of the final product solution was greater than 8.0 M, limiting the batch size for Task I at less than optimum size. Therefore, the L Cell flowsheet was modified by increasing the 2BX and 2BP flows fifty per cent and leaving the acid addition to the 2BP and the stripper boil-off unchanged in order to reduce the acidity to less than 7.0 M, an acceptable acidity. Acidity of subsequent batches averaged 6.4 M. However, the flows were returned to flowsheet after eight days of operation at the increased rates when preliminary calculations indicated a buildup of plutonium in the L Cell Package. After subsequent re-evaluation of data indicated no increase in the plutonium holdup, the 2BX and 2BP flows were again increased. These flowsheet conditions required to prevent plutonium polymer formation in the stripper and also to permit production of plutonium product of acceptable acidity limits the capacity of the L Cell concentration equipment at ca. CF 2.

Plutonium Concentration - Ion Exchange

A prototypical cation exchange facility is currently being installed for demonstration of an alternate process for plutonium concentration with the additional benefit of improved product purity. The structural steel work preparing the location for installation of the ion exchange equipment has been done by Minor Construction forces and is 95 per cent complete. Equipment installation is scheduled to start during October.

The flowsheet for plutonium ion exchange is as follows:

<u>Stream</u>	<u>Flows(1)</u>	<u>Composition</u>
XAF (2BP)	3.0(2)	0.28 M HNO ₃ , 0.05 M NH ₃ OH·1/2 H ₂ SO ₄ Pu(III) 7.05 g./l.
XAX	0.163(3)	Dowex 50 W x 8, 50-100 mesh
XAIS	0.53	0.25 M H ₂ SO ₄ , 0.05 M NH ₃ OH·1/2 H ₂ SO ₄
XAS	0.42	H ₂ O
XAW	3.95	0.28 M HNO ₃ , 0.059 M H ₂ SO ₄ 0.053 M NH ₃ OH
XCK	0.38	6.3 M HNO ₃ , 0.33 M NH ₂ SO ₃ H
XCS	0.42	H ₂ O
XSW (slip water)	0.38	H ₂ O
XCP	0.42	5.12 M HNO ₃ , 0.3 M NH ₂ SO ₃ H(4) 50 g. Pu/l.

- (1) HAF flow = 100
- (2) Reduction of plutonium in the 2B Column assumed.
- (3) Resin flow expressed as wet settled resin volume.
- (4) Will require concentration to reduce HNO₃/Pu ratio from 0.1 to 0.05.

Organic Treatment

The overall performance of both organic treatment systems is summarized below:

<u>Organic Treatment System</u>	<u>Organic Activity uc/gal</u>				<u>Average Decontamination Factor</u>
	<u>Unwashed</u>		<u>Washed</u>		
	<u>Max.</u>	<u>Min.</u>	<u>Max.</u>	<u>Min.</u>	
No. 1	7.0 ⁴	4.0 ³	5300	900	8
No. 2	110	10	67	2	2 - 5

The change to a low-acid Precycle flowsheet shifted the fission product distribution in the washed organic. Ruthenium now constitutes 25 per cent of the total gamma activity whereas previously it was not detectable. Total solvent losses from both organic systems remained low at 0.25 per cent of the total gallons processed in spite of a loss of about 2800 gallons which resulted from a plant shut-down and start-up.

Operating procedures for carbonate changes in the ICF batch contactor TK-31 were modified by reducing the batch volume from 2000 to 250 gallons and increasing the frequency of the change proportionately. A significant improvement in the stability of the IC Column was noted, apparently a result of maintaining a more nearly uniform temperature in the contactor.

Organic which normally accumulates in 10W Tank C8 and 20W Tank R8 is currently being separated and routed to C Farm for storage. Previously, waste organic was mixed with the carbonate wastes and sent to Tank 241-A-103 which resulted in excessive solvent reaching the boiling waste storage tank. Solvent distilled from this self-concentrating tank into the tank farm condensate crib probably restricted the crib percolation rate.

Waste Treatment

Minor operational difficulties were experienced with the Waste Concentrator E-F11 in the form of plugged dip tubes and a plugged overflow line. During one period jetting from the concentrator to the receiver was necessary for eighteen hours to maintain continuity of operation before the line became unplugged. The plugging was probably caused by a buildup of an iron dibutyl phosphate sludge which results from reaction of TBP hydrolysis products with iron in the concentrator. A shift in the specific gravity calibration also may have aggravated the buildup of solids by slight over-concentration. In order to improve concentrator operation, the specific gravity control point was lowered from 1.22 to 1.19. Although operation now appears normal, a 5 per cent caustic flush of the waste concentrators is planned during the October shutdown.

Carbonate waste and neutralized 10W volumes of 340 and 202 gallons per ton of uranium, respectively, were sent to the Underground Storage Tank 241-A-103. Dissolver coating wastes amounting to 215 gallons per ton were stored in TK-241-C-104.

Operation of all solvent extraction cycles on low-acid flowsheets has reduced the concentration in the acid concentrator feeds thus eliminating the need for dilution water addition and increasing the maximum acid recovery system capacity factor.

A test to evaluate the performance of the Acid Fractionator E-F5 operating as an acid absorber produced the following data:

<u>Reflux Ratio</u>	<u>HNO₃ in Over-heads, % of HNO₃ in the Feed</u>	<u>HNO₃ Concentration in Bottoms, %</u>
0.25	3.5	21
0.20	31.9	23
0.15	50.7	27(a)

(a) Did not reach equilibrium.

The composition of vapor feed was determined to be 4.3 per cent nitric acid.

The Waste Self-Concentrator EK-241-A-103 continued to concentrate Purex Plant wastes without incident until the first week of September. During this week three consecutive bumps blew the By-Pass Seal Pot water seal (60 inches) and forced steam directly out the tank farm stack. To prevent recurrence of the incident which may cause spread of contamination, the low-level air-lift circulators were started. After the circulators were in operation, bumping ceased and has occurred only once, when the motive air failed.

REDOX TECHNOLOGY OPERATION - M. K. HarmonSummary

Solvent extraction operation on low MWD/T metal was begun on August 31, after extensive 60 percent nitric acid flushing of most of the process vessels. The distribution of the small amounts of plutonium recovered in these flushes indicates that the large plutonium recoveries in the earlier August flushes resulted from an unusual, avoidable type of rework operation, and are not characteristic of normal process performance (cf. report for August, 1956, HW-45115-H).

For over three weeks following the start-up, the process performance was satisfactory and decontamination of both products was excellent. Although there was a steady, gradual increase in the gamma activity of the uranium streams throughout the month, this was not accompanied by an increase in plutonium stream activity and with the exception of the month's first batch of final uranium products, all production met specifications. During the three-week period there was also a progressive decrease in the capacity of the first cycle columns as indicated by the tendencies toward flooding and unstable operation which were not alleviated by flushing the columns with water at the end of the third week.

Numerous major equipment failures occurred which made it impossible to maintain steady-state conditions for any appreciable period of time, and processing rates varied from zero to 145 percent of Phase II throughout the month. Despite these difficulties, plus more or less continuous leaks of process solutions, product recoveries were good, averaging greater than 99.5 percent for both uranium and plutonium.

During the final five days of the month, while some of the major equipment replacement was being done, the pre-cycle and partition cycle extraction columns were flushed with hot, concentrated nitric acid to restore operational stability and to check on the possible re-accumulation of plutonium in these portions of the system during the preceding 26 days of operation. The total amount of plutonium picked up by the flushes was negligible, amounting to approximately 0.10 percent of one day's production at the average daily rate for the month.

Dissolver charges of 7 tons were resumed and minor changes in chemical concentrations and addition rates were made, improving dissolver time cycles. The second stage of waste backcycle was in use by September 2, but was interrupted by failure of the backcycle pump on September 17 and was discontinued for the balance of the month when the replacement pump also failed on September 23.

The goal concentration of plutonium in the final concentrated product was reduced 35 percent in an effort to reduce the iron contamination (from plutonium concentrator corrosion), which at the time was averaging between 10 and 12 percent by weight in the product stream.

The average exposure of the metal charged to the dissolvers was 253 (245 to 255) MWD/T, and its average cooling time was 148 (121 to 183) days. Control of iodine-131 emission to the environs was excellent.

Feed Preparation

An instantaneous dissolution rate of 155 percent of Phase II rates (3 dissolvers)

was demonstrated after adoption of a standard 7-ton dissolver charge on September 7 and after increasing the rates of caustic and acid addition. Following discovery of a 0.06-gpm leak in the A-2 Dissolver pot coil on September 12, the metal heel was removed and the radiation level of the pot was reduced with nitric-hydrofluoric acid fumes. The pot was then replaced with the operational spare surmounted by a downdraft tower on September 24. The initial operation of the downdraft dissolver in the removal of a 3-ton cut on September 25 was satisfactory and further testing is in progress. Preliminary results indicate an improvement of approximately 15 percent in acid economy.

Many of the head-end batches were composed of up to 20 to 25 percent of rework solution resulting from leakage at the shaft of the HSF concentrator.

The 1 gpm leak discovered in the coil of the feed solution oxidizer (H-4) on September 17 increased to over 10 gpm by September 25 and necessitated replacement (after processing approximately 1500 tons of uranium) of the helical-type coil with a similar unit on September 26. Permanganate feed pretreatment was used throughout the month.

Decontamination

Plutonium decontamination was excellent throughout the month. Uranium decontamination was satisfactory but progressively worsened, becoming marginal before the columns were flushed. The final product gamma ratios steadily increased from a minimum of 0.15 to a maximum of 1.9. Over-all fission product decontamination factors (logarithmic) averaged 6.8 and greater than 8.1 for uranium and plutonium, respectively. The gamma activity of the 2DF stream exceeded the normal range by a factor of approximately 10 during the period of HA-HS Column instability, with the principal fission product shown by analysis to be the zirconium-niobium couple.

Solvent Extraction

The column operation was smooth during the first two weeks of September, but operation at the maximum rate of 145 percent of Phase II resulted in aspiration in the organic overflow lines from the stripping columns. This was alleviated by adjustments in instrument gas flows. After September 17 and until the columns were flushed, the HA, HS, and IC Columns were unstable even at rates corresponding to less than Phase II.

The HAS flow was reduced 37 percent on September 17 permitting a 7 percent reduction in HAX flow on September 20. Increases in IAFS and 2DF stream gamma activities by factors of 3 and 10, respectively, followed the HAS reduction but were believed to have been caused by unstable column operation plus the coincident failure of the second-stage waste backcycle pump (see below).

Major difficulties were experienced attempting to maintain the flow of the HAIS waste backcycle stream to the first cycle. The HAIS pump "froze" several times and two new ones were installed. Both failed, thus preventing backcycling after September 23. The HAIS sampler failed on

September 11, thus making it very difficult to obtain information explaining the pump failures. The problem of precipitation in the HAIS is being investigated by the Process Chemistry Operation.

The relatively rapid accumulation of solids in the HA and HS Columns during September may be partly related to the large volumes of sump solutions which were reworked through head end. The analyses of the HA and HS Column acid flushes showed a gamma activity (greater than 95 percent Zirconium-niobium) removal from each column equivalent to about 25 tons of metal solution.

Product Concentration

During the two weeks after start-up the iron concentration in the plutonium product solution gradually rose from about 8 percent to 10 to 12 percent by weight of the plutonium. A 60 percent increase in 3BX ratio had no beneficial effect. A 35 percent reduction in the concentration of the final plutonium solution (L-6) was therefore inaugurated September 30 in an effort to reduce the iron pick-up from concentrator corrosion. Preliminary results indicate a slight improvement.

Waste Losses

The over-all recoveries for the report period were 99.57 percent and 99.54 percent for uranium and plutonium, respectively. Recoveries were reduced by the discard of several F-Cell sump batches containing IAFS from concentrator leakage, in the first week of September. These batches had backed into other sumps when a plug developed in the jumper between the sump collection header and the collection tank. To avoid possible equipment contamination, the affected batches were sent to underground storage.

Waste Storage

The neutralized salt waste batches are currently routed to 111-SX Tank. The 111-SX Tank is being filled to the overflow with an air-lift circulator in operation.

No pressurizations occurred in the underground storage tanks during the month.

FINISHED PRODUCTS TECHNOLOGY OPERATION - R. E. SmithMETAL RECOVERY OPERATIONSummary

The Metal Recovery Plant processed feed aged about 14 months since irradiation to 250 MWD/T. The over-all uranium waste loss was 0.8 per cent of the new feed uranium; 0.6 per cent was contained in the pooled solvent-extraction waste and the remainder in the condensates. The logarithmic gamma decontamination factor across the entire system was 5.1. The decontaminated UNH transferred to the UO_3 Plant contained 105 per cent of the gamma activity of aged natural uranium.

The cobalt-60 concentration of the scavenged waste continued to exceed the maximum permissible drinking water concentration (MPC). Consequently, one and ~~one-half~~ million gallons of scavenged waste were transferred to trenches on a specific retention basis. Since no satisfactory plant scavenging process has been developed, the remainder of the waste produced from the metal recovery plant will be scavenged by the existing nickel ferrocyanide procedure to remove cesium and strontium and then transferred to trenches. A new process, which removes cobalt (as well as cesium and strontium) from unscavenged stored (in-farm) waste, is being developed and is to be tested in the near future.

Metal Removal and Feed Preparation

Feed shipments to the 241-WR vault consisted of slurry blends from tanks 101-U (minimum age 13 months) and 107-TX (minimum age 15 months), and supernatant blends from tanks 106-U and 115-TX. TXR and UR facilities supplied 41 and 59 per cent of the uranium, respectively, at an average uranium concentration of 0.20 pounds per gallon. Although over-all removal rates were generally satisfactory, equipment limitations caused wide variations in feed compositions.

In order to minimize the time required for final tank cleanout, a second sluicing operation has been started at the TXR facility. The sludge heels from tanks which have been processed once but not completely emptied are being sluiced into a "slurry accumulator", tank 101-TX. To date, cleanout in two of the five possible tanks is nearly complete.

Tank 105-U has been designated as the receiver tank for miscellaneous rework batches of uranium. This uranium will be recovered during the final phase of metal recovery operation.

Solvent Extraction

Uranium waste losses in the RAW, RCW, and REW averaged 0.5, 0.2, and 0.05 per cent of the feed uranium, respectively. Steady-state losses were generally about one-half these values, but the average was increased because of transient upsets caused by rate changes, solids in rework feed, and one instance of severe RC Column emulsification. The RC Column emulsion broke rapidly when extra nitric acid was added to the RCX and the pulse frequency was reduced. Inadequate hold-up time in the carbonate wash tank was probably the cause of the upset.

The proportions of supernatant and slurry in the first cycle feed varied widely; about 200,000 gallons contained no supernatant whatsoever. When older feeds (in which cesium was the major activity) were processed, such slurry-rich material invariably affected gamma decontamination performance adversely. However, with the current relatively "young" feed in which niobium and zirconium are the predominant gamma emitters, feed source has no significant effect on product activity.

While slurry-rich high-acid feed was processed, the RDIS (4.0 M nitric acid, 0.1 M ferrous ammonium sulfate, and 0.2 M sulfamic acid) flow was reduced to 70 per cent of the flowsheet rate. The decreased ferrous ion concentrations caused no significant change in plutonium decontamination performance. Since ultimate stored waste volumes are determined primarily by the amount of iron in the waste, significant savings in storage cost as well as essential material consumption result from decreased RDIS usage. Further reductions in this flow are being considered.

Waste Treatment

Approximately one and one-half million gallons of scavenged waste (in-plant batches 42 and 43, and in-farm batches 3 and 5) containing cobalt-60 concentrations greater than MPC (4×10^{-4} microcuries per milliliter) were transferred to the BC No. 7 and No. 8 trenches on a specific retention basis.

A recommendation that Phase III of Project CA-688, "Additional Disposal Facilities for Scavenged Waste", consist of six trenches rather than cribs was made. The lack of a demonstrated process to scavenge cobalt-60, strontium-90, and cesium-137 simultaneously from plant wastes was the basis for this recommendation.

All laboratory work is currently directed toward development of a satisfactory in-farm scavenging process for stored wastes. Such a process, in which cobalt is precipitated as the sulfide, may be ready for plant testing by October. Since laboratory tests show that this process is not effective for the waste in tank 101-C, this tank is being scavenged using a nickel ferrocyanide-calcium phosphate procedure to remove cesium and strontium. The resultant settled supernatant liquid will probably be transferred to a trench on a specific retention basis.

URANIUM CONVERSION OPERATION

UO₃ Quality

All powder produced during the month was within specifications. Gamma activity ranged between 39 and 52 per cent of aged natural uranium and averaged 47 per cent. Total metallic impurities and reactivity ratio averaged 100 parts per million of uranium, and 0.97, respectively.

Tests and Process Changes

To prolong the life of the TD-4 acid fractionator, increase absorber acid concentrations, and reduce operating costs, the reboiler steam and reflux water were reduced to zero and one gallon per minute, respectively. No increase in the uranium or acid concentration of the C-5 condensate tank resulted.

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The TA-3 acid absorber was placed in parallel service with the TA-1 absorber in order to improve the pot room vent vacuum. The pot vacuum was increased from one-half inch to three inches of water, with some air in-bleed required.

The average acid concentration in C-4 tank was 43 per cent, a decrease from 45 per cent during August. This can be attributed to dilution resulting from the startup of TA-3 and the plug of the fume vent header, at which time normal reflux was maintained with no fume flow.

UO₃ Continuous Calciner - Prototype Development

The prototype continuous calciner was operated successfully during the month to produce about 86 tons of uranium oxide containing sulfur at 1200 parts per million parts uranium. Typical operating conditions were 260 C bed temperature and 55 rpm agitator speed. Production rates of about six tons of uranium per day were obtained with an average shell temperature of 510 C.

The reactivity of the UO₃ produced ranged from 0.86 to 0.90, with reduction and hydrofluorination temperatures at 925 C and 600 C, respectively.

Improvement in the shaft seal service has been obtained by controlled furnace temperature distribution to minimized trough distortion.

Some difficulty was encountered in obtaining accurate bed temperature measurements due to powder caking between the feed injector and the thermowell. Repositioning of the thermowells alleviated the trouble, and similar modifications are being made on the six production units.

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234-5 LABORATORY OPERATION - H. H. HopkinsContinuous Plutonium Trifluoride Precipitation

Continuous precipitation of plutonium trifluoride from plutonium(III) nitrate solutions is being investigated on a laboratory scale. Some difficulty has been experienced in preparing plutonium feed of the desired composition, 50 g/l Pu(III) and 6 M HNO₃, from plutonium(IV) nitrate stock solution. Hydroxylamine nitrate, ascorbic acid, and sulfur dioxide have all been tested as reducing agents. However, the most satisfactory reduction procedure to date has used ascorbic acid, with sulfamic acid as a holding reductant.

One continuous precipitation run has been made with a feed of 32 g/l Pu in 3.75 M HNO₃. The 3 M HF feed rate was such that a calculated 1 M HF excess was obtained in the reactor. The residence time of the slurry in the reactor was seven to eight minutes. Samples of slurry were filtered through medium fritted Pyrex filters periodically during the 30 minutes of running time. Filtrate losses during the run were 250 to 480 mg/l Pu, which amounted to 1.4 - 2.4 per cent. Two samples were taken after the run was completed at times corresponding to residence times of about 12 and 15 minutes. Filtrate losses were 130 to 95 mg/l respectively (0.7 and 0.5 per cent). The latter of these was taken through a coarse frit, which retained the precipitate as well as the medium frits.

Ascorbic Acid Stability

Ascorbic acid has been tested at SRL and other sites for the reduction of plutonium(IV) to plutonium(III) in feed solutions for an ion exchange process, and as a holding reductant in the elutant. Present reductants and holding agents for plutonium are unsatisfactory in that gas forms during the elution stage, and decreases the concentration efficiency of the column. Under adverse conditions, the pressurization could present a safety hazard. The stability of ascorbic acid solutions is being investigated after initial tests made by J. Carroll at HAPO indicated that precipitates are formed in solutions of ascorbic acid and plutonium.

A 1 M ascorbic acid solution turned yellow within a week, indicating some degradation of the ascorbic acid; however, no precipitate had formed after 20 days. Solutions containing from 0.01 M to 0.10 M ascorbic acid were tested in nitric acid ranging in concentration from 0.3 M to 8 M; with solutions containing 0.025 M to 0.1 M ascorbic acid, discoloration occurred after periods ranging from one to ten days. In plutonium solutions 5 g/l Pu in 0.3 M HNO₃, a precipitate formed in all cases. In 6 M HNO₃, the ascorbic acid did not reduce the plutonium unless sulfamic acid was also present. Although the solutions oxidized, no precipitates formed after 18 days. Table I is a summary of tests made to date at room temperature.

If ascorbic acid should be used as a reducing agent, it will be necessary to reoxidize the plutonium(III) to plutonium(IV) and, in some cases, to further

concentrate the solutions by evaporation. A cold "continuous kill" test was set up using 250 ml of 0.10 M ascorbic, 0.3 M sulfamic acid, 6.0 M HNO₃ solution which was fed continuously into 100 ml of boiling 6 M HNO₃. After all of the ascorbic mixture had been added, the solution was refluxed for approximately ten hours. The solution darkened to a deep brown at first, then lightened to a clear yellow after two hours, but no precipitates or tars were formed. Further tests will be made with plutonium solutions.

TABLE I

ASCORBIC ACID STABILITY TESTS

<u>Ascorbic Acid</u> <u>M</u>	<u>Nitric Acid</u> <u>M</u>	<u>Sulfamic Acid</u> <u>M</u>	<u>Plutonium</u> <u>g/l</u>	<u>Time To Color</u>	<u>Time To Precipitation</u>
0.10	0.3			7 days	
0.10	6.0			2 days	
0.05	0.3			10 days	
0.05	6.0			> 20 days	
0.01	0.3			> 20 days	
0.10	0.3	0.3		1 day	
0.10	6.0	0.3		1 day	
0.10	0.3		5	15 days	15 days
0.01	0.3		5	1 1/2 hr.	1 1/2 hr.
0.10	0.3	0.3	5	4 days	8 days
0.05	0.3	0.3	5	20 days	----
0.01	0.3	0.3	5	1 hour	1 1/2 hrs.
0.10	6.0		5	(no Pu reduction)	
0.05	6.0		5	(no Pu reduction)	
0.10	6.0	0.3	5	4 1/2 hrs.	> 18 days
0.05	6.0	0.3	5	4 1/2 hrs.	> 18 days
0.01	6.0	0.3	5	> 18 days	> 18 days
0.10	6.0	0.1	35		1 day

Titanium Corrosion Test

A quick test was set up to obtain an estimate of the corrosion rate of titanium in plutonium-nitric acid solutions. The corrosion media was 8 M HNO₃ containing approximately 130 g/l Pu. The titanium specimen, which had not been polished or degreased, was totally immersed in the solution during the test. After 72 hours of boiling, the surface of the coupon had darkened considerably. A maximum corrosion rate of 0.0003 - 0.0004 inches/month was calculated from weight-loss measurements made during the test. No surface reactivity was noted after the test.

Oval Vibrator Tube Test

An oval vibrating tray was fabricated and installed in the Laboratory to simulate the operation of the proposed oval tube vibrator to be used in the new Task I continuous hydrofluorinator. The simulated tray was three feet long, with a two-inch wide flat bottom. Sand was used as the material moved in the

tray. Various flow rates were obtained by changing the slope of the tray. The sand traveled down the tray with a tumbling action in a channel of from one-half inch to one and one-half inches wide, depending on the slope and the rigidity of the vibrator mount. Standing waves were observed in the tray during some of the tests, but these were eliminated by changing the slope of the tray. The test demonstrated that an oval tube vibrator can be adjusted to spread the powder layer over the vibrating surface satisfactorily and that a sufficient flow capacity can be obtained. Some adjustments in the slope, weight distribution, and vibrator mount may be necessary to obtain the desired flow pattern in the proposed Task I continuous hydrofluorination tube.

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PROCESS CHEMISTRY OPERATION - K. M. HarmonPROCESS ASSISTANCESolvent Extraction Studies

A series of miniature pulse column runs (using columns with stainless steel sieve plates and, in alternate spaces, shredded fluorothene packing) was made to investigate variables of Purex IA-IC column operation. It was shown that 1) increase in C column temperature from 23 to 70 C was accompanied by no change in either the decontamination factors or the disengaging and dispersion characteristics; and 2) the addition of 1 g/l tartaric acid to the feed resulted in a ten-fold increase in uranium loss to the IAW (from 0.02 to 0.2 per cent), a six-fold increase in uranium loss to the ICW (from 0.003 to 0.017 per cent), and a ten-fold increase in plutonium loss to the ICW (from 0.0009 to 0.01 per cent). No effect upon column operation or gamma decontamination was noted. These results indicate the feasibility of processing Hot Semi-Works clean-up solution, containing tartaric acid, in Purex by blending with Purex feed.

Since Purex solvent quality has remained nearly constant since start-up, the weekly quality tests formerly made on Purex first and second cycle solvent have been discontinued.

Cobalt-60 Scavenging From Uranium Recovery Waste

Since a satisfactory process has not yet been developed for scavenging Co^{60} from current uranium recovery process wastes, and since, on this basis, the decision has been made to dispose of the remainder of these wastes in trenches, laboratory work on this process has been discontinued. Future efforts will be directed toward processes for the removal of Co^{60} , Sr^{90} , and Cs^{137} from stored uranium recovery wastes.

"Separan" Solution Viscosities

At the request of the 190H Water Control Laboratory, the viscosities of three "Separan" solutions were measured over the temperature range of 5 to 25 C. The measured viscosities ranged from 47.25 to 886.8 millipoise at 5 C, for 0.1 and 1.0 per cent "Separan", respectively. The corresponding values at 25 C were 28.47 and 554.6 millipoise.

ANALYTICAL ASSISTANCECobalt-60 Analysis

Radiochemical yields for the cobalt-60 determination in uranium recovery process wastes have been increased from an average of 93 to greater than 99 per cent. This has been accomplished by a modification of the procedure in such manner that rather than precipitating hexamminecobaltiferrocyanide, the hexamminecobalti ion in the waste sample is destroyed by reduction and hydrolysis and the cobalt is precipitated as cobaltous cobalticyanide. One hundred determinations for cobalt-60 were performed during the month.

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Tests were carried out on the use of cobalt cobalticyanide as a carrier for radiocesium in strong acid solutions in the hope that the technique may be applicable to the present analytical determination of radiocesium. Preliminary data shows that cobalt cobalticyanide will quantitatively carry radiocesium from solutions up to 3 N in sulfuric acid.

Procurement and assembly of new apparatus (coincidence and pulse height analyzers and allied equipment) for the instrumental part of the analysis is continuing. The assembly should be complete by November 15.

Determination of HNO_3 in UNH Solutions

A laboratory investigation has been started of the marked discrepancy which was found in the Purex Analytical Laboratory between the coulometric and pH measurement methods of determining the nitric acid content of low acid, UNH solutions (0.5 lbs/gal HNO_3 , 1.7 M UNH). In the course of the study, a new HNO_3 concentration vs. pH table was prepared (HpH Table 11) to cover the range of solution compositions of interest (after dilution and a caustic spike, 0.007 molar uranium and 0 to 0.0076 M HNO_3). The use of the pH measurement method with HpH Table 11 has been recommended for HNO_3 determinations in Purex E-6, H-1, and J-1 samples. Detailed study of the procedure showed that improperly cleaned dilution vials and pH beakers could lead to serious errors.

Plutonium Assay

The ceric sulfate titration method for the determination of plutonium has been under intensive study in an effort to improve the precision obtainable in routine use. The results and recommendations will be issued in a separate report.

Quality Control and Standards

During the month, the quality control program for the Chemical Processing Department Analytical laboratories was maintained as usual. Standard alpha disks (for geometry determinations of ASP's) were provided these laboratories and the Hanford Laboratories Operation. The Standards Laboratory performed 644 determinations on standard solutions, calibrated 48 volumetric flasks and 9 pipets, and checked the calibration of 578 pipets.

DECLASSIFIEDINVENTIONS

All Research and Engineering Operation personnel engaged in work that might reasonably be expected to result in inventions or discoveries advise that, to the best of their knowledge and belief, no inventions or discoveries were made in the course of their work during September, 1956 except as listed below. Such persons further advise that, for the period therein covered by this report, notebook records, if any, kept in the course of their work have been examined for possible inventions or discoveries.

<u>Inventor(s)</u>	<u>Title</u>
None	

ORGANIZATION AND PERSONNEL

	<u>September</u>
Research and Engineering	3
Advance Process Development	7
Purex Technology Operation	18
Redox Technology Operation	14
Finished Products Technology Operation	25
Process Chemistry Operation	26
234-5 Laboratory Operation	14
Total	107

R. B. Richards

Manager, Research and Engineering
CHEMICAL PROCESSING DEPARTMENT

RB Richards:khs

EMPLOYEE RELATIONS OPERATION
PERSONNEL DEVELOPMENT AND COMMUNICATIONS OPERATION

September, 1956

I. RESPONSIBILITY

In accordance with the reorganization on September 1, 1956 the Personnel Development and Communications Operation was established with department responsibility for personnel development, personnel training and communications.

II. ACHIEVEMENT

A. Measurement Statistics

Participation in training courses	
Monthly	4
Weekly	21
G.E. Selection Program - number completed	3
Orientation of new employees	1
Participation in filling exempt job openings	2
Technical Graduates on Rotation	4
Technicians in training	10
Management News Bulletins issued	3
Employee News Letters prepared	1
Items in newspapers	2
Articles and feature stories reviewed	5
Luncheons or dinners arranged	1

B. Comments on Statistics

Although there were ten Technicians in training in the Department as of the end of the month, five of these had completed their training and were ready to be transferred to assignments in other departments.

The items in the newspapers concerned the pending shutdown of a metal recovery facility and a personal contamination incident.

Three articles for possible inclusion in the January G.E. Review and two feature stories, one on the plastic man and one on waste storage activities, were reviewed and approved.

Assistance was given in arranging and conducting a luncheon in 2101-M for the Atomic Power Development Association.

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III. ORGANIZATION AND PERSONNEL

A. Force Summary

	<u>Start of Month</u>	<u>End of Month</u>
Monthly	4	4
Weekly	$\frac{2}{1}$	$\frac{2}{1}$
Total	6	6

B. Personnel Activities

The Specialist, Personnel Development is currently planning a program for presentation of PEM courses. It is tentatively planned to conduct two courses this fiscal year and six each subsequent year until all exempt people have participated. Actual initiation of the program will have to await approval from the Atomic Energy Commission.

Programs were prepared outlining proposed activities in the fields of personnel development, personnel training and communications.

C. MEETINGS

Round Table	8
Information	4
Staff	2
Committee	8

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CHEMICAL PROCESSING DEPARTMENT
EMPLOYEE RELATIONS OPERATION
SALARY & WAGE ADMINISTRATION

September, 1956

I. RESPONSIBILITY

The responsibilities assigned to the Salary and Wage Administration Operation were assumed in accordance with the new organization structure of the Chemical Processing Department, effective September 1, 1956.

II. ACHIEVEMENT

The principal accomplishment of the period was the establishment of the mechanics of doing business smoothly within the Unit as quickly as possible to prevent payroll disturbances. Involved was the relocation of records of all Chemical Processing Department personnel from the 700 Area, and the rapid training of new personnel in the essentials of their new functions. The establishment of complete records and the transferring of 1898 (433 Exempt; 1465 Non-Exempt) employees officially into the new organization was accomplished with a minimum of confusion.

The wage records for all non-exempt Chemical Processing Department employees were adjusted to reflect the three percent general increase effective October 1, 1956.

An organization directory for the department was issued.

III. ORGANIZATION AND PERSONNEL

A. Force Summary

	<u>Start of Month</u>	<u>End of Month</u>	<u>Changes</u>
Exempt	4	4	0
Non-Exempt	<u>3</u>	<u>4</u>	<u>+ 1</u>
Total	7	8	+ 1

B. Meetings

Ten meetings were attended by personnel of the Salary and Wage Administration Operation.

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CHEMICAL PROCESSING DEPARTMENT
PERSONNEL PRACTICES OPERATION

September, 1956

I RESPONSIBILITY

All responsibilities related to the Personnel Practices Operation, provided for under the recent reorganization, have been assumed except the handling of an area orientation for new employees, some phases of terminations, and personnel testing program.

II ACHIEVEMENT

A. Employment

	<u>Exempt</u>	<u>Non-Exempt</u>	<u>Total</u>
1. Additions to Payroll	0	15	15
New Hires	0	2	2
Reactivates	0	3	3
Re-hires.	0	1	1
Transfers into C. P. D. from other H.A.P.O. Departments.	0	9	9
2. Removals from Payroll.	2	14	16
Transfer--other GE sites	2	0	2
Illness	0	3	3
Resigned, other employment.	0	3	3
Transferred from C. P. D. to other H.A.P.O. Departments.	0	8	8
Hanford Laboratories	0	0	0
Relations & Utilities.	0	1	1
I. P. D.	0	7	7
3. Requisitions for Personnel (Non-Exempt)			
No. Received.		24	
No. Filled.		11	
No. on Hand		13	
No. Positions to be Filled.		16	
4. Requests for Transfer (Non-Exempt)			
No. Requests on Hand (September 1).		95	
No. Received this Month.		16	
No. Transferred		0	
No. Requests on Hand (October 1).		111	

A great portion of time during this period was spent in getting Employment Facilities set up for future operation. Efforts were also directed toward

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A. Employment (Continued)

increasing the efficiency and accuracy of handling employment functions through the development of some of the detailed procedural mechanisms needed. The personnel folders for all C. P. D. employees have been transferred to the 222-B Building, although much work is needed in order to make them a ready source of information.

B. Professional Recruitment (Exempt)

1. Requests for Transfers

No. Requests on Hand (September 1)	21
No. Requests this Month	6
No. Transferred	2*
No. Closed Out	1
No. Requests on Hand (October 1)	24
No. Interview Trips	2

* One transferred to General Electric Company, San Jose, California
One transferred to General Electric Company, Cincinnati, Ohio

2. Requests for Employment

No. Requests	5
No. Hired	0
No. Holding	4
No. Closed Out	1

A majority of the transfer requests handled to date have one thing in common. Namely, that the housing situation has been a determining factor not necessarily the major factor in their desiring employment elsewhere within the General Electric Company.

As a member of the General Electric Company Western Recruiting Circuit, the C. P. D. Professional Recruiter has been assigned to canvass the Pacific Southwest District for prospective technical employees. He will visit this district for both interviewing and follow-up purposes two times yearly. His first visit is planned for October 24th and 25th. A survey to determine the C. P. D. rotational trainee requirements for 1957 and 1958 is being made with an anticipated completion date of October 7, 1956. Our recruiting activities for BS, MS and PhD will be formulated after completion of above survey.

C. Employee Benefits

1. Status of Suggestion Plan

No. of open Suggestions (September 1)	207
No. of Suggestions received during September	109
No. of Suggestions evaluated during September	114
No. of Suggestions not adopted during September	50

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1. Status of Suggestion Plan (continued)

No. Suggestions, Board has not acted on 10
 No. of Suggestions adopted during September 54
 Total Awards (Tentatively approved by Board only) . . \$1,250

 No. of Open Suggestions (October 1) 212*

The C. P. D. Suggestion Board was organized early in the month. Due to the large number of suggestions that accumulated during the transition period of the recent reorganization it was necessary for the board to have two meetings during September. In the future, meetings will be held on the third Thursday of each month at 1:00 p.m. in the 2704-E Conference Room.

D. Employee Services

1. Deferments

We have a total of 74 non-vets subject to military training through Selective Service System. These fall in the following classification:

1A	12
2A	16
3A	37
4F	8
4D	<u>1</u>
Total	74

Deferments Requested (September)	1
Deferments Granted	4
Deferments Pending	3

All deferments were processed on a routine basis and no difficulties were encountered in obtaining the necessary deferments.

E. Office Services

1. Duplicating

Orders on Hand (September 1)	13
Orders Received	562
Orders Completed	519
Orders on Hand (October 1)	43

Construction work has started on a new duplicating room in 271-B Building 200-E Area. All duplicating equipment now in 2704-M Building will be moved to the new location when remodeling is completed.

In addition to the present equipment of Multilith "80", Ozamatic and Embossograf, a Verifax machine has been ordered for the new location. This will permit a more complete and efficient duplicating service.

* This includes the ten (10) the Board has not acted on.

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E. Office Services (Continued)

2. Mail and Motor Messengers

Effective October 1, 1956, a swing shift delivery and pick up of mail is being established by Central Mail. This added service will result in mail prepared in the 700 Area after 1:00 p.m. being delivered to area destinations the following morning. Likewise mail prepared in the areas will be delivered to 700 Area destinations the following morning.

Upon completion of the 271-B Duplicating Room a new mail room is to be established in the 2701-M Building, serving 200-E Area.

III ORGANIZATION AND PERSONNEL

A. Force Summary

<u>Payroll</u>	<u>On Roll</u> <u>September 1, 1956</u>	<u>On Roll</u> <u>End of Month</u>	<u>Net Change</u>
Exempt	4	5	1
Non-Exempt	<u>12</u>	15	<u>3</u>
Total	<u>16</u>	20	<u>4</u>

B. Safety

There were no disabling injuries during the month.

Two medical treatment injuries occurred in the Mail and Messenger Component. One resulted in a slight laceration to the leg when the truck door suddenly closed on the messenger's leg. The other occurred when the messenger lost her footing in loose gravel and twisted her knee. Both were attended by First Aid and released.

C. Personnel Activities

Several meetings have been held dealing with Employee Benefits, Employee Services, Employment and between our specialists and those in the other departments and operations. These have been necessary as a result of the recent reorganization, to assist in establishing uniformity between departments.

Mr. W. Watson attended a meeting in Palo Alto, California on September 17th and 18th in regard to training for participation in the General Electric Company Western Region Recruiting Circuit.

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CHEMICAL PROCESSING DEPARTMENT
EMPLOYEE RELATIONS OPERATION
UNION RELATIONS OPERATION

SEPTEMBER, 1956

I. RESPONSIBILITY

The responsibilities assigned to the Union Relations Operation were assumed in accordance with the new organization structure of the Chemical Processing Department, effective September 1, 1956.

II. ACHIEVEMENT

With the concurrence of the General Manager of Chemical Processing Department, the Manager--Employee Relations appointed a Department Negotiating Committee to assist the Manager, Union Relations, as required in the review of bargaining unit grievances and in the resolving of nonbargaining unit grievances. The initial meeting of this Committee was held September 19, 1956, at which time the members determined the propriety of a disciplinary action case involving time off without pay. The Hanford Atomic Metal Trades Council was apparently satisfied with the findings of this Committee since no further action has been taken by the Council.

An arbitration hearing was held to consider a time off -disciplinary action case involving two employees of the Relations and Utilities Department. The arbitrator, Joan S. Harlow, ruled in favor of the Company, contending that the disciplinary penalty was fair and appropriate.

In anticipation of a shut-down of the T.B.P. Operation about January 1, 1957, a meeting was held with the Hanford Atomic Metal Trades Council to acquaint them with the reasons for such shut-down and the mechanics of accomplishing same. The Company's plan was outlined in a letter to the HAMTC, to which the Union verbally replied that they did not concur with the proposed action. They did not, however, submit an alternative, so it is anticipated that the original proposal will be carried out.

The Manager, Union Relations, serving as a member of the Company Negotiating Committee, participated in wage discussions involving the Richland Community Fire Department. The contract for this group is open at this time for wage discussions.

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II. ACHIEVEMENT (continued)

Numerous unit and nonunit grievances were received during the month in which particular employees protested the recent reorganization which, in their opinion, had an adverse affect upon them. Changes in job location and classification were the points of contention. It is the opinion of the Union Relations Operation that in those instances where nonbargaining unit employees are concerned, too little consideration is given to the affected employees' service and performance records. Objective effort will be applied by Union Relations to impress all echelons of supervision that management must do right voluntarily, whether the employees involved are or are not affiliated with bargaining units.

Jurisdiction between the various crafts continues to be a constant and perplexing problem. This is especially prevalent in the Radiation Monitoring group and the Millwright and Pipe Fitters crafts.

Preparatory steps have been taken to inaugurate a series of Union Relations Information Bulletins pertaining to Chemical Processing Department. The first issue will be circulated within the next few days.

Three Step II Grievance Meetings were held during the month. Following is the summary of grievance statistics for the month of September, 1956:

	<u>Unit</u>	<u>Nonunit</u>
Grievances received	24	2
Satisfactorily answered		
at Step I	4	1
Processed at Step II	9	0
Pending at Step II	11	1

III. ORGANIZATION AND PERSONNEL

The Manager, Union Relations, addressed the Yakima Chapter of the Pacific Northwest Personnel Management Association, and discussed General Electric Company's labor-management philosophy

Force Summary

	<u>Start of Month</u>	<u>End of Month</u>	<u>Change</u>
Exempt	2	2	0
Non-exempt	<u>0</u>	<u>1</u>	<u>/1</u>
Total	2	3	/1

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EMPLOYEE RELATIONS OPERATION

HEALTH AND SAFETY OPERATION

September, 1956

I. Responsibility

Coincident with approval of the decentralized HAPO organization structure, the Health and Safety Operation was delegated responsibility to administer the health and safety program for the Chemical Processing Department.

II. Achievement

A. Safety

1. Injury Experience

There were no Disabling Injuries, Serious Accidents or Incidents. Medical Treatment Injuries totaled 56, this month, for the Department as compared to 104 in August and 77 in July.

2. Measurement

A record system was established to report injury occurrence and injury frequency rate on a layer four operation basis.

3. Communication

New formats were designed for publicizing pertinent injury and safety information.

4. Programs

A Chemical Processing Department Safety Council was formed to maintain high standards of health, safety and security.

The 200 Areas Safety Stampede was postponed from November until early in 1957. It was generally agreed that a greater degree of individual participation could be gained at a later date, considering the effects of the reorganization. Also the other major activity, Fire Prevention Week, preceded the Stampede by only two weeks, thus revealing the need for rescheduling main features of the overall program.

5. Operation Liaison

Counsel was provided to achieve safe unloading of a hexone tank car received without valving for bottom unloading. The Shell Chemical Company was advised via Purchasing and Stores of failure to conform to the safe practice regulation.

Lack of regard for some safety rules in the unloading of nitric acid truck-trailers was reported. General Chemical Company of Hedges, Washington was contacted via Purchasing and Stores and advised of the problem.

As a result of an incident in the Uranium Reduction Operation, management's attention was directed to the advisability of considering age and physical condition in job placement.

B. Fire Prevention

1. Fire Experience

One fire occurred in the Uranium Reduction Operation. Shorting of a calciner heating element was determined as the cause. Damage was confined to the electrical connector.

2. Programs

Plans were completed for Fire Prevention Week, October 7 through 13, 1956. The program consists of billboard, poster and news publicity, fire drills, inspection by a non-exempt committee, fire prevention displays, burning of shacks, fire truck display, and preparation of a Fire Prevention material package for use in safety meetings.

3. Operation Liaison

Blueprints of the Purex crane maintenance platform addition were reviewed and location of first aid fire appliance and emergency lighting units were designated.

Recommendations to correct fire hazards in the Redox Operation were accepted by management, with one exception. Work authorizations were issued for approval. The potential fire hazard in the Cable Room will be re-evaluated by Redox management.

C. Radiation Investigation and Audit

1. Radiation Experience

There were 30 Radiation Occurrences this month, a reduction from 34 in August. Improvement in administrative control was evident.

One occurrence involved plutonium mouth contamination of a Metal Finishing operator and was formally investigated. Study of the low-level fallout near the Purex 291-A stack was in progress at month end.

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2. Operation In Progress

Use of disposable paper protective clothing on a limited trial basis was initiated in the Purex, Redox and Finished Products Operations.

D. Plant Disaster and Civil Defense

1. Evacuation Experience

There were no actual or practice evacuations.

2. Operation Liason

A review was completed of the overall department evacuation program. The OPG was revised. Recommendations were made concerning reassignment of evacuation buses and relocation of Crash Alarm telephones.

Objectives raised by the AEC to conversion of a construction type bus to a Rescue Training vehicle were clarified and mutual agreement was reached. A new request will be prepared by the Health and Safety Operation.

E. Security

1. Security Experience

One violation in the Process Design and Development Operation resulted from improper storage of classified material.

F. Reports Issued

1. Routine

None

2. Non-Routine

HW-45667, Official Use Only, Radiation Incident Investigation CPD-1, September 25, 1956 - H. F. Soule.

III. Organization and Personnel

A. Force Summary

<u>Classification</u>	<u>Start of Month</u>	<u>End of Month</u>	<u>Change</u>
Exempt	5	5	0
Non-exempt	1	2	+1
Total	6	7	+1

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B. Safety

There were no injuries or accidents in the Health and Safety Operation.

C. Personnel Activities

Dr. Van Nostrand from KAPL, accompanied by Dr. Fuqua and Dr. Brockman, was given a guided tour of the Redox and Purex Operations.

Meetings were held or attended to establish relations and communications with:

1. Atomic Energy Commission Property, Safety and Fire representatives
2. All HAPO Department Health and Safety representatives
3. Industrial Medical Operation
4. Industrial Hygiene Operation
5. Exposure Evaluation and Records Operation
6. Consulting Radiological Scientist

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CHEMICAL PROCESSING DEPARTMENT
EMPLOYEE RELATIONS OPERATION
FIRE PROTECTION OPERATION

SEPTEMBER, 1956

I. RESPONSIBILITIES

The responsibilities assigned to the Fire Protection Operation were assumed in accordance with the new organization structure of the Chemical Processing Department, effective September 1, 1956.

II. ACHIEVEMENT

A. General

Additional personnel and fire apparatus were moved to the Chemical Processing Department Fire Protection Operation, September 3, 1956, and are presently located in the 2709-W Building, 200 West area.

B. Fire Responses

1. The Chemical Processing Department Fire Protection Operation did not experience a Fire Response during the month, within the Department.
2. September 26, 1956, responded on Mutual Aid to assist 100 Area Fire Protection, in the extinguishment of a grass and brush fire. Location: near the intersection of Routes No. 1 and 2 North. Time: 2:14 P.M. Cause-- probably lightning.

C. Fire Extinguisher Service

Inspected	395
Installed	12
Delivered to new location	12
Seals Broken	15
Serviced	35
Weighed	350

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II ACHIEVEMENT continued.

C. Gas Masks Inspected - - - - - 28
 Gas Masks Serviced - - - - - 7
 Hand lines Inspected - - - - - 20

D. Training.
 Two Training Classes were conducted, in the use of CO₂, Dry Powder and Water Pump Can Fire Extinguishers. A total of nine employees from 222-S Building attended.

III ORGANIZATION AND PERSONNEL

A. Force Summary.

	Exempt	Non-exempt
1. Employees - beginning of month - - - - -	11	30
Transfers in - - - - -	0	1
Transfers out - - - - -	0	0
Terminations - - - - -	0	0
New hires - - - - -	0	1
End of month - - - - -	11	32

2. Overtime.
 34 non-exempt employees worked an 8 hour hold over shift due to shortage of Personnel.
 5 non-exempt worked 1 hour overtime due to fire.
 4 Exempt employees worked an 8 hour hold over shift, due to two Exempt Employees being absent.

B. Meetings.

Type of Meeting	Number of Meetings	Number Attending
Staff	1	11
Safety	8	74
Security	4	36
Round Table	4	38

C. Personnel Activities.

- Drills conducted within Fire Protection Operation
 - Outside Drills - - - - - 33
 - Inside Drills - - - - - 45
 - Feet of Hose used in drills - - - - - 6350
 - Feet of Ladders used in drills - - - - - 126
- Hose from Apparatus or Storage racks, washed, flushed and dried.
 - 2 1/2 inch hose - - - - - 9050 feet
 - 1 1/2 inch hose - - - - - 2600 feet
 - 1 inch cotton hose - - - - - 200 feet
 - 1 inch rubber hose - - - - - 600 feet
- Three exempt employees attended and completed instructors course in American Red Cross First Aid on their off time.

END

**DATE
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8 / 31 / 92

