# DECLASSIFIED

## CHEMICAL PROCESSING DEPARTMENT

### MONTHLY REPORT

**FOR JULY, 1958**

**Compiled By**

**OPERATION MANAGERS**

**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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<table>
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</table>

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**MASTER**

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Copy Number

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6          C. T. Groswich
7          W. N. Mobley
8          T. G. LaFollette
9          K. G. Grimm
10         H. P. Shaw
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12         C. R. Bergdahl
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          Attention: E. J. Bloch, Director, Division of Production
18         Atomic Energy Commission, Washington 25, D. C.
          Attention: F. F. Baranowski, Chemical Processing Branch
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PRODUCTION

The separations plants operated satisfactorily during the month excepting for short outages for minor equipment repairs and replacements. The output of plutonium was 128% of the Official Forecast.

The production of UO$_3$ met the commitment shown in the Official Forecast. Shipments of UO$_3$ were about 30 tons ahead of the established schedule at the end of the shipping period, July 20, 1958.

Output of unfabricated plutonium and shapes met the commitments. Deliveries of both products conform to the current ALOO Delivery Schedule.

ENGINEERING

The Purex two-cycle flowsheet was determined to be capable of producing specification grade products without the HS column. This column was cut out of the system because of a leak.

The behavior of Np in the Purex process was intensively observed during the month. Although a large fraction of the Np escaped into the first cycle waste, recovery from this source as well as from backcycling second cycle waste is considered possible.

The value of the Purex anion exchange unit was demonstrated to bring Pu product within specifications. Process upsets associated with the HS column failure and with flowsheet modifications (to improve the retention of Np) had resulted in Pu product from the solvent extraction battery that exceeded specifications.

The operation of the Redox 1A column continued to be erratic. It undergoes cyclic flooding after an average of 4 to 5 days of operation. Nitric acid (10%) flushing successfully restores stable operation. The formation of a complex compound of iron-chromium-aluminum is believed to be the underlying cause. Flowsheet changes have been made, as yet unsuccessfully, to eliminate the problem.

Studies of equipment operations were made to increase the mean particle size of uranium oxide powder. The customer has requested this increase, believing that better fluidization characteristics will follow.

The recycle from Task I operation was abnormally high (8.4%) during the month. Loss of flow ratio control appears to be responsible, but is readily correctable. The second continuous precipitator (Task I) system was placed
in service. Marginal performance resulted from flow control and agitation difficulties.

Plutonium oxide produced by high temperature (400 - 500 C) calcination of the oxalate was found to require 500 - 600 C temperature with phosgene to obtain adequate chlorination rates. These temperatures, higher than previously anticipated, result in the formation of phosgene decomposition products (that could plug the off-gas system).

The formal proposal for the Phase I process development work on Rare Gas Recovery was approved by General Electric on June 30, and the Notice to Proceed was issued to Air Products Company on July 30, 1958.

The study on Commercial Rare Gas Processing was completed July 8, 1958, with the issuance of Document HW-56660 RD to Finished Products and Customer Liaison.

A preliminary study was made on the substitution of caustic for limestone for neutralization of process condensate prior to discharge to the Purex A-5 crib. This study was prompted by reports of experimental work to the effect that the calcium used for neutralization promoted leaching of radiostrontium from the soil column under the A-5 crib.

A capital expenditure of approximately $30,000 would be required for conversion to the use of caustic.

All material for the vacuum cleaning system for Hood 9A in the RMC Button Line was received and has been installed. Overall performance of the vacuum cleaning system to date has been very good.

Directive HW-458, Modification 1 (CGC-800 - Reduction of Radiation Exposure, RMA Line, 234-5 Building), dated July 16, 1958, authorized General Electric the requested $257,000 for providing shielding and other types of equipment to reduce radiation exposure in the RMA Line area of the 234-5 Building.

Development studies on the various phases of power fuels reprocessing are continuing along both total dissolution and mechanical processing lines. The dissolution processes for both stainless steel and zirconium have indicated rather erratic dissolution rates at various times during the development studies.

GENERAL

The initial financial plan for FY 1959 was received from HOO-AEC. Contract Accounting was immediately advised that funds provided in the plan for the 3000 Research and Development were not commensurate with planning communicated to the AEC in the Revised FY 1959 Budget. The HOO-AEC Budget Office advised by letter that with sufficient justification interchangeability of funds within the 3000 Program can be arranged and that the major limiting factor was the over-all 3000 Program total contained in the current Congressional Budget.
Revision of forms and methods necessitated by an AEC prescribed method of calculating BPID was accomplished. For FY 1959 the AEC has specified the use of an annual rolling average for inclusion in calculating ending inventories. Use of this method, rather than the monthly actual BPID, will remove some of the distorting effect experienced in the past in calculating product costs.

A 2% upward shift in the Exempt Salary Structure was authorized, effective July 1, 1958, to bring the total accumulated percentage change since January, 1954, to 20.27%. Revised Salary and Wage Trend Data Charts were issued.
STAFF

Vice President and General Manager, Atomic Products Division . . F. K. McCune
General Manager, Hanford Atomic Products Operation . . . . W. E. Johnson
General Manager, Chemical Processing Department . . . . W. K. MacCready
Manager, Production Operation . . . . . . . . . . . . . . . . . . J. H. Warren
Manager, Purex Operation . . . . . . . . . . . . . . . . . . . . . . O. C. Schroeder
Manager, Redox Operation . . . . . . . . . . . . . . . . . . . . . . C. T. Groswith
Manager, Finished Products Operation . . . . . . . . . . . . W. N. Mobley
Manager, Power & General Maintenance Operation . . . . . T. G. LaFollette
Manager, Financial Operation . . . . . . . . . . . . . . . . . . . . K. G. Grimm
Manager, Facilities Engineering Operation . . . . . . . . . . . V. R. Cooper
Manager, Employee Relations Operation . . . . . . . . . . . . D. S. Roberts
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<td>1524</td>
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UNCLASSIFIED
CHEMICAL PROCESSING DEPARTMENT

PATENT SUMMARY
FOR
MONTH OF JULY, 1958

All persons engaged in work that might reasonably be expected to result in inventions or discoveries advice 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.

<table>
<thead>
<tr>
<th>INVENTOR</th>
<th>TITLE</th>
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<tr>
<td>W. H. Swift and</td>
<td>Processes and Techniques for the Recovery of Neptunium-237 from a</td>
</tr>
<tr>
<td>S. J. Beard</td>
<td>Purex Type Solvent Extraction Plant</td>
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<tr>
<td></td>
<td>Processing Irradiated Uranium Fuel Elements</td>
</tr>
</tbody>
</table>

J. W. Warren
ACTING GENERAL MANAGER
CHEMICAL PROCESSING DEPARTMENT

DECLASSIFIED
JULY, 1958

I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Production Statistics

1. Purex Operation

<table>
<thead>
<tr>
<th>July</th>
<th>June</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tons uranium processed</td>
<td>521.18</td>
</tr>
<tr>
<td>Average production rate during operation (T/D)</td>
<td>17.8</td>
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<tr>
<td>Total waste loss (%)</td>
<td>0.05</td>
</tr>
<tr>
<td>Uranium</td>
<td>0.16</td>
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<tr>
<td>Plutonium</td>
<td>108</td>
</tr>
<tr>
<td>Minimum cooling time (days)</td>
<td>93</td>
</tr>
<tr>
<td>On-line efficiency (%)</td>
<td>93.7</td>
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2. Redox Operation

<table>
<thead>
<tr>
<th>July</th>
<th>June</th>
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</thead>
<tbody>
<tr>
<td>Tons uranium processed</td>
<td>220.4</td>
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<tr>
<td>Average production rate during operation (T/D)</td>
<td>9.3</td>
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<tr>
<td>Total waste loss (%)</td>
<td>0.16</td>
</tr>
<tr>
<td>Uranium</td>
<td>0.31</td>
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<tr>
<td>Plutonium</td>
<td>108</td>
</tr>
<tr>
<td>Minimum cooling time (days)</td>
<td>95</td>
</tr>
<tr>
<td>On-line efficiency (%)</td>
<td>76.8</td>
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3. 234-5 Operation

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<tr>
<th>July</th>
<th>June</th>
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<tbody>
<tr>
<td>Batches input to Task I</td>
<td>313</td>
</tr>
<tr>
<td>Runs completed through Task III</td>
<td>181</td>
</tr>
<tr>
<td>Waste disposal (units)</td>
<td>670.01</td>
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4. **UO₃ Operations**

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<thead>
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<th>June</th>
<th>To Date</th>
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<tr>
<td>UO₃ loaded (tons)</td>
<td>491.86</td>
<td>234.9</td>
<td></td>
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<tr>
<td>UO₃ approved for shipment (tons)</td>
<td>456.86</td>
<td>254.66</td>
<td>28,104.14</td>
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<tr>
<td>UO₃ shipped (tons)</td>
<td>506.88</td>
<td>508.03</td>
<td>27,984.96</td>
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<tr>
<td>UNR backlog (tons)</td>
<td>308</td>
<td>155</td>
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5. **Power**

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<th>200 West</th>
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<td>Raw water pumped (gpm)</td>
<td>9,861</td>
<td>5,046</td>
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<tr>
<td>Filtered water pumped (gpm)</td>
<td>890</td>
<td>1,094</td>
</tr>
<tr>
<td>Maximum steam generated (lbs./hr.)</td>
<td>166,000</td>
<td>82,000</td>
</tr>
<tr>
<td>Average steam generated (lbs./hr.)</td>
<td>141,357</td>
<td>70,213</td>
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<tr>
<td>Total steam generated (M lbs.)</td>
<td>105,170</td>
<td>52,239</td>
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<tr>
<td>Coal consumed, est. (tons)</td>
<td>6,534</td>
<td>3,590</td>
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6. **Waste Storage**

<table>
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<tr>
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<th>July</th>
<th>June</th>
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<tr>
<td>Salt waste reserve storage capacity-Redox</td>
<td>1,980</td>
<td>2,200</td>
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<tr>
<td>Salt waste reserve storage capacity-Purex</td>
<td>13,370</td>
<td>13,891</td>
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<tr>
<td>Coating waste reserve storage capacity-Redox</td>
<td>40,767</td>
<td>40,987</td>
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<tr>
<td>Coating waste reserve storage capacity-Purex</td>
<td>41,811</td>
<td>42,332</td>
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7. **Equivalent Tons U**

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B. **Production Planning and Scheduling**

In cooperation with Chemical Effluents Technology's proposal to conduct experiments aimed at simulating a leaking waste storage tank, arrangements were made for the test to be performed in the area adjacent to SX Farm. After burying a 7' x 8' stainless steel plate in the earth approximately 6 feet over 1,000 gallons of synthetic Redox salt waste, at an estimated minimum temperature of 150°F, were disposed to the ground through a 1" opening in the plate. Although expected, plugging of the ground pores did not occur. On the contrary, the entire volume flowed freely into the soil. Attempts will be made to determine the direction of flow by excavation and multiple sampling. A second test with more concentrated waste was underway at month-end.

The questionable integrity of Tank 113-SX remains unchanged. Attempts to sink well points near the tank met with only moderate success, 48 feet being the maximum depth attained. Monitoring at this level detected no contamination; however, it is doubtful that sufficient depth was reached to permit detection of activity, assuming it to be present.

A second well point was successfully sunk to and slightly below the tank fill line for monitoring purposes, since if a leak had occurred, the fill...
line was a logical source. In view of the fact that contamination was not found at this site either, it seems safe to proceed with excavation as soon as the tank can be emptied. Pumping of the liquid to Tank 103-SX started July 23 and was expected to be completed before month-end.

Both Redox and Purex had high production months. Although neither's production was a record the combination of both is a CPD record by quite a margin for both uranium and plutonium output. Both plants produced well in excess of commitments.

A schedule for shipping UO₃ cars has been worked out with the AEC representative for the next two years. The first few months in detail and the general outline of the balance have been communicated to UO₃ plant personnel.

A five year production forecast was completed in the latter part of July. This forecast either meets or exceeds all shipping schedules for uranium and plutonium requested by the AEC. One major problem posed by the forecast is how to best operate Purex and Redox with the reduced tonnages shown. The reduction in tonnages from the last five year forecast is major and is due to utilizing higher concentration levels for the I & E fuel elements in the reactors.

C. Finished Products and Customer Liaison

The Fission Products Market Survey continued as scheduled. Information is continuing to be obtained and compiled by Arthur D. Little, Inc. people. The incomplete information to date still indicates no large commercial market, probably for the next five years. The government (classified) market is being surveyed by the D.O.D.; however no information as to their findings or progress will be available until our next meeting, tentatively scheduled for the week of August 18, 1958. Survey work by Arthur D. Little, Inc. under contract with the CEM group - AEC/OID, was started on July 15, 1958. Prior to the start of this study, AEC approval was received to freely exchange basic information common to both surveys. The joint use of basic information will assure that the two surveys are well integrated, and that both programs make optimum use of all available information.

Completed during the month at the request of the AEC, was a cursory study of a Commercial Fission Product Recovery Program at Hanford. Answers to specific technical questions on the feasibility of such a program were given. Technically, the program appears feasible, however a detailed study would be necessary to provide sufficient information to determine which alternate would be most attractive from an economic and operational standpoint.

On July 15, the CPD representative attended the quarterly meeting of the HAPo Patent Panel held with L. B. Mackey, A.P.D. Patent Counsel. For the two CPD invention reports included on the agenda, no further
General Electric action was recommended after AEC patent review. After the meeting, L. E. Mackey toured CPD, and held a brief meeting with CPD personnel in which he discussed his functions and answered questions pertaining to invention reports and patents.

D. Essential Materials

During July the most economical method of receiving hexone was via rail tank car. The one tank car received corresponds to a savings of $250. Savings since August, 1957 to date total $3,509. The next four tank cars will be shipped from Whiting, Indiana instead of Martinez, California. It appears that there will be no competitive truckers at Whiting. However, the delivered price from Whiting is lower than the delivered price from Martinez.

Bulk purchases of propane for the Redox facility were continued and the most economical method of receiving propane during July was via tank truck from Ferndale, Washington. This truck load of 8,000 gallons represents a savings of $410 compared to the old method of receiving small truck loads from local vendors. The accumulated savings since inception of the program in August, 1957 is $4,391.

General Chemical at Redge is interested in delivering sodium nitrate in their tank trucks. The question of price will be forthcoming shortly. This method should work better than receiving dry sodium nitrate in 100-lb. paper bags.

E. Reports and Documents

1. Prepared and Issued

HW-56611 RD Redox Plant Production Schedule, July, 1958
   D. McDonald

HW-56612 RD Purex Plant Production Schedule, July, 1958
   D. McDonald

HW-56613 RD UO3 Plant Production Schedule, July, 1958
   D. McDonald

HW-56614 RD 234-5 Plant Production Schedule, July, 1958
   D. McDonald

HW-56664 Essential Materials Consumption-Purex - Chemical Processing Department for June, 1958, M. A. Thress

HW-56666 Hanford Atomic Products Operation Production,
   H. F. Tew

HW-56671 Essential Material Area Report to Cost and Purchasing - Production Operation - Chemical Processing Department for June, 1958, M. A. Thress
III. ORGANIZATION AND PERSONNEL

A. Force Summary

<table>
<thead>
<tr>
<th></th>
<th>Beginning of Month</th>
<th>End of Month</th>
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<tr>
<td>Exempt</td>
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<tr>
<td>Non-exempt</td>
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<tr>
<td>Total</td>
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</table>

B. Safety

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

C. Security

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

D. Visits

J. H. Warren and H. F. Tew visited E. I. du Pont de Nemours Company, Savannah River Plant; Union Carbide Nuclear Company, Oak Ridge; and Dow Chemical Company, Rocky Flats Plant to discuss plant procedures pertaining to SS accountability.

Acting Manager
Production Operation

B-5
CHEMICAL PROCESSING DEPARTMENT
PUREX OPERATION

July, 1958

I. RESPONSIBILITY

There were no changes in the responsibilities of the Purex Operation during the month.

II. ACHIEVEMENT

A. Processing Experience

1. Production Statistics

   a. Production - Percent of Monthly Commitment

      Uranium 130 Percent

   b. Production Rates

      Rates were held at a nominal 2.16 CF during the operating period.

   c. Operating Continuity

      93.7 Percent

   d. Waste Losses

      Uranium 0.05 Percent
      Plutonium 0.16 Percent

   e. Product Re-treated in Silica Gel

      33 Tons

2. Normal Processing

   With the exception of two short outages, processing was continuous at a 2.16 CF throughout the month. The H-1 pump (HAF feed) developed an upper seal leak and was replaced during a ten-hour outage on July 12. On July 17 an outage was taken to bypass the HS column. Startup was delayed until 1500 on July 18 to enable Z Plant to reduce the backlog of material in PR cans.

   During the first portion of the month the HA and HS column flowsheets were continually being adjusted in order to study the characteristics of the new system. It was found that the HA column was fairly sensitive to saturation adjustments which left a narrow margin between adequate decontamination factors and excessive waste losses. Increasing the HAO flow (recycled organic to the HA scrub section) materially improved the column stability and increased the DF by a factor of two.

   A leak developed in the disengaging section of the HS column shortly after initial operation. The column was bypassed by routing the HAP flow directly to J-3 as had been done during May and June of this year.
The feasibility of decontaminating the tower in order to permit inspection and repairs is being investigated.

Neptunium concentrations in the 3WB stream continued to increase as it had done during the previous run periods. However, on July 10 a definite decline in the system neptunium holdup was observed, reaching a minimum on July 17. The cause of this loss is not yet understood, but the loss was coincident with the increased HAO flow. Following this neptunium loss, several hundred units of neptunium were segregated in the waste system and sent to F-8 for rework.

Flowsheet adjustments were made to optimize the refluxing of neptunium in the 3WB system. As a result of the strong incentive for insuring the recovery of neptunium, flowsheet experimentation for improved product decontamination was temporarily halted. Consequently, a portion of the uranium produced during the month required silica gel treatment. The plutonium product was well within specifications.

At the start of the month the plutonium production was divided between the L-Cell package and N-Cell because of minor difficulties in N-Cell. On July 9 and continuing through the rest of the month the entire product was processed through the N-Cell ion exchange system with excellent results.

The two operating dissolvers were able to keep pace with the extraction battery rates although the metal solution inventory was low on two occasions. In order to maintain a 24-hour dissolver cycle time, additional buckets were added to alternate charges.

Changes made in the air bleed to the dissolvers to improve the backup facility acid recovery have also improved the acid recovery performance in the dissolver downdraft towers. The change in air bleed causes the dissolver pot vacuum to be quite sensitive to boilup rates.

UO$_3$ recovered acid is now being bled directly into the nitric acid vacuum fractionator feed tank, which has simplified the handling of the recovered acid without creating new problems.

Tank 101-A temperature rose sharply over a week's period to a maximum of 172°C on July 14. Control was maintained but water additions of ten gallons a minute in excess of the boiloff rate were necessary before the temperature would downwards. All indications are that the heat was distributed evenly in the tank and there were no hot spots.

Self-concentration in tanks 241-A 101, 102, and 103 continued at rates of 10, 6, and 1.7 gallons per minute, respectively.

3. Special Processing

The selective reworking of waste continued throughout the month. After approximately 30 days of refluxing in F-8 the high 20W waste from R-Cell, plus some 2WW waste, was processed without difficulty. Later in the month the 2W waste containing the segregated neptunium was refluxed in F-8 and reprocessed. Also some 1100 gallons of 1WW waste was
reprocessed directly from F-15 to E-3 to control the plutonium losses.

Early in the month 28 tons of uranium were recycled within the building to permit the rework of 12 cans of out-of-specification plutonium produced during June, 1958.

Eleven hundred gallons of 20W were segregated in R-6 and R-5 for the future recovery of some 600 pounds of uranium. The loss occurred during the startup of K-Cell.

Rework of the solvent waste from the leaking HS column was attempted for the first time in the history of the plant by adding small increments to J-3. The downstream activities increased from 15- to 50-fold and both products temporarily exceeded specifications. The rework program was suspended.

B. Radiation Performance

The emission of iodine 131 from the 291-A stack totaled 4.46 curies for the month. The maximum emission during a seven-day period was 1.28 curies for the period ending July 30.

Five radiation incidents were incurred during the month. Thirteen cases of skin contamination were recorded, with maximum levels of 40,000 d/m plutonium, 1000 d/m uranium, and 8,000 c/m fission products.

Remote crane work in A and H-Cells resulted in contamination of localized areas of the canyon deck to fields of a few hundred mr/hr. at surface to 20 rads/hr. at 12 inches. Decontamination and housekeeping were in progress at month end.

Three failed pumps (F-1, H-1, and J-1) were removed from the canyon and transported to U Plant for decontamination and repair. Dose rates 30 and 400 feet from the shipping container were 3.5 r/hr. and 30 mr/hr., respectively. Contamination control was excellent.

Repair of the D-2, E-5, and E-6 process sampling equipment was accomplished at a maximum dose rate of 3 rads/hr., including 1 r/hr. The average dose rate was 500 mrads/hr.

Special process samples for neptunium recovery have resulted in increased exposure to samplers and laboratory personnel. The maximum dose rate encountered was 9.25 rads/hr., including 250 mr/hr. to the hands. Improved techniques have reduced the maximum dose rate to 2 rads/hr. and an average rate of less than 100 mr/hr.

A gross plutonium contamination spread occurred in the PR area when water was inadvertently left on in the decontamination sink, causing the L-11 hood to overflow. A large floor area was contaminated to 6,000,000 d/m. Prompt and extensive strip coating and decontamination brought the spread under control. Stepwise decontamination and repainting has restored most of the area to its former contamination-free status.
C. Mechanical Experience

The neoprene lined steel tank (211-A) used for regeneration acid makeup for the demineralized water system, failed on July 21. The neoprene lining, which had buckled and raised six inches from the tank bottom, finally ruptured, allowing the acid to attack the steel tank. It is planned to repair the failed tank, using a lead liner.

The H-1 canyon pump failed on July 11 because of excessive seal leakage. A new spare unit was installed on July 12. The failed pump was the original K-1 pump which was rebuilt and installed in the H-1 position on March 31, 1958. This failure is the sixth pump failure experienced since plant startup. A new type spring-loaded conical slinger ring, recommended by Chemical Development, has been installed on the spare pump being held for use in the H-1, J-1, or K-1 positions.

The three-inch DOV's which control the steam flow to the F-11 concentrator were replaced by six-inch DOV's in order to meet the steam requirements of this vessel.

The three-inch DOV's which control the steam flow to the F-11 concentrator were replaced by six-inch DOV's in order to meet the steam requirements of this vessel.

The damaged steam heater on the A-Cell dissolver off-gas system was satisfactorily repaired and tested following extensive decontamination. The heater was reinstalled in A-Cell during the month.

The 20 HP vacuum blower unit designed for vacuum decontamination of the canyon failed on July 11 for the second time this year. Repairs consisted of replacing two damaged motor bearings, rewinding the motor stator and replacing the bent shaft with a new spare. A definite cause for the failure could not be determined.

D. Analytical Experience

Considerable emphasis was placed on developing improved analytical methods for tracing neptunium in process streams. Special equipment was set up for handling raw waste samples to detect unusual neptunium losses. In spite of the high radiation levels of these samples, the laboratory is now able to handle them without undue exposure of personnel. Procedures for neptunium analysis on routine stream samples have become quite stable.

A one-month trial period was completed to perform all sample disposal and equipment decontamination in the laboratory on a straight day basis. This enables the shift laboratory crews to provide better analytical service.

A new program for 100 Area analytical work has been studied and accepted. The new schedule will go into effect in August 1958. Much of the special instrumentation for the 100 Area analyses has been received or is on order for August delivery.
E. Improvement Experience

1. Process Tests and Revisions

Tests were conducted to find the optimum HA-HS column flowsheet. These tests were temporarily suspended in favor of a flowsheet which would favor the collection of neptunium in the 3BW system.

2. Equipment Changes

The F-Cell iodine monitor for the vessel vent system was installed and is operating satisfactorily. This monitor will help provide information as to the source and mechanism of iodine emissions from the vessel vent system. It will enable corrective action, such as mercuric nitrate additions to the metal solution tanks, to be taken immediately after emissions are detected by the monitor.

e. Inventions and Discoveries

No inventions or discoveries were reported by Purex personnel during July 1958.

F. Events Influencing Costs

The responsibility for trash removal has been assigned Power and General Maintenance instead of Purex as in the past. Economies are expected for CPD now that trash removal can be planned on a CPD-wide basis instead of on an individual building basis.

III. ORGANIZATION AND PERSONNEL

A. Safety

There were no disabling injuries and seven medical treatment injuries. There was one serious accident that occurred on July 1 but was reported incorrectly in the June report as occurring on June 30.

B. Security

There was one security violation in July.

C. Personnel Activities

S. I. Allen was transferred to the Heavy Military Electronics Equipment Department, Syracuse, New York, on July 25. He was replaced by K. V. Seyfrit, from the Purex Technology Unit.

J. J. Jech accepted a position with General Electric X-Ray Department and left HAPO on July 11.
F. J. Sobeck, on special assignment with the Atomic Energy Commission at Arco, Idaho, reported back to the laboratory on July 31.

Two Utility Operators resigned to accept employment elsewhere.

O C Schroeder
Manager
Purex Operation

OC Schroeder:EAF:gt
I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Processing Operation

1. Production Rates and Operating Continuity

Processing operations were continued over June month end without interruption. For the balance of the month operations were maintained as scheduled except for short shutdown periods required to replace the H-4 oxidized metal solution jet, repair the controls on the 2-D column feed valve, and for flushing of the columns to relieve flooding conditions. Production rates were maintained at 100% of nominal except for short periods prior to and following the shutdown periods, and on two occasions when sufficient PR cans were not available to receive plutonium production at the nominal rate. The reduced rates ranged from 60% to 90% of nominal.

Processing operations were shutdown over the July 4 holiday for a scheduled outage of 60 hours. During this period the right hand tube bundle in the G-3 organic pot and the 2-D column feed jumper were replaced. Both units had previously been found leaking and replacement was scheduled for this period.

Two unscheduled processing shutdowns were taken on 7-10-58 and 7-14-58 to repair the controls on the 2-D column feed valve and replace the inoperative H-4 to G-5 jet, respectively. Four additional shutdown periods were required during the month to flush the precycle and partition columns with 10% nitric acid to relieve flooding conditions in the 2-D column. The six shutdown periods involved a total of 137 hours. The monthly production commitment was exceeded by 10% while operating at 74% of the total hours in the month. The mechanical efficiency for the period was 80%.

All UNH produced during the month was within shipping specifications. Only six E-12 batches with excessive gamma activity required ozonation and/or silica gel treatment to meet shipping specifications. All plutonium production for the month was within shipping specifications.

Product waste losses for the month were again very good, averaging 0.16% and 0.31% for uranium and plutonium respectively.
Iodine-131 emission to the 291-S stack was well under control throughout the month averaging 0.40 curies per day. No uncontrolled high emissions occurred.

B. Maintenance Operation

The tachometer on the H-2 centrifuge failed during the month, but was successfully replaced for the first time by remote operation. The success of the replacement was undoubtedly due to a fork guide which was installed on the tachometer connector head when the centrifuge was installed during April. This revision allows the tachometer jumper to align itself as it is made up.

The H-1 feed preparation tank agitator failed due to a frozen shaft on July 11 and was replaced without incident. The failed unit had been in service since May 21, 1957.

The number one caustic scrubber recirculation pump, in the 293-S Iodine Removal and Nitric Acid Recovery Building, failed in service on 7-14-58. It was replaced with a new stainless steel pump in view of present plans to convert the caustic scrubber to a nitric acid absorber. Replacement of the installed spare pump with a stainless steel pump has also been scheduled for the next shutdown period. Both of the original pumps were of black iron, designed for service in caustic solutions. Installation of the stainless steel pumps will permit the use of water in the scrubber, which will subsequently be pumped to the absorber for increased nitric removal.

Additional pressure switches and three way valves were installed on the inert gas compressors this month in an effort to stabilize the operation of the inert gas generators. Although sufficient time has not elapsed to fully evaluate the success of the installation, significant improvements have been noted. It is expected that more accurate adjustments of the generator burners and smoother operation will improve the gas quality as well as prolong the life of the equipment.

C. Waste Handling and Decontamination Operation

1. Waste Handling

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redox Coating Waste Received (S Farm)</td>
<td>30,202 Gallons</td>
</tr>
<tr>
<td>Redox Salt Waste Received (SX Farm)</td>
<td>188,222 &quot;</td>
</tr>
<tr>
<td>Total Gallons Boil-off Salt Waste</td>
<td>272,436 &quot;</td>
</tr>
<tr>
<td>Salt Waste Transferred SX Farm to U Farm</td>
<td>None</td>
</tr>
<tr>
<td>Waste Received at TX (221-U)</td>
<td>47,337 &quot;</td>
</tr>
</tbody>
</table>

On 7-9-58 the 240-S catch tank was found overflowing to diversion box 241-S via the pipe encasement. Investigation revealed that the flexible jumper in the 240-S diversion box was leaking badly thus allowing the Redox D-1 and D-2 condensate flow to drain almost directly to the catch tank and subsequently to the 241-S diversion box. The leaking jumper was removed to the 221-U Building, decontaminated, rebuilt, and reinstalled. Except for some
minor contamination in the immediate 240-S diversion box area the installation was completed without incident.

Pumping of the Salt Waste from tank 113-SX to tank 103-SX was accomplished this month. As reported during May, the 113-SX tank bottom had buckled to a maximum height of approximately four feet above its normal position. Investigation during June revealed that the tank bottom had returned to essentially normal position. However, as a precautionary measure against possible tank leakage, it was considered advisable to remove the salt waste from the tank. To accomplish the transfer, the pump from the 103-SX tank was first removed and installed in 113-SX. However, this pump would not pump the boiling solution and it was removed. A spare pump was then modified with a check valve, water injector, and a three foot section of three inch pipe on the bottom of the staging. The modified pump worked very well, and in 41 hours 286,168 gallons of salt waste was pumped from tank 113-SX to tank 103-SX. With the waste removed, excavation of the fill line at the 113-SX tank has been started in an effort to determine if a leak at this location may have permitted waste to seep down behind and under the liner thus causing the tank to buckle. Further investigation will depend upon the results of this check.

2. Equipment Decontamination and Repair
   a. Regulated Steam Pit

      A total of eight vehicles and five pieces of heavy equipment were decontaminated during the month.

   b. Railroad Equipment

      A total of 58 manhours was charged to this operation. The work included the decontamination and repair of seven casks and one well car. Operational coverage was also provided for the Relations and Utilities Operation during their repair work on three well cars at Riverland.

   c. 221-J Canyon

      Decontamination and repair of the Redox F-5 concentrator vessel and coil was completed this month. The effective use of Turco No. 4501 has demonstrated the feasibility of fission product decontamination on large pieces of process equipment if the proper cleaning facilities are available. Accordingly plans are now proceeding for the alteration of one of the large TBP bath-tub type cell tanks for use as a decontamination bath for large equipment.

      The decontamination of dummy slugs, used in the 100 Area reactors, was initiated early in the month and a total of 95 buckets have been processed to date. The presence of poisoned slugs in these first shipments has presented numerous handling and sorting problems. However, plans are now being made to remove the poisoned
slugs in the 100 Areas prior to shipment and this should reduce the handling problems significantly.

D. Analytical Control

The pulse column evaluation program being conducted in the 222-S Building multi-curie cells by the Chemical Research and Development Operation of HLO has been temporarily discontinued for about a month in favor of ion exchange column work on neptunium. Although the amount of work forthcoming for the neptunium program is unknown at present, procedures are being reviewed and made current since the major portion of the analytical work connected with this program will be performed by the Redox Analytical Laboratory.

Information on glove box decontamination chambers and sand blasting decontamination chambers was furnished to the Technical Information Group to aid them in answering a request received from the Belgian Embassy.

E. Radiation Monitoring Operation

Five radiation occurrences were reported in the Redox Operation during the month. Two of the five occurrences involved potential localized technical over-exposure to personnel. However, investigation in each case revealed that no over-exposure had resulted.

The burial of the failed G-3 organic pot tube bundle was accomplished with dose rates of 2 r/hour at 40 feet during transit. Dose rates of 400 mr/hour at 300 feet were encountered at the burial ground during the burial of a box containing miscellaneous failed H cell equipment and the H-1 agitator. A maximum exposure of 1 r/hour at 200 feet was encountered while the box was being moved from the railroad flatcar into the burial trench.

Extended exposure of 250 mr in 24 hours was authorized to a crane operator in order to accomplish the transfer of an air lift circulator from waste underground storage tank 113-SX to 103-SX. Dose rates of 3 r/hour at 30 feet were encountered during the transfer. A dose rate of 8 rads/hour at 4 feet was measured on the failed 113-SX transfer pump when lifted from the pump pit for repair. Repair was not accomplished due to the personnel dose rates involved. The 113-SX pump was subsequently transferred to the 111-SX tank with exposure rates of 800 mrads/hour at 40 feet. Contamination to 1500 mrads/hour was spread in the immediate area during the transfer.

Dose rates of 2500 mrads/hour at 6 feet were encountered during the removal and repair of the D-2 waste tank to 216-S-7 underground crib transfer jumper in the 240-S diversion box. Decontamination efforts and shielding reduced the exposure rate to regasket and repair the jumper from 4 rads/hour at 4 feet to 500 mrads/hour at 4 feet. The 240-S diversion box work resulted in contamination spread in the immediate area to ground surfaces and to the crane to a maximum of 7 rads per hour at surface. Decontamination of the equipment and ground surfaces was accomplished without incident.
F. Improvement Experience

1. Process Tests and Revisions

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

2. Inventions or Discoveries

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

G. Events Influencing Costs

The Redox Plant was shutdown for the July 4 holiday and only a standby crew was scheduled to work.

Spare parts reductions during July amounted to $3,342. The total decrease for CY 1958 now amounts to $17,064.

Spare equipment reductions during July amounted to $1,759. The total spare equipment reduction for CY 1958 now stands at $59,116.

Effective July 1, 1958 the Redox budgeted funds for all external and internal maintenance were removed from the operating budgets and assigned to the Redox Maintenance Operation. Maintenance operation costs will no longer be charged to other Level 4 organizations except for new work items specifically ordered by the customer. Accordingly, the Redox Maintenance Operation is now responsible for the amount of maintenance cost stated on the Redox Manufacturing Cost Summary. Necessary budget changes reducing Level 4 maintenance allowances have been made based on the proportion of new work included in the present provisions.

H. Plant Development and Expansion

1. Preparatory Engineering

Cask Car Contamination

The AEC has approved the Contingency Maintenance Request for installation of flushing devices in process casks. All the 105 buildings in IPD have been visited and the program publicized among Level 4 and 5 supervisors. A letter from the Redox Operation Manager to all Level 3 managers in IPD has been written, outlining the program and requesting their cooperation in the cask transfer procedure. Design of the flushing heads is completed to the point where take-off for fabrication can begin. It is expected that the first nine casks will be completed in August.

Equipment Decontamination, Building 2706-W

The project proposal (CAC-812) requesting funds for a new mobile equipment decontamination facility at the 211-U Area, has been
approved by the HAPO General Manager and is now awaiting AEC approval.

2. Design and Construction Liaison

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

Installation of the acid metering panel and calibration of the instrumentation has been completed. Installation of the flow meters to the dissolvers is currently in progress.

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

Construction of the tank car unloading spot is nearing completion. Finish grading, black-topping and other cleanup work remains to be done. The facility will be ready for use on completion of the acid metering system on project CG-648.

CG-772, "E" Metal Dissolvers - Redox

Revision 1 of the Project Proposal, requesting construction funds, was transmitted to the AEC May 9, 1958. A letter dated July 14, 1958 was sent to the AEC requesting immediate authorization of $310,000 for one dissolver installation and deferment of action on the second unit until additional information on criticality and production schedules is available.

I. Reports Issued

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

III. ORGANIZATION AND PERSONNEL

A. Safety

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

B. Security

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

C. Personnel Activities

Mr. A. J. Schwertfeger, Plant Engineer at the Savannah River Plant of E. I. duPont de Nemours and Company, Inc., visited the Redox Plant on July 8, 1958. A general plant review and discussion on remote maintenance was held. The use of television as an aid in crane maintenance operations was also demonstrated.
H. L. Maxfield, Analyst, Redox Waste Handling and Decontamination Operation, visited the Phillips Petroleum and General Electric Company Plants at Arco, Idaho on July 7 and 8, 1958. Purpose of the visit was to inspect decontamination methods and procedures for possible application at Hanford.

On July 15, 1958, an extensive tour of the Redox Operation was conducted for twelve technical graduates and summer hires who are currently participating in this program.

Mr. D. E. Gushee, Assistant Editor of "Chemical and Engineering News" magazine, met with H. L. Maxfield of the Redox Waste Handling and Decontamination Operation on July 30, 1958 to obtain material for an article on process and equipment decontamination, to be published in the magazine.

Professor R. Machen, from the Michigan School of Mines, visited the 222-S Analytical Laboratory with HLO personnel to examine the multi-curie cells and obtain data on their construction.

CT Groswhite:HWM:bfg
I  RESPONSIBILITY

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

II  ACHIEVEMENTS

A. Metal Finishing Operation

Operating activities in the preparation of plutonium metal were marked by an unusually high incidence of mechanical and process problems. The bulk of the production was through Hood 9B where difficulties were experienced with faulty precipitation, fouling of lines and valves and equipment leakage which resulted in poor hydrofluorinator vacuum. The new, permanent 9A unit was started at mid-month but precipitation difficulties arose resulting from reactor size and speed of agitation. Necessary alterations will be made during the first part of August.

During the month systems were devised whereby two different types of plutonium metal can be processed simultaneously by the RMA Line with a minimum of interference. There are no gains here at HARO at this time, but this new ability materially helps one of the offsite button customers and therefore is a benefit to the overall weapons program.

In fabrication several difficulties were encountered with the new 200-BR Hood which was placed in operation on June 23. The problems were mainly concerned with tooling. At the end of July this new equipment appears to be functioning as intended.
B. Product Recovery Operation

A total of 51.4 Kg of Pu was processed through the Product Recovery Operation during July. Approximately 30 Kg of this total were processed normally, being extracted from 50 slag and crucible dissolver runs and other miscellaneous sources. 21 Kg was dissolved from high purity metal and was transferred without processing through Recuplex, directly to the Metal Finishing Operation, enabling a monthly schedule of 50 Kg to be met. The columns operated at 70.1% efficiency at 1863 liter/day, instantaneous rate, with extremely high column losses measuring at 1.20% of throughput (0.0094 g/l). The column losses resulted from an accumulation of system solids from the process and from the sumps. An extensive system cleanout will be initiated during the early part of the coming month to alleviate this situation.

C. Uranium Reduction Operation

Operations were resumed at the Uranium Reduction Operation on July 7, following a scheduled two week vacation shutdown. Production schedules were achieved with no difficulty following this shutdown. All shipment schedules have been maintained. During July 150,149 pounds of 100% Nitric Acid was recovered and sent to Redox and Purex. At month end, there was 360 tons of Uranium as UNH stored at various sites awaiting processing through the Uranium Reduction Operation. This backlog is significantly higher than previous inventories and reflects operation of the primary plants at high rates during the period of outage of the Uranium Recovery Operation. Reduction of this backlog to a normal figure will not be difficult and storage of the material does not present a problem.

D. Maintenance Operation

In Z Plant the maintenance problems centered around equipment failures in the 9B Hood. Principle trouble spots were the offgas system, the vacuum drum filter cloth, the worm gear drive to the vacuum filter and the banjo valve. In Task III difficulty was experienced with coils and shields on the furnaces and a defective shaft on the sander. In Task IV difficulties included failures of heating elements and a diffusion pump. In Task V the magnetic clutch failed on the lathe drive on 200C Hood. In Recuplex the H-I bellows failed twice and the D-7 filter block also failed. Other maintenance problems were routine.

Equipment performance at the Uranium Reduction Plant during the month was reasonably good. Four minor failures of the calciners were experienced together with powder system failures involving rotary valves, slide valves and filter bag blow rings. Maintenance work on the concentration equipment, the UNH feed system, the waste handling and the acid recovery equipment was favorable during the month.
E. Analytical Control Operation

A total of 5927 determinations were performed on 1898 samples received during the month. It has been noted that referee limits, as a result of improved precision, are tighter on every method compared to that of the last of 1957.

F. Radiation Monitoring Operation

Fourteen radiation occurrences were documented in July. Accumulated exposures to operators continued at the annual rate of 2.4 r. The average stack emission from the 234-5 Building for the month was 1.4 micro curies/day. Emphasis was put on cleanup of RC and PR cans and control of contamination from the cans in transit between plants. The status of the PR cans has been greatly improved.

G. Improvement Experience

1. Process Tests and Revisions

Information relating to this item will be covered in the Research and Engineering portion of the Department report. Other information concerning Weapon Data will be covered in a separate report to be written at a later date.

2. Inventions or Discoveries

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

H. Events Influencing Cost

Nothing significant to report.

I. Plant Development and Expansion

1. Projects: Study, Scoping or Approval Phase

Engineering studies have been instigated prior to presentation of project proposals for waste incineration and leaching, and for additional fire protection for the 234-5 operations. Studies regarding replacement of the 216 WR Crib at the Uranium Oxide Operation have been requested.
I. Plant Development and Expansion (Cont'd)

1. Projects: Study, Scoping or Approval Phase (Cont'd)

Project scoping studies are being conducted for waste handling at the Uranium Oxide Plant, and for additional plutonium fabrication equipment for the 234-5 operation.

Project CGC-800, Reduction of Radiation Exposure, RMA Line, and CA-798, Cribs and Test Wells, 234-5 Building have been approved during the period and construction funds issued.

Project CG-767, Rev. 2, UO₃ Improvements is still waiting General Electric approval prior to submission for Commission approval. Project CGC-811 requesting design funds for additional fabrication at 234-5 has been submitted to the Commission.

2. Projects: Construction Phase

A total of five projects are in the construction phase for the Finished Products Operation. They are: CG-745 Fabrication Equipment, CG-734 RMC Button Line, CG-722 UO₃ Nitric Acid, CG-723 Conversion of Recuplex, and CG-756 Fire-proof Filter Replacement.

Project CG-723 will require a new proposal requesting additional funds to complete the scoped work.

3. Projects: Completed

The exceptions listed on the completion notice of Project CG-691, Continuous Tasks I and II, are being solved. Project CG-767, Rev. 1, UO₃ Improvements was accepted during the period with exceptions.

III ORGANIZATION & PERSONNEL

A. Organization Changes

There were no organization changes during the month.

B. Safety Experience

No disabling injuries or near-serious accidents occurred during the month. Six medical treatment injuries were experienced as compared to nine in June. The frequency rate decreased from 1.99 to 1.33.
C. Radiation Experience

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

D. Security Experience

No security violations were experienced during the month.

E. Personnel Activities

Nothing significant to report.

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

The responsibilities of Power and General Maintenance Operation remained unchanged during the period covered by this report.

II. ACHIEVEMENT

A. Operating Continuity

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

B. Inspection, Maintenance, and Replacement

Fabrication of an ammonia scrubber of new design was completed for use by the Purex Facility. Other assistance rendered the Purex Facility included the repair and/or replacement of equipment damaged in the "A" cell chemical explosion. This consisted of repairs to the existing steam heater, fabrication of three cell pipe jumpers, the modification of new silver reactor, and repairs to the existing off-gas heater.

Installed in the low vacuum exhaust system at the Finished Products Operation's 234-5 Facility, were three vendor fabricated filter boxes, thus bringing to a close the planned program to install six such filters. The work was performed under rigidly controlled SWP conditions without incident.

Made ready and shipped to the Redox and Purex plants respectively were an agitator and pump as required on an emergency basis to replace failed process equipment. Other work by the Shops Operation in support of operating continuity of the Redox plant included modification and run-in of a centrifuge, assembly and test of three pumps, and fabrication of fifteen pipe jumpers.

Twelve of the thirty plutonium fuel elements being assembled and machined for the Arco Test Reactor were completed during July, bringing to 19 the total completed to date. Progress of this work is contingent upon the rate at which the elements are released by the Hanford Laboratories Operation, however it now appears that the program will be completed during August.

Special emphasis was placed on the expediting of precision machine work by the Tool and Die Shop in support of Project Quail. The volume of work required has exceeded the original estimate furnished by the Hanford Laboratories Operation and is conflicting somewhat with other Shop work which also has critical completion dates. The problem is being resolved through the use of overtime.

Removal of an 80,000 lbs/hr Riley coal fired boiler intact from the 200 Test Area to the 300 Area was started July 1. Dismantlement of the auxiliary equipment, associated piping, etc., was 15% complete at month's end. The work is being done by an outside contractor on Project CG-759 (Additional Steam Generating Facility - 300 Area).
Boilers No. 1 and 2 in the 200 East Area and No. 3 in 200 West Area, were inspected by representatives of the Travelers Insurance Company, thus completing third party inspections of high pressure boilers for this year. The units inspected were reported to be in a good state of repair.

Assistance was rendered the Irradiation Processing Department in correcting difficulties encountered in the ventilation systems of "H" and "DR" Reactor buildings.

The Department's precious metals inventory, for which this Operation has control custody, was audited by Financial Operation and witnessed by representatives from the HOO-AEC. A $4.92 discrepancy was disclosed out of $161,316.39 total book value, and was attributable to weighing variances. Materials Transaction Report (No. S-55) has been executed to account for the variance.

C. Improvement Experience

Annual savings in the amount of approximately $15,000 will be realized in that the payroll was reduced by three (net) people during the month.

III. ORGANIZATION AND PERSONNEL

A. Safety and Security

There were no disabling injuries incurred during the month. A frequency rate of 4.63 is reflected in the 17 medical treatment cases reported.

B. Personnel Activities

Four Craft Training Sessions were held with a total of 74 craftsmen in attendance.

The exempt salary roll experienced further retrenchment during the month as the result of one Shop Foreman transferring to HLO, one specialist leaving the Company to join HOO-AEC, and three other exempt personnel being reclassified to nonexempt status.

J.S. LaFontan, Manager
Power & General Maintenance Operation
I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Product Cost

In anticipation of conversion to a full responsibility reporting arrangement for FY 1959, numerous contacts were made by personnel of Product Cost with Operating Management explaining the revisions in reporting actual costs and budgets necessitated by the change.

The initial financial plan for FY 1959 was received from the Commission. Contract Accounting was immediately advised that funds provided in the plan for the 3000 Research and Development were not commensurate with planning communicated to the Commission in the Revised FY 1959 Budget. H. R. Ennor, of the local Commission Budget Office advised by letter that with sufficient justification, interchangeability of funds within the 3000 Program could be arranged. In his opinion, the major limiting factor was the over-all 3000 Program total contained in the current Congressional Budget.

Cost coding changes resulting from the current P & GM reorganization and the institution of responsibility reporting constituted a major problem in July, particularly as a number of the coding changes were made after the beginning of the month's business. The excellent cooperation received from P & GM in this conversion effort was evidenced by the fact that while approximately 300 corrections were made to coding for the first week in July, less than 50 corrections were made to submitted coding in the last July week.

Contact with the Commission was made in regard to provision by them of definitive advice as to the source of revenue on each Special Request. The Commission is currently considering institution of a separate budget item and account on their books against which to charge the cost of numerous minor requests which ordinarily result in bookkeeping out of all proportion to the number of dollars involved.

Revision of forms and methods necessitated by an AEC prescribed method of calculating BPID was accomplished. For FY 1959 the Commission has specified the use of an annual rolling average for inclusion in calculating ending inventories. Use of this method, rather than the monthly actual BPID, will remove some of the distorting effect experienced in the past.
Work continued on the revision of CPD Budget detail to accommodate the blanket reductions taken by the General Manager's office prior to submission to the Commission. Additional revisions were necessitated by the change to responsibility reporting, which required the elimination of non-controllable costs from all operations. Breakdown of the first quarter budget into months was nearing completion at the end of July.

Copies of the Revised FY 1959 Budget, in Level 4 detail, were sent to the CPD Level 3 Managers. Explanatory discussions were conducted with management of the three production operations.

The inventory of precious metals, completed on June 30, was reconciled and the report issued to local management and the Commission. Only a very minor adjustment to book figures was necessitated by the physical count.

All year-end reports were issued on or ahead of schedule, and required year-end adjustments to inventory reserve accounts accomplished.

**B. Personnel Accounting**

Considerable discussion developed during the month concerning the detail to be encountered due to the HAMTC agreement which stipulates October 1 as the effective date for a 3.48% increase in the "adder" factor, a one cent increase in shift differential and the reduction of 1% in employee pension contribution. Because October 1 falls in midweek, an attempt will be made to obtain the consent of the HAMTC and the AEC to change the effective date from October 1 to September 29. If consent is not obtained, it will be necessary, as it was last year, to split the week ending October 5, and work it as two separate payroll periods.

**Statistics**

1. **Overtime Payments During Month**

<table>
<thead>
<tr>
<th></th>
<th>July</th>
<th>June</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonexempt</td>
<td>$16 215*</td>
<td>$12 144*</td>
</tr>
<tr>
<td>Exempt</td>
<td>3 880</td>
<td>3 120</td>
</tr>
<tr>
<td></td>
<td>$20 095</td>
<td>$15 264</td>
</tr>
</tbody>
</table>

* Payments to nonexempt employees cover a four week period.

2. **Gross Payroll**

<table>
<thead>
<tr>
<th></th>
<th>July</th>
<th>June</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonexempt</td>
<td>$553 179*</td>
<td>$603 697*</td>
</tr>
<tr>
<td>Exempt</td>
<td>348 946</td>
<td>345 772</td>
</tr>
<tr>
<td></td>
<td>$902 125</td>
<td>$949 469</td>
</tr>
</tbody>
</table>

* Payments to nonexempt employees cover a four week period.
C. General Accounting

FY 1959 control budgets for Attendance at Meetings of Professional and Trade Societies and Attendance at Off-Site Courses and Seminars were allocated by the Department General Manager to Level 3 components on July 25, 1958.

Ninety-three voucher checks totaling $282,782.82 were prepared by CPD during July, 1958. General Books issued seventeen of these checks totaling $3,776.48. No checks for contamination of personal effects were issued.

The June General Ledger Trial Balances (Pre and Post), Reconciliations of Accounts and Reports of Travel and Living Expense were delivered to Contract Accounting on schedule.

A FY 1958 closing narrative including supporting correspondence and schedules has been prepared and is on file in General Books for audit and review purposes.

A revision to CPD Advice 5.4.4 (Travel, Living and Moving Expenses) which will incorporate changes in procedure for procuring transportation and hotel reservations and tickets is in process. The revised advice will be issued in August, 1958.

An audit of General Books functions for FY 1958 was commenced July 25, by the HAPO AEC Audit Staff.

There were 23 active CPD projects with $15,084,000 authorized funds as of June 30, 1958. Expenditures and commitments of $10,233,000 and $806,000, respectively, have been incurred against these projects. Cost of $293,000 was incurred during June.

Preliminary cost closings were completed during July for CG-691 - Improved Task I and II Facilities - 234-5 Building, $943,825 and CG-717 - Transfer Facilities for Redox Non-Boiling Wastes, $290,856.

Authorization for $227,000 additional funds on project CGC-800 - Reduction of Radiation Exposure, RMA Line, 234-5 Building was received in July.

D. Auditing

Field work was completed in connection with an audit of Administrative Services. A formal report covering the findings and recommendations will be issued during August.

Field work in connection with an audit of Employment Administration is proceeding satisfactorily and a formal report will be issued in August.

An audit was made of material transactions relating to Contract AT (45-1) 1179 Jensen-Rasmussen and Company. A formal report will be issued as soon as the supplying of material is complete.
Several meetings were held with Facilities Engineering personnel in connection with the procurement and control of project materials.

Thirty-five AEC Manual Chapters and/or revisions were received and distributed.

Twelve AEC Approvals were received including:

Approval No. 185, Addendum No. 1 - Services to be performed by Manufacturing Services Laboratory FY 1959. This covers assistance to Hanford work for CPD in the way of processing equipment development not to exceed $70 000 cost.

E. Procedures

Considerable time and effort was expended on new forms for the Product Cost Report. Problems were discussed with CPD, IPD and Contract Accounting.

Continued effort was placed on work simplification studies within the Financial Operation.

A meeting conducted by L. B. Mackey, on the subject of patents and inventions, was attended.

Forms work performed during July was as follows: Orders processed - 77; Designed - 10.

F. Measurements

Productivity reports for the second quarter of CY 1958 and the first six months of CY 1958 were prepared and issued for CPD, Redox and Purex.

Cost and production analysis reports for Redox, Purex and Finished Products, comparing actual cost and production with forecast, were prepared and issued to interested Level 3 Managers.

III. ORGANIZATION AND PERSONNEL

A. General

M. S. Burrup was transferred to the Relation and Utilities Operation June 23, 1958.

C. E. Loveless was promoted, effective July 1, 1958, to fill the position vacated by Mr. Burrup.

G. F. Kuehn, Business Trainee, was promoted to the position of semi-senior auditor effective July 1, 1958.

B. Safety and Security

A safety and security meeting for all Financial Operation personnel was held on July 25, 1958.
No medical treatment or disabling injuries were experienced during the month.

No security violations occurred in July.

C. Reports Issued

<table>
<thead>
<tr>
<th>Report Code</th>
<th>Title and Details</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HW-56703</td>
<td>Essential Material Inventory and Consumption Report - June, 1958</td>
<td>G. E. Dyreng</td>
</tr>
<tr>
<td>HW-56711</td>
<td>CPD Operating Report - June, 1958</td>
<td>M. M. McDonald</td>
</tr>
<tr>
<td>HW-56838</td>
<td>Finished Products Cost and Production Analysis - June, 1958</td>
<td>G. H. Temple</td>
</tr>
<tr>
<td>HW-56839</td>
<td>Purex Cost and Production Analysis - June, 1958</td>
<td>G. H. Temple</td>
</tr>
<tr>
<td>HW-56840</td>
<td>Redox Cost and Production Analysis - June, 1958</td>
<td>G. H. Temple</td>
</tr>
<tr>
<td>HW-56852</td>
<td>CPD Unit Cost Information - June, 1958</td>
<td>B. M. Dobbs</td>
</tr>
<tr>
<td>HW-56930</td>
<td>Purex Productivity Report</td>
<td>G. H. Temple</td>
</tr>
<tr>
<td>HW-56931</td>
<td>Redox Productivity Report</td>
<td>G. H. Temple</td>
</tr>
<tr>
<td>CLVI-434</td>
<td>CPD Cost and Production Analysis - June, 1958</td>
<td>K. G. Grimm</td>
</tr>
</tbody>
</table>

Manager - Finance
CHEMICAL PROCESSING DEPARTMENT  
FACILITIES ENGINEERING OPERATION  

July, 1958

I. RESPONSIBILITY

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

II. ACHIEVEMENTS

PUREX OPERATION

A. Research and Development

The formal proposal for the Phase I process development work on Rare Gas Recovery was approved by General Electric on June 30, and the Notice to Proceed was issued to Air Products Company on July 30, 1958.

The study on Commercial Rare Gas Processing was completed July 8, 1958, with the issuance of Document HW-56660 RD to Finished Products and Customer Liaison. This document provides answers to the AEC questions regarding cost and engineering feasibility for several production alternates for Rare Gas Recovery.

B. Process Technology

Prototype Densitometer

The jumper design for the HA column densitometer has been revised and modifications are in progress in the Purex Building. The electrical connector portion is being revised to accommodate other cell jumper changes which are being made this month.

Centrifuge Oiling System

The prototype independent oiling system procured from Bird Machine Company on DDR-18 has been installed on a centrifuge at the mock-up shop and has run intermittently for about two months. Operation has been satisfactory. Several minor changes will be made to further improve the system and the unit will be given a final test run of 40 hours before being put in spare parts.
C. Plant Engineering

Ammonia Scrubbers

The Purex A-Cell ammonia scrubber unit has been fabricated and installed with start-up scheduled for August. Fabrication of the B and C cell units should be completed at approximately one month intervals.

An overall review of the Ammonia Scrubber System has revealed several process limitations requiring minor modifications. The ammonia liquor drain jumpers require incorporation of a 36-inch loop seal to prevent cross-venting between the several scrubbers during the system pressure extremes. Also, instrumentation will be added to permit automatic operation of the jet transfer from the 216-A-TK-2 to the 216-A5 crib. Little delay or additional cost is expected to result from these changes.

Neutralization of A-5 Process Condensate

At the request of Purex Operation, a preliminary study was made on the substitution of caustic for limestone for neutralization of process condensate prior to discharge to the Purex A-5 crib. This study was prompted by reports of experimental work from Effluents Technology that the calcium used for neutralization promoted leaching of radiostrontium from the soil column under the A-5 crib.

The essential materials cost for the proposed caustic addition appears to be the same as for present limestone. A capital expenditure of roughly $30,000 would be required for conversion to the use of caustic, including the installation of a large agitator and a pH monitoring system in the Carbonate Neutralization Tank along with an extension of the caustic supply line to the tank from the 293-A acid and iodine recovery facility.

Economic Study - Four-Fold Counters

The four-fold counters currently used require considerable repair and calibration. A new transistorized four-fold counter has been developed in the 300 Area and operated at the 329 Building for about five months with no maintenance. In addition, this machine requires little radiation monitoring warning level adjustment. The Purex Plant now has this instrument on a trial test. A study has been started to analyze existing four-fold repair and calibration costs to see if purchase of the new type of counter can be justified.

Repair of EA-2 Steam Heater

An investigation of the flange leaking problem on the original steam
heaters in the Purex dissolver cells revealed a material expansion differential between the 304 flange and the specified bolting material ASTM A-193 Gr. B7 which loosened the flange under operating conditions.

Recommendations to replace these bolts with ASTM A-193 Gr. B8F type 304 free machining, 302 Brinell material were made to the facility along with a recommended torquing of the stud nuts to insure optimum stressing under pressure.

D. Project Activities*

CA-513-E - Purex Facility

A capacity study was completed on the concentrator steam supply diaphragm-operated valves following reports from Purex Operation of difficulties in supplying steam to the E-F-11 concentrator bundles under the recently inaugurated two-cycle flowsheet. It was recommended that the present three-inch valves on F-11 be replaced by the same type of six-inch valves as employed on all other concentrators for future operations at 3.2 capacity factor.

CA-773 - Interim Waste Crib, Purex

Drilling of the last test well was completed by the contractor on July 18, 1958. All work on this project is now complete and the Physical Completion Notice will be issued as of that date.

REDOX OPERATION

A. Process Technology

Corrosion of Buried Piping

A second shipment of three lengths of Fluoroflex-T plastic tubing was received recently for final shop installation tests. These tests will consist of installing a length of tubing in a section of pipe bent to the same pattern as those which have failed. The tests will include the use of the shop crane and the steps required for the installation will duplicate in nearly full detail the procedure to be followed in the process building for repairing the failed pipes. Actual repair work in Redox is planned after these shop tests have been completed.

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

Semimonthly Status Report
AEC-HGO Monthly Progress Report of
Construction Jobs
FINISHED PRODUCTS OPERATION - Z PLANT

A. Research and Development

Z Plant Radiation Study

The interior monitoring of Hood 9A during start-up showed maximum readings of 50 mrem/hour at the surface of process equipment, such as the reactor vessel in the upper hood. The background from the material in process with an entirely clean hood interior was shown to be 2 mrem/hour at the walls of the hood enclosure. After one week of initial operation the background at the hood wall in the upper section rose to 5 mrem/hour. This increase reflects the gamma radiation from interior surfaces of the hood following such major maintenance jobs as filter cloth changing and removal of the reactor tank.

In the interest of maintaining low levels of radiation around Hood 9A for as prolonged a period as possible, the various procedures for doing maintenance within the hood have been reviewed. Tentative procedures, as agreed upon by operating and maintenance supervision, are being issued for work within the hood interior.

Weapons

Design scoping of the additional RMC fabrication line facilities is nearing completion. A rough draft of the design scope document has been prepared and comment issues will be distributed along with a complete set of drawings.

A purchase order has been placed for the design and fabrication of two airlock hoods to be installed on the prototype casting furnace. The detail design work associated with installing the prototype furnace has been essentially completed and the only significant amount of design work remaining must now await vendor information on the airlocks.

B. Process Technology

RMC Button Line

All material for the vacuum cleaning system for Hood 9A was received and has been installed. Overall performance of the vacuum cleaning system to date has been very good and a relatively high degree of cleanliness inside the hood has been maintained.

A new doctor blade was designed and fabricated for use on the rotary drum filter. This blade will be used in Hood 9A and is expected to
improve the removal of cake at the filter edges and to minimize the possibility of spills from the blade onto the hood floor.

The prototype off-gas filter for the fluorinator has been assembled and is ready for delivery to the 300 Area for testing. If these tests prove satisfactory, it may be possible to perform the initial filtration on the off-gas inside the banjo valve at the fluorinator discharge.

**Recuplex Tube Bundle**

The design on the new type titanium tube bundle (Recycle Boiler G-59, Drawing H-2-20971) has been completed and approved. Bids on the cost of fabrication and the required delivery time will be obtained to provide the necessary information for replacement scheduling.

**Continuous Radiation Monitors, New Task I**

A four-point recorder with three gamma detectors and one neutron detector was installed on Hoods 7 and 9A. The monitors clearly indicated the radiation changes as material was processed through the hoods. A primary function of the monitors is to follow the build-up of radiation level, and to graphically show contamination build-up and the effectiveness of clean-up methods.

**C. Project Activities**

**CG-691 - Continuous Task I and Task II**

Hood H-9A was started up on July 22, 1958 on process feed. The principal operating difficulty to date has been the inability to produce a dry filter cake consistently. After a new oxalic addition line was added and the instrumentation re-calibrated, efforts were directed at providing a smaller reactor and new agitator in an effort to maintain a dry filter cake.

**CG-756 - Fire Resistant Exhaust Filters, Z Plant**

All work has been completed except replacement of one filter box in Building 231 and the closure of the access opening in the interior wall of 234-5 Building. The change of the remaining filter box in 231 Building requires a ventilation shutdown which cannot be scheduled until the latter part of August.

**Directive**

Directive HW-458, Modification 1 (CGC-800 - Reduction of Radiation Exposure, RMA Line, 234-5 Building), dated July 16, 1958, authorized
General Electric the requested $257,000 for providing shielding and other types of equipment to reduce radiation exposure in the RMA Line area of the 234-5 Building.

GENERAL ACTIVITIES

A. Research and Development

Power Reactor Fuels Reprocessing

Development studies on the various phases of power fuels reprocessing are continuing along both total dissolution and mechanical processing lines. The dissolution processes for both stainless steel and zirconium have indicated rather erratic dissolution rates at various times during the development studies.

Zirconium materials that have an oxide exterior coating exhibit very slow dissolution rates in the ammonia fluoride process. This can be overcome by using a room temperature molten salt bath prior to the dissolution step; however, this type operation poses many problems when considering remote operation in an existing facility.

Several designs of fuel shipping containers have been studied and evaluated from the safety and cost standpoints. At present, the capacity as affected by critical mass considerations is being evaluated by the HLO physicists. Further work on cask design will be limited to the study of various casks used by other sites.

B. Process Technology

High Level Waste Storage

Exploratory work has started to determine means of providing a leak detection system of small diameter laterals five to ten feet below the bottom of existing waste tanks.
One method under consideration is the sinking of large diameter vertical shafts between the storage tanks and extending small diameter horizontal laterals beneath the tanks without disturbing the bearing capacity of the soil adjacent to the tanks.

Construction procedures and details are being reviewed to establish the most desirable shaft size and lateral size.

**Tungsten-Arc Cutting**

ASME Boiler Code qualification specimens of tungsten-arc cut stainless plates were prepared and welded. Mechanical testing of these specimens showed that qualification and quality requirements of the ASME Code and HAPO specification can be met when stainless steel materials to be welded are prepared by the tungsten-arc cutting process. Recommendations were made that Mechanical Draftsman and Heliarc units be purchased for use in the CPD shops.

**C. Plant Engineering**

**Electrical Wall Connector**

The final design has been completed on the tools developed to remove and replace electrical connectors remotely. The drawings have been approved, and bids for fabricating the tools will be obtained as soon as possible.

**Steam Condensate Treatment**

Test coupons from the steam condensate systems in the 202-A, 202-S, 284-E and 284-W Buildings have been sent to Betz Laboratory for determination of corrosion rate. Sludge conditioning additives are now being used in boiler feedwater make-up. Filming amines will be added at each boiler downcomer.

D. **Project Activities**

**Project Cost Information as of July 20, 1958:**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total authorized funds - Active Projects</td>
<td>$14,073,000</td>
</tr>
<tr>
<td>Total cost-to-date</td>
<td>9,161,000</td>
</tr>
<tr>
<td>Commitments and Open Work Releases</td>
<td>1,668,000</td>
</tr>
<tr>
<td>Unencumbered Balance</td>
<td>3,244,000</td>
</tr>
<tr>
<td>Costs charged to above Projects 6-15-58 to 7-20-58</td>
<td>255,000</td>
</tr>
</tbody>
</table>
CG-686 - In-Line Instruments

The alpha monitor installations have been essentially completed in Purex and Redox. The existing Purex 2AW monitor has been modified to include improvements.

III. ORGANIZATION AND PERSONNEL

A. Personnel

J. S. Crowder, Senior Engineer, transferred to Power and General Maintenance Operation effective July 1, 1958.

B. Safety

No unfavorable safety trends have been noted during the month. Regular safety meetings have been held as scheduled.

C. Inventions

None

D. Reports Issued

HW-56660 RD - Commercial Rare Gas Recovery, by L. R. Michels dated July 8, 1958.


E. TRIPS


W. A. Graf visited the Savannah River Plant of E.I. duPont De Nemours and Company on June 30 and July 1, 1958, and the Oak Ridge National Laboratories on July 2, 1958 to discuss problems of power fuel processing and shipment.

L. R. Michels visited Air Products, Inc., at Trexlertown, Pa., on July 30 and 31, 1958, to initiate technical liaison on the design and development contract for rare gas recovery.

E. Doud visited the Dow Chemical Company, Rocky Flats, Colorado, on July 14 and 15, 1958, to obtain information on incineration and leaching process.
F. VISITS

Mr. Goldsworthy of Boyles Brothers Drilling Company visited HAPO July 23, to discuss leak detection methods with E. Doud and L. B. Bradley.


Acting Manager
Facilities Engineering Operation

HP Shaw:FC:mh
PUREX PROCESS TECHNOLOGY

Feed Preparation

The converted Backup Acid Recovery Facility (caustic scrubber converted to a second acid absorber) operated smoothly making 15 and 5 per cent nitric acid in XA and XB towers, respectively. Preliminary data indicate that 90 to 95 per cent of the oxides of nitrogen are being absorbed. A large portion of this increased efficiency is attributed to a new procedure of varying the dissolver air in-bleed during the dissolving cycle.

The blending of UO₃ recovered acid with Purex recovered acid for feed to the Acid Vacuum Fractionator was initiated on July 15. A ratio of one part UO₃ to four parts Purex recovered acid is being used. No abnormal effects to the process have been detected.

Solvent Extraction

The solvent extraction system was operated at a 2.16 C.F. on a two-cycle flowsheet. Because a leak developed in the HS Column, the First Cycle was operated without the HS Column after July 18. Performance of the solvent extraction system with and without the HS Column is summarized below:

<table>
<thead>
<tr>
<th>Cycle</th>
<th>Log Decontamination Factor</th>
<th>Instantaneous Loss, Percent</th>
<th>Recycle Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Uranium</td>
<td>Plutonium</td>
<td>Uranium</td>
</tr>
<tr>
<td>First (with HS Col.)</td>
<td>4.4</td>
<td>4.7</td>
<td>0.15</td>
</tr>
<tr>
<td>Final</td>
<td>2.3</td>
<td>3.2</td>
<td>0.05</td>
</tr>
<tr>
<td>Ion Exchange</td>
<td>-</td>
<td>0.3</td>
<td>-</td>
</tr>
<tr>
<td>Overall</td>
<td>6.7</td>
<td>8.2</td>
<td>0.20</td>
</tr>
<tr>
<td>First (without HS Col.)</td>
<td>4.1</td>
<td>3.8</td>
<td>0.03</td>
</tr>
<tr>
<td>Final</td>
<td>2.3</td>
<td>4.2</td>
<td>0.007</td>
</tr>
<tr>
<td>Ion Exchange</td>
<td>-</td>
<td>0.5</td>
<td>-</td>
</tr>
<tr>
<td>Overall</td>
<td>6.4</td>
<td>8.5</td>
<td>0.037</td>
</tr>
</tbody>
</table>

Process performance without the HS Column after July 18 is not typical of expected performance because no effort was made to optimize flowsheet conditions. Since satisfactory products were produced, plant conditions were maintained for maximum neptunium accumulation rather than maximum fission product decontamination.
Following initial startup with the new HS Column, the HA2 plutonium loss was about ten-fold above normal. This was attributed to excessive plutonium reflux as a result of increased scrub height (HS Column) and/or increased scrub temperature (HS jet temperature). Increasing the HA0 (IBSU plus HO0) flow to the two-cycle flowsheet value of 65 flows reduced this loss to normal. Varying the flow ratios of the IBSU and HO0 while maintaining the HA0 at 65 flows affected the decontamination performance of the HAO and IBS Columns. The initial increase of HA0 (HO0, 41 flows and IBS, 24 flows) resulted in a two-fold reduction in the 2IF gamma activity but had no effect on the 2AF gamma activity. Later when the IBS was increased to 45 flows and the HO0 reduced to 20 flows, the 2AF gamma activity was reduced by a factor of two with no change in the 2IF gamma activity. The resulting average gamma activities of the 2IF and 2AF for the final conditions were:

2IF Gamma ratio = 170
2AF Gamma/AT = 4.4 x 10^-8 c/m/gal.

These values are about two-fold better than the best pseudo two-cycle operation of May.

Eight hours before plant shutdown for by-passing the HS Column, the HSS acidity was increased from 2.0 M to 2.5 M HNO3 in order to determine any effect on decontamination which might be indicated by the new HSP gamma monitor (which would not be in service without the HS Column). No effect was noted. The new HSP, 2AF and 2EU gamma monitors have been beneficial in indicating process performance throughout the month.

For startup with the HS Column bypassed (HAP routed to IBXF Tank J3), the HA0 and IBS were reduced to 29 flows and the HO0 to 0 flow. Borderline specification uranium product was produced with these flowsheet conditions, but concern for neptunium reflux prohibited any changes.

Neptunium Recovery

The neptunium refluxing in the HA and HS Columns at the beginning of the month was lost to waste during the period of the HA0 test. The specific cause of this loss is not known as yet, but it is believed related to the increase in HA0 flow. A test to determine the effect of NaNO2 in the 3WB on neptunium reflux was upset by the shutdown to bypass the leaking HS Column. Since startup with the HS Column bypassed and reduced HA0 flow, neptunium reflux is again being maintained.

An attempt to recover the neptunium lost to waste by blending IWW with the HAF at a ratio of 1 to 20 failed. A solid material (presumably dehydrated silica) in IWW appears to be partially scavenging neptunium. Also, personnel in Chemical Research Operation report that at the radioactivity level of the IWW, sufficient nitrite ion is generated to maintain neptunium in the in-extractable V valence state. At month end plans are being made to start the second neptunium recovery run.
Plutonium Concentration

Operation of the Anion Exchange Unit during the month permitted production of specification plutonium product despite the unusually high gamma activities in the extraction batteries resulting from process and column upsets and the bypassing of the HS Column. Some mechanical difficulties were encountered in ion exchange operation; however, marked improvement in overcoming these difficulties has been demonstrated. From July 1 to 9, mechanical failure and improper phasing of the XAF pump made it necessary to use the L-Cell Package for plutonium concentration. Three attempts to start the Anion Exchange Unit were made before a new procedure for rephasing the remote head on the XAF pump corrected the difficulty. On July 30, failure of the resin movement valve forced a twelve-hour shutdown of the unit. The routing of the XAF to the 3WB via the XAF for five hours presented no problems in moving the "loaded" resin in the HA Column when the unit was again started.

During the periods when the L-Cell Package was being used (HS Column operating), the capabilities of the two-cycle flowsheet were demonstrated by the production of specification plutonium product.

Solvent Treatment

Because of the continued excellent performance of the Solvent Treatment process, for the first time in the plant's history an attempt was made to rework spilled solvent. Approximately 750 gallons of solvent of HAP composition were collected from the leaking HS Column. On July 18, 150 gallons were added to the IBXF tank, and twelve hours later another 250-gallon addition was made. Immediately the gamma activity across the plant started to increase, with the 21F and 2AF increasing 15- and 50-fold, respectively. Simultaneously, the residual activity of the IOO increased 16-fold. Without special treatment, the No. 1 Organic Treatment Process decontaminated the IOO to the normal activity level in less than six days. Because of the deleterious effect on process decontamination discussed above, the remaining 350 gallons of spilled solvent were stripped of plutonium and uranium by batch treatment with 2.5 Wt. percent sodium carbonate and sent to the Organic Crib A2.

The No. 2 Organic Treatment System was upset after the startup on July 18, by overflowing the aqueous phase from the 2E Column to the 2OF tank. By continued treatment, 600 pounds of uranium were collected in about 11,000 gallons of 20W. This material was concentrated in the waste rework tank and is being held for future rework. The combined solvent loss for the month, including the leakage, was 11,240 gallons or 0.39 percent of total solvent processed.

Waste Treatment and Acid Recovery

The operation of the Waste Treatment and Acid Recovery equipment has been satisfactory during the month. Continuing efforts to reduce the IWW volume have resulted in a further reduction of IWW from seven to six flows (two-cycle flowsheet = five flows).
Waste volumes sent to underground storage tanks during the month averaged 73, 331, 13, and 125 gallons per ton of uranium for neutralized IWW, solvent washes, centrifuge cleanouts, and cell drainage, respectively. The coating waste volume sent to storage was 216 gallons per ton of uranium. Overall plutonium and uranium losses for the month were 0.19 and 0.06 percent, respectively.

Aqueous rework during the month consisted of 20W and R-Cell flushes resulting from high 2EW losses during ion exchange startup in April, 2WW, IWW (primarily for Np recovery), sump drainage from the H1 pump seal leak, and sump drainage from the HS Column leak. No adverse effects were noted with the possible exception of higher-than-normal gamma levels experienced during some of the rework processing.

Self-concentration continues in Tanks 241-A-101, 102, and 103 at boil-off rates of 9.4, 6.0, and 1.7 gal./min., respectively.

During the latter part of June the temperature in TK-241-A-101 had gradually increased from 130° to 140° C; then a sharp increase in temperature was noted beginning on July 9 when the temperature increased from 142° C to 171° C over a six-day period. As in previous temperature excursion experiences, water addition to the tank reduced the sodium concentration and the temperature to normal.
REDOX TECHNOLOGY OPERATION

Acid Recovery and Iodine Removal

The average efficiency of acid recovery was approximately 76 percent during the month with acid concentration averaging 49 weight percent. Both values are lower than those for June due to malfunctioning of the oxidation controller plus continued increase in the temperature of the acid absorber cooling water. During the month, one of the caustic recirculation pumps in the scrubber failed and was replaced with a stainless steel unit; the caustic scrubber can therefore be used as a back-up acid absorber when work is completed on the necessary instruments and auxiliaries. Completion is anticipated in the coming month. It has been previously pointed out in these reports that essentially all of the unrecovered acid can be accounted for by material balance around the caustic scrubber, and it is estimated that after the conversion has been made, over-all acid recovery may range as high as 95 percent.

Because of reduced efficiency of the A and B silver reactors which contained abnormally large amounts of silver nitrate (see report for June, 1958), radioactive iodine entered the acid absorber system at rates up to 35 curies per day while metal cooling times averaged 105-107 days. Less than 0.001 curie per day passed through the absorber-scrubber system, and the over-all emission of 131 iodine to the stack averaged 0.4 curie per day. Nevertheless, the A silver reactor was replaced on the last day of the month with the new prototype reactor.

The gas sampling program initiated approximately four months ago to determine the path of 131 iodine was continued. It has been found that when the silver reactors are performing normally, a nearly constant percentage of the iodine present in the metal charged to the dissolvers is emitted through the sand filter to the stack, accounting for approximately half of the average daily emission. Plans have been made to attempt to locate the source and test the suppression of iodine evolution by the addition of mercuric ion to metal solution after dissolving but before centrifuging.

Feed Preparation

A recent statistical study (cf. HW-56823, "Redox Essential Materials Consumption - Hexone Loss Study", by A. C. Morgenthaler) of Redox process variables indicated some degree of correlation between certain feed preparation steps and the loss of process solvent. On the basis of recommendations resulting from this study, several relatively minor changes were made in the "head-end" flowsheet, including time cycles, acidity adjustments, centrifuging rates, etc. No data are yet available.

Solvent Extraction

The principal problem continued to be the periodic flooding of the 1A Column which was shut down and flushed with dilute nitric acid on an average of once per week during the month. Two short-lived, unsuccessful attempts were made to alleviate the problem by acidifying the entering extractant stream to prevent
the formation of the complex iron-chromium-aluminum precipitate believed to be the cause of trouble. Because there appeared to be a correlation between the progressively increasing uranium-to-aluminum ratio in the lA Column feed and the increasing frequency of flooding over the past several months, and because no improvement was noted when the recycling of IAW to the lA Column was discontinued in May, 1958, the lAW recycle was resumed near the end of the month in order to reduce the uranium-to-aluminum ratio in the feed and thus raise the aluminum nitrate concentration in the IAW. Simultaneously, the concentration of chromium (VI) was reduced to approximately one-fourth of its former value in an attempt to eliminate the precipitation potential by decreasing the amount of one of the precipitate constituents. Early results were erratic but the general outlook for improvement is hopeful. Despite the periodic interruptions, the over-all decontamination and recoveries of both products were very good. (Uranium recovery was 99.84 percent and plutonium recovery was 99.59 percent.)

Waste Storage

The bulge in the bottom of the 241-SX-113 tank (Redox buried waste) collapsed during June, and as the bottom plate resumed its normal shape, the rate of apparent liquid loss observed during the collapse (12,000-15,000 gallons per day for approximately five days) dropped sharply to 3000-3500 gallons per day where it remained essentially constant until the tank was emptied by pump near the end of July. This rate of decrease represents normal boil-off, thus indicating that the steel liner was intact and that no liquid was escaping to the soil during this period. However, the most painstaking calculations show that approximately 40,000 gallons of waste remain unaccounted for. This is consistent with the theory that the bulge was caused by liquid (under the bottom of the liner) which subsequently escaped to the soil through a fault in the concrete, thus allowing the steel plate to resume its normal position. At the beginning of the final week of the month, approximately 270,000 gallons of the tank's contents were pumped to another tank, leaving a heel of approximately 20,000 gallons in 113-SX. This liquid level has continued to drop slowly but steadily at an evaporation rate of about 1200 gallons per day, and will be permitted to continue until the tank is dry. At such time, inspection of the interior of the tank (by periscope or photographic techniques) can be started. Meanwhile, excavation has been started for the purpose of exposing the influent line so that a postulated mechanism for the formation of the bulge can be investigated.
FINISHED PRODUCTS TECHNOLOGY OPERATION

URANIUM CONVERSION OPERATION

Process Performance

All UO₂ produced met product specifications.

Nine hundred eighty-six (986) pounds of nitric acid per ton of uranium processed (93.5% of theoretical) were recovered at an average concentration of 49%.

The average operating rate of the calciners was 7.0 tons uranium per calciner for each day on the line.

The particle size of milled powder, though within specifications, has been finer than desirable for optimum fluidization in the customer's reduction reactor. In an attempt to increase the mean particle size, the mill speed has been reduced to 5100 rpm from 6000 rpm. Data collected from three carloads produced at the slower speed indicate only minor changes in particle size and size distribution. It is planned to reduce the mill speed further, and to increase the mill retention screen openings.

Process Improvement

Use of Windsor Felt filter cloth in sump waste service resulted in rapid pluggage of the cloth. American Felt Company Windsor Felt filter cloths 320-DY-V (water permeability at one lb/sq. in. of 8 gpm/sq. ft. and one micron particle size retention) and 320 DA-B (water permeability at one lb/sq. in. of 43 gpm/sq.ft. and five micron particle size retention) were tested. These cloths plugged after passing 120 and 180 gallons respectively. The Fulflo K-8 RIOS glass fiber filters (30 micron particle size retention) currently in use pass about 3000 gallons before the pressure drop becomes prohibitive.

METAL FINISHING OPERATION

Re-suplex

Fifty runs, consisting of crucibles, fragments, powders, and clean-outs, were processed through the S and C Hood. Slurry losses averaged 0.41% of the recovered plutonium. Both filter blocks were replaced during the month.

The SE columns processed 1300 liters per day at 70% operating efficiency for an average instantaneous rate of 1860 liters per day. Waste losses to crip averaged 0.0094 g/L or 1.20% of the feed plutonium. The high waste losses were caused by the presence of excessive quantities of solids in the solvent extraction system, and a clean-out is scheduled.
Continuous Task I - II

Three hundred thirteen runs were processed with an average recycle in supernates of 8.4%. The high recycle was caused by calibration drift in feed flow control and by operating disturbances associated with the start-up of the second continuous processing unit.

The second continuous Task I - II unit was activated during the month. Except for minor difficulties associated with the precipitator agitation conditions the start-up performance of the equipment was good.
Silver Reactor Studies

Studies made in the laboratory silver reactor have demonstrated very graphically the loss of silver nitrate and other silver compounds from the reactor packing under typical operating conditions. As a result of these observations, it was concluded that the standard packing (coated by soaking in 18-24 M AgNO₃) had too thick a layer of AgNO₃ for optimum performance, the excess AgNO₃ contributing little to iodine absorption capacity and at the same time being responsible for early plugging of the reactor. Further study of the problem was made by measuring the iodine absorption capacity of AgNO₃-coated saddles as a function of coating thickness. Unglazed saddles were coated by immersing in silver nitrate solution, then drying. The iodine capacity was measured by exposure to iodine vapor (in an air stream) at 150°C until no further weight change occurred. It was found that the use of 0.1 to 5.0 M AgNO₃ gave coatings which were 90 per cent or more reacted with the iodine, with no loss of Ag from the saddles. Using 10 M AgNO₃, 10 per cent of the silver salts were lost, and only 82 per cent of the AgNO₃ reacted with the iodine.

During recent months, two old silver reactors from Redox were cleaned out with thiosulfate solution. Analysis of the flush solutions has shown the following:

1) The thiosulfate solution should be kept alkaline (pH 11) to avoid the formation of silver sulfide and to minimize halide corrosion of the stainless steel.

2) Most of the halide-absorption capacity of these reactors was spent in the formation of AgCl. In one of the reactors, 79 per cent of the silver removed had been present as the chloride and only 1.4 per cent as iodide.

3) Sodium salts equivalent to 20 pounds of sodium nitrate were found in the preliminary water flushes of one of the reactors. The sodium presumably came from entrainment during coating removal.

The analytical scheme used for these analyses hinged on the precipitation of silver sulfide and the destruction of thiosulfate by hot alkaline peroxide treatment. This was followed by the application of standard methods for determination of the constituents of interest, with the exception that an iodide-chloride separation was made by oxidation of the iodide with nitrite and extraction of the resulting iodine into CCl₄.

Scouting work has also been done on the use of other higher melting compounds for iodine absorption. Rough comparisons of the abilities of lead chromate, silver chromate, silver phosphate, and silver nitrate to remove...
iodine vapor from an air or an air-NO₂ stream showed the two silver compounds to be about as effective as silver nitrate at 170°C. Lead chromate was ineffective.

ANALYTICAL ASSISTANCE

Analysis of Neptunium-237 in Purex Process Streams

The analytical separation method (TTA extraction) used in the analysis of neptunium-237 in Purex stream samples has been modified to facilitate the analysis of highly radioactive solutions. In the modified method, TTA-extractable fission products and plutonium(IV) are extracted away from the TTA-inextractable neptunium(V). Valence adjustment is accomplished by heating (70 - 80°C) with nitrate ion (0.4 - 0.8 M) in dilute nitric acid (0.6 - 1.0 M) using ferric ion (0.001 - 0.01 M) as a catalyst. This treatment converts neptunium(IV) and neptunium(VI) to neptunium(V), and plutonium(III) and plutonium(VI) to plutonium(IV). Under the conditions described above, the two slowest reactions, the oxidation of neptunium(IV) to neptunium(V) and the reduction of plutonium(VI) to plutonium(IV), are essentially complete in 20 minutes. Following the pre-extraction step, which removes the bulk of the extractable fission products and over 99.9% of the plutonium, the neptunium(V) is reduced to the TTA-extractable neptunium(IV) with hydroxylamine and ferrous ion, and additional purification is obtained by extracting neptunium(IV) into TTA.

Verification of Recuplex Slag and Crucible Solution Analysis

In conjunction with current programs aimed at determining possible causes of Z-plant underaccounting, six SCF samples were analyzed for total plutonium and plutonium-containing solids. Five of the samples contained no appreciable amount of solids. Results of the analysis of these samples by direct radioassay agreed within seven per cent of Z-plant Control Laboratory results obtained by the TTA-extraction method. Only one of the six samples contained an appreciable amount of particulate material. Dissolution and analysis of the solid material revealed that the solid phase contained only about one per cent of the total plutonium present in the sample.

Gamma Scintillation Counter Discriminator Shifts

Recent studies with 222-S Control Laboratory gamma scintillation counters (G.S.C.) showed that large shifts (0.3 MEV), which are not readily detected by present instrument testing procedures, can occur in the discriminator setting. As a result, laboratory gamma spectrometers have been modified to facilitate the routine verification of G.S.C. discriminator settings.
QUALITY CONTROL AND STANDARDS

During the month the quality control program for the Chemical Processing Department analytical laboratories was maintained as usual. The Analytical Control Quality Report - April-June, 1958, HW-56702, was issued. All laboratory operations will collect quality control data for use on the IBM-702 as of August 1st.

The Standards Laboratory continued the production of calibrated glassware and standard solutions. The calibrations and checking of geometry discs for the alpha counters was in good control at month end.
Preparation of Plutonium Trichloride

Over four kilograms of plutonium trichloride were prepared in support of the plutonium trichloride conversion program. The plutonium dioxide used this month had been calcined at 400 - 500 C. This high temperature oxide was less reactive toward phosgene than oxide calcined at 350 C or below. It was necessary to increase the chlorination temperature to 500 - 600 C to achieve an adequate reaction rate. Bulk density of this powder was 2.7 g/cc.

Chlorination of plutonium dioxide by phosgene has been previously reported at temperatures of 350 - 500 C. When the temperature is raised to 500 - 600 C, some unidentified by-products appear which are not formed at lower temperature. These are brown and white residues which collect in and tend to plug the off-gas lines. They are similar to the by-products from chlorination with carbon tetrachloride.

Several samples of plastic tubing were tested for use with phosgene. There is no evidence of deterioration of polyethylene, fluorothene (Kel-F), or Saran. Tygon proved unsatisfactory. It turns white, hardens, and becomes swollen to the point that slip-on connections may fail to contain the phosgene.

Plutonium Trichloride Reductions

Magnesia crucibles flame-sprayed with nickel have proved satisfactory as liners for plutonium chloride reductions. An RS-4 crucible flame-sprayed with 700 grams of nickel was used successfully; however, a crucible with 140 grams of nickel deposited on it was considered marginal. Some cracking and slag loss resulted in partial crucible sticking. A crucible three-fourths coated with 175 grams of nickel will be tested as soon as it can be obtained, and is expected to be nearly optimum.

Other crucible types tested were graphite lined with magnesium zirconate, magnesia impregnated and glazed with sodium chloride, and magnesia impregnated with barium chloride. The sodium chloride glazed crucible appeared most promising. Larger scale tests will be made with both the barium chloride and sodium chloride treated types. The graphite coated crucible resulted in a poor reduction.

A joint test with 300 Area Analytical Laboratories has started to determine the water pickup of plutonium chloride under controlled humidity conditions. Reductions will be made from powder stored simultaneously under the same conditions. Successful reductions have been made of plutonium chloride held for 22 and for 93 hours in an 8.5 percent relative humidity atmosphere. Neither excessive pressures nor mixing difficulties were encountered. These tests will continue up to 500 hours' exposure.
There appears to be a difference in the reduction characteristics of plutonium trichloride made from different source materials. Consistently higher pressure during the reduction and lower yields are obtained from the trichloride produced by chlorinating plutonium oxalate than are obtained from powder made by chlorinating the oxide. No explanation is given at present.

A phase diagram for the CaCl₂-CaI₂ system was determined.

Continuous Task III

A dense thoria crucible proved to be satisfactory when tested with the Task III melt (BaCl₂-NaCl-KCl) in an argon and in a hydrogen-hydrogen chloride atmosphere at 800°C for 3-1/2 hours. The melt adhered to the crucible walls.

Molybdenum and Pyroceram were tested in the melt at 800°C with a hydrogen-hydrogen chloride atmosphere. The molybdenum was unharmed, but the Pyroceram shattered—probably from thermal shock.

Ceramic Development

Work continued on reducing the porosity of magnesia crucibles in support of the plutonium trichloride reduction work.

Magnesium acetate impregnation includes soaking with a saturated water solution, drying, and heating to convert to magnesium oxide. An RS-4 crucible was given two cycles of acetate treatment, was fired at 1300°C, and is held in a desiccator for another trial. Two LCRS-4 crucibles given similar treatment are also available.

Impregnation with fused salt involves melting salt in the crucible and allowing the salt to soak into the pores. LCRS-4 crucibles impregnated with sodium chloride (m.p. 800°C) and barium chloride (m.p. 960°C) were tested as small-scale reduction liners. Results were favorable enough to warrant further trials.

Work with barium chloride in RS-4 crucibles (2-7/8" I.D. x 9-3/4") is now in progress. A charge of 100 grams of barium chloride brought to 1075°C for 30 minutes gives impregnation about half-way up, but leaves a salt residue in the bottom. The treated part is impervious to water. A charge of 100 grams brought to 1150°C for 30 minutes was found to give impregnation seven-tenths of the way up with no residue. Again, the treated part is impervious to water.

Addition of calcium fluoride in pressed crucibles should result in less porosity. Work started on the influence of large additions of calcium fluoride to the standard pressed crucible magnesia coarse mix. H-5 crucibles containing 20 percent and 30 percent calcium fluoride were pressed, and fired at 1300°C and 1400°C.
Work continued on the development of nickel-coated RS-4 reduction liners. The liner reported before as resulting in a successful reduction had been covered externally with nickel weighing about 700 grams. During this month, three other RS-4 crucibles were coated (using the Metco wire gun) — the weights of nickel being 142, 93, and 34 grams. Test of the liner with the 142-gram coat resulted in cracking of the coat with escape of slag. As the report period ended, Fuels Development Operation, HLO, had been requested to flame-spray 175 grams of nickel on the bottom three-fourths of an RS-4 crucible for a further trial.

A zirconia-coated RS-5 pressure vessel was received from the Norton Company. The Rokide Z coating thickness was specified as .04 to .05". Fabrication of close-fitting magnesia slip cast liners (identified as RS-6) for the zirconia-coated RS-5 pressure vessel was started. An aluminum pattern was designed.
ORGANIZATION AND PERSONNEL

Personnel

A. Brunstad, 234-5 Development Operation resigned on July 22 to accept a position with the Atomic Energy Commission, Hanford Operations Office.

J. F. Facer, Purex Technology Operation resigned on July 14 to accept a position with the Atomic Energy Commission, Grand Junction Colorado.

R. W. Henkens was assigned to the 234-5 Development Operation on July 10 as a Tech Grad.

Trips

G. L. O'Neill of the Advance Process Development Operation visited Mr. C. E. Stevenson of the Phillips Petroleum Co., Idaho Falls, Idaho on July 29 and 30 to attend non-production fuels meeting.

Visitors

Marshall W. Cook from the University of California visited V. R. Cooper, E. R. Irish and R. G. Geier on July 1 to discuss neptunium-237 recovery.

A. E. Cameron, Eric N. Sloth and R. R. Walters also visited J. P. Duckworth on July 22 to tour central and head-end control rooms, P & O gallery and N-Cell.

G. D. Braden and S. B. Strom of Knolls Atomic Power Laboratory visited E. R. Irish on July 22 to tour Purex Plant.

Inventions

<table>
<thead>
<tr>
<th>Names</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. J. Beard</td>
<td></td>
</tr>
</tbody>
</table>
I. RESPONSIBILITY

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

II. ACHIEVEMENT

FIRE PROTECTION OPERATION

A. Fire Responses

A total of six fire responses were made during the month with a loss of $30.00.

1. A grass fire occurred inside 200 East Area proper. Cause, burning material was blown out of burning pit. Approximately seven acres of sagebrush and cheat grass was burned. Loss-$10.00.


3. Grass and brush fire outside 200 East Area NW corner of fence, caused by lightning. Loss, $10.00.


5. Power and General Maintenance 272-E, no fire, low pressure on sprinkler system caused transmission of fire alarm. Loss-nil.

6. Relations and Utilities, 2101 M, 200 East Area, Accidental alarm, no fire. Contractor attached hose to sprinkler system and opened valve which tripped sprinkler system and alarm box transmitted. Loss - nil.


1. During the month 295 fire extinguishers were inspected, one installed, one delivered to new location, ten seals broken and not reported, 20 serviced, and 185 weighed.

2. Twenty gas masks were inspected and three serviced.

3. Twenty hand lines were inspected.

4. Sprinkler systems in 272 E, 272 W, 277 U, and 277 S were inspected.
C. Services Performed for Other Operations


2. Assisted Power and General Maintenance in pumping and flushing water line from 200 North Area to 251 Substation.

3. Assisted Redox in testing sprinkler system in 276-S Building and fog system in 202-S Building.

4. Assisted engineering personnel on water system survey and supplies for 200 East and 200 West Areas.

D. Fire Hydrant Flushing

1. A program to flush all fire hydrants in 200-E and 200-W Areas was initiated due to finding foreign material in the water system in the Redox Area.

E. Training of Personnel in Other Operations

1. Twenty people were given instructions in Back Pressure Arm Lift Method of Artificial Respiration, Research and Engineering, 271-T Building.

2. Instructed 30 people, Power and General Maintenance, use and limitations of Chemox Oxygen Breathing Apparatus.

F. Training of Fire Protection Personnel

1. One exempt member attended CPD Process and Equipment training.

2. Three of the four shifts made a detailed tour of the laboratories in 234-5 and 231-Z Buildings. The fourth shift to complete the first week in August.

G. Civil Defense Rescue Training

1. Three classes were conducted during the month with 21 people in attendance.
EMPLOYEE COMPENSATION OPERATION

The quarterly report of Salary Distribution Data was prepared and issued.

A 2% upward shift in the Exempt Salary Structure was authorized, effective July 1, 1958, to bring the total accumulated percentage change since January, 1954, to 20.27%. Revised Salary and Wage Trend Data Charts were issued.

Revised Position Relationship Data charts were prepared and issued. This data will be prepared each July 1 only in the future.

In conjunction with reorganizations and position revaluations, audits and reconciliations of four positions were completed.

The HAPO-wide study of the nonexempt wage compensation policies was continued. The cross evaluation of clerical type jobs between departments using job evaluation systems from external departments, has been partially completed. This is a preliminary step to the overall study.

SUGGESTION PLAN

Suggestions Received 44 69
Acknowledgements to Suggesters 42 70
Suggestions Pending Acknowledgement 4 3
Suggestions Referred to Operations for Investigation 42 70
Suggestions Pending Referral to Operations 4 3
Suggestions Completed and Closed 95 52
Adopted Suggestions Approved by Board 20 26
Adopted Suggestions Pending Approval by Board 28 23
Total Net Tangible Savings $2,860.00 $600.93
Cash Awards Paid During Month 575.00 270.00

As of the end of July $3,740.00 have been paid in awards in 1958 with total Net Tangible Savings of $31,718.93. The average award of the 221 adopted suggestions is $16.92 and the ratio of awards to savings is 11.8%

Total Number of Suggestions Outstanding to Operations at the End of the Month

June July
107 125
Participation in Benefit Plans

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<tr>
<th>Benefit Plan</th>
<th>June</th>
<th>July</th>
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<td>Insurance Plan</td>
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<td>Pension Plan</td>
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<td>Stock Bonus Plan</td>
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<td>Good Neighbor Fund</td>
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<td>61.0</td>
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One employee, C. E. Griffin, retired during the month.

Two employee deaths - A. B. Sands and W. D. Mattison
UNION RELATIONS OPERATION

Five grievances were filed at Step I during the month. Of these, three grievances were of a jurisdictional nature.

Two grievances were discussed at Step II.

Notice of arbitration was received from the HAMTC in the matter of the G. M. Brown grievance. The grievance is concerned with the transfer of an employee between two shops of a Level 4 component. The Company is alleged to have violated the Agreement in not recognizing a transfer request of another employee for the same location.

During the month Company representatives met with Council representatives in the matter of the Wonacott case (RMU jurisdiction). The discussion centered upon the remaining points of disagreement: 1) Establishment of all dose rates sought by union and the union stand that all radiation zone work shall be monitored by RMU. 2) The Company contention is that anyone can perform self monitoring in unchanging fields where conditions are known to require time limits exceeding thirty minutes duration.

No noteworthy progress was made in the discussion. The Company will attempt to rephrase its position, as above, as expressed in the last communication to the union in May of last year.

The union is not expected to take any action on the case nor has any date been set for future discussion.

The Operation is continuing its study of all CPD grievances submitted since September 1956. The study is approximately 45% completed.
UNION RELATIONS OPERATION

Bargaining Unit Employees in CFD
819
823

Bargaining Unit Employees Utilizing Check-off
571
559

Percentage of Total Bargaining Unit Employees Utilizing Check-off
69.7
67.9

Following is the grievance statistics summary for the month of July, 1958.

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<th>Nonunit</th>
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<td>1</td>
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<td>Grievances pending at Step II on 6-30-58</td>
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<td>Satisfactorily answered at Step I</td>
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<tr>
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<tr>
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### Personnel Development and Placement

#### A. Employment

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<th>Non-Exempt</th>
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<td>11</td>
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</tr>
<tr>
<td>Re-Hires</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Re-Engages</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Transfers from other components</td>
<td>1</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Changes from Non-Exempt to Exempt</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Changes from Exempt to Non-Exempt</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Removals</strong></td>
<td>11</td>
<td>13</td>
<td>24</td>
</tr>
<tr>
<td>ROF</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Illness</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Retirement</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Transfer to other components</td>
<td>6</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Resigned</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Changes from Exempt to Non-Exempt</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Changes from Non-Exempt to Exempt</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

#### Requisitions (Non-Exempt)

| Number on hand at beginning of month | 4 |
| Number received during month | 10 |
| Number filled | 6 |
| Number on hand at close of month | 8 |

#### Request for Transfer (Exempt)

| Number on hand at beginning of month | 20 |
| Number received during month | 0 |
| Number transferred | 1 |
| Number closed out | 4 |
| Number on hand at close of month | 15 |

#### Applications for Employment (Exempt)

| Applications received during July | 1 |
| Hired | 0 |
| Closed Out | 1 |
| Applications on hand | 0 |

#### Open Requisitions

| 2 |

#### Service Pins

A total of 13 pins were issued as follows:

- 10 yrs. service: 6 Male, 3 Female
- 5 yrs. service: 4 Male, 0 Female
CPD employment for July was quite stable, with no one in CPD being RDF'd. There were some excesses declared during July consisting of two General Clerks C, one Field Clerk A, one Electrician Journeymen, and one Plumber Steamfitter Journeymen. These excesses were resolved by two General Clerks C voluntarily terminating. The junior Field Clerk A in CPD was transferred to HLO as an Engineering Assistant and the excess Field Clerk A replaced him. The Electrician Journeymen declared as excess earlier in the month was later cancelled. The Plumber Steamfitter exercised his "bumping rights" under the HAMTC agreement and displaced the junior fitter in his seniority group in FPD.

Two CPD exempt employees were transferred to other Company components outside HAPO during the month. J. J. Jech transferred to the X-Ray Department in Milwaukee, Wisconsin and S. I. Allen transferred to the Heavy Military Electronic Equipment Department at Syracuse, New York.

Two CPD exempt personnel were placed in AEC jobs during the month.

### Status - Personnel Development Program for Non-Exempt Employees

<table>
<thead>
<tr>
<th>Month</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of appraisals scheduled</td>
<td>71</td>
<td>99</td>
<td>64</td>
<td>440</td>
</tr>
<tr>
<td>Number of appraisals delinquent 7-31-58</td>
<td>6</td>
<td>13</td>
<td>42</td>
<td>63</td>
</tr>
</tbody>
</table>

### Correspondence

During the month a total of 59 inquiries regarding CPD personnel were answered. They consisted of:

- 3 letters of inquiry regarding credit
- 56 letters regarding housing loans

### Military Service Records

Records show that CPD has a total of 121 employees who are subject to military training through Selective Service or Armed Forces Reserve action.

<table>
<thead>
<tr>
<th></th>
<th>Exempt</th>
<th>Non-Exempt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ready Reserve</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>Standby Reserve</td>
<td>15</td>
<td>6</td>
</tr>
<tr>
<td>Deferments Requested</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Deferments Granted</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Deferment Requests Pending</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

### E. Personnel Training and Development

#### Participation in Training Courses

<table>
<thead>
<tr>
<th></th>
<th>Exempt</th>
<th>Non-Exempt</th>
</tr>
</thead>
<tbody>
<tr>
<td>G.E. Supervisory Selection Program - No. Completed</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>G.E. Supervisory Selection Program - Revaluation</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Technical Graduates on Rotation</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>
Participation in Training Courses (Continued)

Employees counseled in self-development  2
Films shown  5
OPG's Issued (3 new, 10 revised)  13

A new group (10 people) started Dr. Conant's course "Understanding People."

The course "Techniques of Interviewing" was scheduled in CPD for the first time by Dr. Conant. All Level 3 Managers are enrolled.

C. Office Services

Duplicating

| Total Multilith Copies Produced | 155,705 |
| Ozamatic Copies Produced        | 13,903  |
| Verifax Copies Produced         | 1,115   |
| Xerox Masters Produced         | 278     |

Mail

| Total Pieces of Mail Handled    | 70,298  |
| Registered Deliveries          | 467     |
| Library Mail, Pounds           | 714     |
| Blue Prints, Pounds            | 301     |

Addressograph

| Instrument Charts Imprinted    | 8,832   |
| Bulletins, OPG's, Etc.         | 8,717   |

An industrial hygiene study has been completed and several recommendations, designed to improve working conditions in 200-E Duplicating, are being considered.

DECLASSIFIED
A. Statistics

GE NEWS items
General Manager's meetings with exempt employees
Management News Bulletins
Employee Headliners
Employee Location Records mailed out
Priority Messages

B. Comments on Statistics

Nine items were carried in the GE NEWS during the month. These included a picture and cutline pointing out the current fire hazard; an attendance award story; a picture and comments of a CPD employee for the Plant Panel which asked the question "What about OPERATION UPTURN?"; an obituary on a CPD employee in 200-W Shops; a picture and cutline of the insurance benefits received by a CPD employee and his family; a picture and cutline of a Purex Analytical Lab group who had completed two consecutive years without a minor injury; a full-page feature on CPD suggestion award winners; a suggestion award story; and a retirement picture and cutline.

Two priority messages were sent out during the month. One concerned the cost-of-living increase, and the other concerned Mr. McCune's employee meeting Thursday night, July 24.

C. Other Employee Communication Activities

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

A letter to accompany the radiation report cards was prepared for the Acting General Manager's signature and the finished letters sent to HLO for distribution.

A Management News Bulletin item on the businessmen's dinner meeting conducted by Community Relations was prepared and provided to all HAPO departments for their use.

A supplement to the June-July Round Table publication was prepared and distributed during the month to all CPD management. The supplement contained an educational article on OPERATION UPTURN, and an item on the results of the Round Table survey conducted in May.

Questions which are received on Round Table Evaluation Forms are being sent to the appropriate authority within the Department for answer. During the month one letter was sent out.
C. Other Employee Communication Activities - Cont'd.

An Employee Newsletter, signed by the HAPO General Manager, regarding Mr. McCune's employee meeting on July 24 was distributed to all Department personnel. Communication also handled ticket distribution within the Department for this meeting.

A letter was prepared to C. L. Fay listing CPD activities in connection with OPERATION UPTURN.

An editorial designed to encourage the "Be An Ambassador" theme, and a short history of the General Electric Company were prepared and distributed to each of the Communication Specialists for use in connection with the OPERATION UPTURN campaign.

A booklet entitled "What's Happening to U. S. Business Today?" was distributed to all CPD management as a part of the OPERATION UPTURN mailing program.

The third and fourth OPERATION UPTURN posters were distributed during the month. Their subject matter was the suggestion system and waste control.

Posters prepared by the local credit unions were distributed throughout the Department for posting on bulletin boards. These posters encouraged home remodeling.

A letter was sent to all Level 3 components requesting that they provide us with the names of the people in their component who should be receiving "Nuclear Science Abstracts." The letter was sent out at the request of the Technical Library in order that they can update the distribution list for this periodical.

D. Public Communication

Arrangements were made for one of the Captains of the CPD Fire Protection Operation to accept a speaking engagement in Montana in August. He will discuss fire protection in locations handling or storing radioactive materials.

An Associate Editor of the CHEMICAL AND ENGINEERING NEWS visited Hanford during the week of July 28. Among the several articles he discussed while here was one on the decontamination facilities in 271-U. Another was a process article on chemical separations. Facilities Engineering and Research & Engineering provided men to meet with the editor while here to discuss the process article.
Chemical Processing Department

<table>
<thead>
<tr>
<th></th>
<th>July</th>
<th>June</th>
<th>Year to Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disabling Injuries</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Serious Accidents</td>
<td>2</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Medical Treatment Injuries</td>
<td>40</td>
<td>41</td>
<td>326</td>
</tr>
<tr>
<td>Overexposure Incidents</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Potential Overexposure Incidents</td>
<td>2</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Radiation Occurrences</td>
<td>25*</td>
<td>22</td>
<td>165</td>
</tr>
<tr>
<td>Fires</td>
<td>2</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Security Violations</td>
<td>2</td>
<td>1</td>
<td>9</td>
</tr>
</tbody>
</table>

*There were four additional Radiation Occurrences in Construction.

The two Potential Overexposure Incidents involved small spots of high-level contamination on coveralls.

One of the fires was caused by spontaneous ignition of acid rags, which had been placed in a plastic lined contaminated waste box. The second fire occurred when a whirlwind carried burning material from burning pit into cheat grass surrounding the pit. Damage and loss from the two fires was negligible.

Programs

First drafts of CPD Radiation Protection Standards are about 75% complete except on the subject where changes are expected in the annual midyear review of the HAPO standards.

Pictures of Purex and Redox personnel wearing eye and face protection were taken; posters were made and have been placed in 202-A, 224-U, 272-W and 202-S Buildings. A July safety topic on "Eye Protection" was issued by the Safety Program Council.

A flier on "On The Spot Care Of The Seriously Ill Or Injured" was prepared and distributed to Managers and first line Supervisors and Foremen.

Safety meeting material "For Your Protection" was prepared and distributed to Supervisors and Foremen in Redox, Purex, Finished Products, and Power and General Maintenance Operations.

In conjunction with the Safety Program Council, plans and material were developed for a Safety Quiz to be conducted as the Department's Third Quarter Safety Program.

Seven messages were posted on the marquee boards.

Advice and Counsel

Redox - Reviewed and commented on revised safety rules for 233-S Building, railroad cut and the pipe gallery; flame arrester checks on 276-S process tank and underground hexone tanks; tested heat detector and fire alarm devices in 276-S Building, 804 enclosure, and silo sample gallery. Safe handling and use of Turco cleaner 450 V in 271-U Building; storage and handling of compressed cylinder gases, acetone, and drums containing asphalt.
Advice and Counsel (continued)

Purex - Analytical laboratory exhausting 90% Argon and 10% Methane gas into the counting room; blocking emergency exit in the counting room; locking paint cabinet in the 202-A canyon lobby storage room; checking pump and trap pits for oxygen deficiency; Plant Engineering - use of spider staging in conjunction with the canyon crane, and spray painting the ventilation barrier before removal.

Finished Products - Change out of manifold pigtails to fit Argon cylinders in 231-Z Building.

P & GM - The five-year flush of sprinkler systems in 272-A, 272-W and 277-W Buildings was completed; repainting of center stripes and cross walks within the 200-East and 200-West Areas and replacement of stop sign on the southwest corner of the laundry addition; minimum water requirements of 3000 gpm for 275-EA hydrant flow have been met with the additional 8-inch line recently installed; burning pit requirements; need for gravel fill at the west entrance to 222-B Building; low spots in pavement at 200-East badgehouse shuttle loading zone.

Production - Essential Materials - provision of shut off valve on Hexone railroad car received from vendor under new contract; also, method of labeling car as containing hazardous liquid.

Facilities Engineering - Guarding of hoist and cable equipment for lifting concrete door of the crane maintenance platform; requirements of 200 Areas fire and sanitary water supply and piping distribution systems. Project CAC-812 has been approved for the Equipment Decontamination Building - 2706-W.

Research & Engineering - Advanced Process Development - review of criticality incident measurements and preventive measures for transmittal to AEC.

HLO - Revision of routine bioassay schedules; midyear review - HAPO Radiation Protection Standards; policy on release of contaminated equipment for repair or service by off-site firms; review of findings of personnel meter investigations (PMI's); draft of General Electric Company advice on radiation protection records.

Inspection, Investigation and Audit

Inspections were made of Purex new remote crane addition; 202-A pipe galleries and chemical storage room; Redox 276-S Building; Maintenance Shop and tool crib; and 200-East Area burning grounds requirements.

An inspection was made of the entire 234-5 Building and grounds for the follow-up audit. Discussions were held with supervisors and employees. The audit has been completed.

Purex audit has been completed.
Investigated Serious Accident CPD 58-3; injury occurred in Purex railroad cut.

Investigated Serious Accident CPD 58-4; vehicle accident on plant road northeast of 275-EA Building.

Special investigation dated July 24, 1958; injury in 202-S south pipe gallery.

Investigated unpleasant odor in assault masks, reported by a Power and General Maintenance foreman; source of the odor was determined.

Reports Issued

Serious Accident CPD 58-3
Serious Accident CPD 58-4
Potential Overexposure Incident Reports 58-3 and 58-4
CPD Radiation Occurrences for May and June
Quarterly Roster - CPD Pu Deposition cases
Semi-annual Progress Report - CPD Radiation Protection Goals
Health, Safety and Security Performance Report
Purex Audit
III. ORGANIZATION AND PERSONNEL

A. Meetings

Personnel in the Employee Relations Operation attended 50 meetings during the month. In addition to Safety, Security, Round Table, and Information meetings, these included:

- Tri-City Safety Council
- Orientation Tours for Firemen - 234-5 Building and Research and Engineering Laboratories
- Silver Reactor Incident - Talk by E. R. Irish
- Burning Pit Procedures
- HAFO Radiation Protection Information
- Step II grievance meetings and Industrial Relations Council
- Meetings concerning Employee Relations Task Force
- Meetings of the CPD Operation Upturn Council
- Meetings with representatives of the HAMTC

B. Personnel Activities

Fire Protection Operation held 48 inside classes, and 56 outside drills, in which 6,430 feet of hose and 335 feet of ladders were used. There was 719 hours spent in training, which amounted to 11.5 percent of the time worked.

The Specialist, Personnel Development and the Specialist, Training conducted a CPD tour of newly hired Tech Grads and Summer Juniors.

K. L. Nash from HMEED, Syracuse, New York visited the Hanford Atomic Products Operation during the month.

The Specialist, Safety and Fire Prevention, attended an orientation meeting to discuss dismantling and removal of No. 5 boiler from 200-W Powerhouse to the 300 Area. At months end the work was in progress. Representatives of Power and General Maintenance, Fuels Preparation Department, Health and Safety Operation, and Bumstead and Woolford Company attended.

C. Safety and Security

The Operation had no medical treatment injuries or security violations during the month.

DECLASSIFIED

D. S. Roberts, Manager
Employee Relations