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HW--61736-De1.

AUGUST, 1959

September 21, 1959

Work performed under Contract No. AT(45-1)-1350 between the Atomic Energy Commission and General Electric Company.

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

AUGUST, 1959

GENERAL SUMMARY

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PRODUCTION

The production of plutonium from the separations plants exceeded the August commitment by 54 per cent, and calendar year-to-date production is 8 per cent above the Official Forecast. The previous record high for plutonium separated in any one month was exceeded by nearly 5 per cent in August.

The production of UO_3 exceeded the monthly and calendar year-to-date commitments by 8 per cent and 2 per cent, respectively, while shipments of UO_3 conformed to the Commission established schedule.

The output of unfabricated plutonium metal exceeded the August and calendar year-to-date commitments by 27 per cent and 8 per cent, respectively. The production of unfabricated plutonium reached a new record high during August, with output being 2.5 per cent greater than that in any previous month. Shape production during August slightly exceeded the Official Forecast; however, calendar year-to-date output is nearly 8 per cent above the Official Forecast.

ENGINEERING

During August, six special charges of enriched uranium fuel elements (standard HAPC design) were dissolved in the Redox Plant. Initial enrichments ranged from 1.44 to 1.74 per cent U-235. Special regulations on charge sizes, completeness of each batch dissolution, and against inadvertent tamping were instituted.

Because of plutonium nitrate, from Purex ion exchange, approaching the purity requirements for buttons, the direct calcination from plutonium nitrate to oxide is being scouted. First samples of material from Purex calcined to a fine powder at about 225° C.

The third phase of UO_3 programmed operation was installed in K calciner during August at the Uranium Reduction Plant. Furnace power control, in addition to steam and air purging of feed lines, was incorporated in the unit. Several start-ups and shut-downs were made satisfactorily, to test various furnace control features. Start-up feed flow control will be possible after installation of magnetic flow-meters.

The bent-tube design proposed by Griscolm-Russel Company for the Purex concentrator tube bundle is being discussed by correspondence to clarify several points before revision of specifications. Two specifications, HW-61877 dealing with function, and HWS-6151 dealing with fabrication, were revised for submittal to the vendor.

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An engineering study of the Purex fission product container and filter assembly was completed. The structure and geometry of the unit will maintain the powder temperature at or below 840° F during shipment. Preliminary design of the lead shipping cask was virtually completed.

The television camera was again lowered into H-cell at Redox to view an attempt at removing a stuck jumper by means of a specially constructed hook. The jumper was removed successfully and the television viewing indicated many similar uses of the equipment.

Two conceptual designs for the Finished Products Operations' vibrating tube reactor were evolved utilizing a magnetically driven screw to convey and expose the powder. Plans are being made to continue this approach, perhaps to the prototype stages.

Directive HW-496 was issued on August 27, authorizing \$70,000 to the General Electric Company for Title I and related management services for the Palmolive program. The task force group for Palmolive Reprocessing and Fabrication (Project CGC-872) began pressing toward October 1, 1959 as the scope completion date.

After daily measurements of the 106-TY waste storage tank confirmed the existence of a leak on the order of 500 gallons per day, transfer of the material (dilute Uranium Recovery Plant waste) to an empty waste storage tank was started on August 28, 1959.

GENERAL

A study of Chemical Processing Department operating costs involved under New Production Reactor "power only" conditions in 1972 was completed. This study was made at the request of the Federal Power Commission and information generated will be integrated with that from other HAPO departments for a single submission.

An audit of the Department's emergency evacuation procedure and disaster rescue training program was conducted. Revision of procedures was begun; recommendations were made to strengthen complement of trained manpower; rosters of current emergency stand-by personnel were developed; training needs and programs were reviewed with CE&U Fire Protection Operation.

The Chemical Processing Department achieved its Sixth President's Safety Award on August 8, 1959. Consecutive injury free hours from the last Disabling Injury on February 7, 1958 totaled 4,200,000.

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STAFF

Vice President and General Manager, Atomic Products Division . . . L. R. Fink
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 . . . P. R. McMurray
Manager, Special Separation Processing & Auxiliaries . . . C. T. Groswith
Manager, Finished Products Operation . . . W. N. Mobley
Manager, Power & General Maintenance Operation . . . T. G. LaFollette
Manager, Financial Operation . . . K. G. Grimm
Manager, Facilities Engineering Operation . . . H. P. Shaw
Manager, Research and Engineering Operation . . . V. R. Cooper
Manager, Relations Practices . . . R. B. Britton

CHEMICAL PROCESSING DEPARTMENT
NUMBER OF EMPLOYEES
AUGUST 31, 1959

<u>OPERATION</u>	<u>EXEMPT</u>		<u>OTHER</u>		<u>TOTAL</u>	
	<u>7-31-59</u>	<u>8-31-59</u>	<u>7-31-59</u>	<u>8-31-59</u>	<u>7-31-59</u>	<u>8-31-59</u>
GENERAL MANAGER'S GROUP	10	10	1	1	11	11
PRODUCTION	6	6	4	4	10	10
PUREX	48	48	210	210	258	258
SPECIAL SEPARATION PROCESSING & AUXILIARIES	50	50	218	219	268	269
FINISHED PRODUCTS	52	52	236	230	288	282
POWER & GENERAL MAINTENANCE	44	44	251	252	295	296
FINANCIAL	13	13	11	11	24	24
FACILITIES ENGINEERING	69	69	22	22	91	91
RESEARCH & ENGINEERING	62	61	24	24	86	85
RELATIONS PRACTICES	<u>5</u>	<u>5</u>	<u>7</u>	<u>7</u>	<u>12</u>	<u>12</u>
TOTAL	359	358	984	980	1343	1338

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CHEMICAL PROCESSING DEPARTMENTPATENT SUMMARY
FORMONTH OF AUGUST, 1959

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

INVENTORTITLE

NONE

General Manager
Chemical Processing Department

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CHEMICAL PROCESSING DEPARTMENT
PRODUCTION OPERATION

AUGUST, 1959

I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Production Statistics

1. Purex Operation

	<u>August</u>	<u>July</u>
Tons uranium processed	628.79	214.86
Average production rate during operation (T/D)	21.0	15.7
Total waste loss (%)		
Uranium	0.05	0.18
Plutonium	0.13	0.53
Average cooling time (days)	105	110
Minimum cooling time (days)	91	87
On-line efficiency (%)	100.0	62.9

2. Redox Operation

	<u>August</u>	<u>July</u>
Tons uranium processed	(61.99 E	62.92 E
	(17.70 N	16.64 N
Average production rate during operation (T/D)	6.7	5.6
Total waste loss (%)		
Uranium	0.29	0.10
Plutonium	0.72	0.45
Average cooling time (days)	(173	182 E
	(	113 N
Minimum cooling time (days)	(122	112 E
	(	110 N
On-line efficiency (%)	56.5	64.7

3. 234-5 Operation

	<u>August</u>	<u>July</u>
Batches input to Task I	263	176
Runs completed thru Task III	282	140
Batches thru Product Recovery	72	87
Reduction Yield (%)	98.5	99.0
Waste disposal (units)	365.08	587.64

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4. UO₃ Operation

	<u>August</u>	<u>July</u>	<u>To Date</u>
UO ₃ loaded (tons)	(55.5 E	84.3 E	441.0 E
UO ₃ approved for shipment(tons)	(565.6 N	396.2 N	34 336.9 N
	(93.4 E	46.6 E	427.88 E
UO ₃ shipped (tons)	(500.3 N	401.3 N	34 159.6 N
	(93.4 E	46.59 E	427.88 E
UNH Backlog (tons)	(450.9 N	451.42 N	34 164.13 N
	(14 E	23 E	
	(244 N	207 N	

5. Power

	<u>200 East</u>	<u>200 West</u>
Raw water pumped (gpm)	11 042	4 668
Filtered water pumped (gpm)	1 082	976
Maximum steam generated (lbs/hr)	202 000	100 000
Average steam generated (lbs/hr)	177 640	67 610
Total steam generated (M lbs)	132 164	50 302
Coal consumed, est. (tons)	7 702	3 367

6. Waste Storage

	<u>August</u>	<u>July</u>
Salt waste reserve storage capacity-Redox	3 368	3 448
Salt waste reserve storage capacity-Purex	30 765	31 402
Coating waste reserve storage capacity-Redox	30 170	30 250
Coating waste reserve storage capacity-Purex	43 005	43 642

E. Reports and Documents

1. Repared and Issued

- HW-61382 RD Redox Plant Production Schedule, August and September, 1959, D. McDonald
- HW-61383 RD Purex Plant Production Schedule, August and September, 1959, D. McDonald
- HW-61384 RD UO₃ Plant Production Schedule, August and September, 1959, D. McDonald
- HW-61385 RD 234-5 Plant Production Schedule, August and September, 1959, D. McDonald
- HW-61454 Essential Materials Consumption-Purex, Chemical Processing Department, for July, 1959, J. E. Lentz

HW-61473 Estimated NPR Reprocessing Costs Power-Only Condition,
V. R. Chapman, August 10, 1959

HW-61491 Essential Materials Area Report to Cost and Purchasing,
Production Operation, Chemical Processing Department
for July, 1959, J. E. Lentz

HW-61582 Chemical Processing Department Waste Status Summary,
for July, 1959, J. E. Lentz

2. Prepared for Signature and Issuance

HW-61367 Production - July, 1959, W. E. Johnson

III. ORGANIZATION AND PERSONNEL

A. Safety

There were no plant injuries reported by Production Operation personnel during August, 1959.

B. Security

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

J H Warren by me

Manager - Production

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CHEMICAL PROCESSING DEPARTMENT
PUREX OPERATION

August, 1959

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I. RESPONSIBILITY

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

III. ACHIEVEMENT

A. Processing Experience

1. Production Experience

a) Production - Percent of Monthly Commitment

Uranium	157 Percent
Plutonium	159 Percent

b) Production Rates

Purex operated continuously during August at a 2.4 capacity factor.

c) Operating Continuity

Uranium	100 Percent
Palm	0 Percent

d) Waste Losses

Uranium	0.05 Percent
---------	--------------

e) Uranium Re-treated through Silica Gel 583 Tons

2. Normal Processing

The plant operated continuously during the month at a 2.4 capacity factor, thereby establishing a new production record. The plutonium waste loss was a record low and the uranium waste loss was only 0.05 percent. The plutonium product was consistently of top quality and all uranium met specifications after receiving silica gel treatment.

The gamma activity of the feed to the second uranium cycle was unusually high during the major part of the month. Several process changes were made in an effort to reduce the activity but none was successful. It is postulated that high activity crud accumulations

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in the IX column or the J8 concentrator are continuing to slough off and cause this situation.

Operation of the G3 centrifuge was reinstituted after the G2 column interface float failed, making it necessary to control the column by static pressure. The centrifuge acts as a gross phase separator in case the column interface should go out the top of the column. No difficulty was experienced.

The performance of the final plutonium ion exchange facility was excellent with production rates of 6.0 CF attained while reworking the out-of-specification plutonium produced during June.

3. Special Processing

All out-of-specification plutonium (30 cans) and uranium (14C tons) produced in June and July were either blended off or reprocessed during the first part of the month.

Two batches of IWW waste containing some 183 units of Palm and 152 units of plutonium were reworked by adding small quantities to virgin feed. A batch of F8 material which had refluxed for several weeks was also reprocessed by the same method, which resulted in the recovery of 117 pounds of uranium, 357 plutonium units and 240 Palm units. For some unexplained reason, the processing of the rework material appeared to improve the first cycle decontamination performance. Further tests are to be conducted to determine the mechanism by which this is accomplished and to determine if it can be adapted to routine operations.

B. Radiation Experience

The total iodine 131 emission during the month was 20.5 curies. In no case was the Purex or CPD limit exceeded. The addition of mercuric nitrate to the metal feed was resumed on two occasions as a means of controlling emissions from the vessel vent system.

Purex incurred five Radiation Occurrences of the following types: a) exposure exceeding authorized limits; b) two skin contamination cases exceeding 10,000 c/m fission products; c) significant exposure of personnel to air-borne contamination; and d) contaminated non-regulated vehicle.

Seventeen cases of skin contamination and six cases of personal effects contamination were incurred during the month. The maximum skin contaminations encountered were 60,000 c/m fission products and 10,000 d/m plutonium. All personnel contamination was reduced to non-detectable.

Fifty-four entries were made to the canyon during August for radiation survey and decontamination purposes. Decontamination efforts have reduced the contamination levels on the cranes, crane maintenance platform, and the craneway to a nearly normal status.

C. Mechanical Experience

Replacement of the pedestal bearing and two fan bearings were completed on the No. 2 291-A fan on a scheduled basis. The bearings have been in

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service since plant startup.

The No. 3 291-A exhaust fan, which was damaged on 7-21-59 subsequent to a bearing failure, was returned to service after extensive repairs, which included replacement of bearings, shaft, pillow-block, belts, and reinforcement of the damaged concrete footing.

Both bearings were replaced on the No. 4 291-A turbine driven exhaust fan after it was noted that the outboard bearing was rough and noisy. Investigation revealed that water had entered the oil reservoir through a leaking copper fitting on the cooling water line. Modifications have been made to all 291 fans to prevent a recurrence of this trouble.

The lead lined steel tank used for regenerating-acid makeup for the demineralized water system was replaced with a spare tank when leaks developed in the lead lining.

D. Analytical Performance

Technical support consisted of several special studies. A plutonium VI-IV valence adjustment study was made as the basis for N Cell rework of out-of-specification product solution. Optimum conditions were determined to be 6 N nitric acid, 0.2 N sodium nitrite at time of makeup and a 24 - 60 hour nitrite contact time. A study is continuing to determine the possible beneficial effect of sulfate ion on the stability of reduced plutonium. Studies are being made to determine the best type of analyses to use for optimum organic quality control. Work was completed on determining the conditions required for maximum dF of the uranium silica gel treatment.

A high bias on the E5 standard during the first part of the month necessitated the changing of the E5 Gilmont sampler. Standard results returned to normal.

E. Improved Performance

In order to reduce the acidity in the H4 backcycle concentrator and thus reduce corrosion of the concentrator tube bundles, the acid butt of the HAF stream was eliminated. The acidity of the HA column was maintained by adding acid to the 3WB stream in J1.

F. Events Influencing Costs

As a result of the elimination of the acid butt to the HAF stream (see item "E" above) the steam consumption of the H4 concentrator was reduced by approximately 13 percent. This amounts to a savings of nearly \$500 per month in coal costs or a reduction of \$0.83 per ton in processing costs.

The ceramic Berl saddle coating unit resumed operation. Forty cubic feet of one-half inch saddles were coated during the period. This represents a savings of \$8,000 under the estimated vendor's price.

The F-13 canyon pump, valued at \$4,500, which failed on 3-4-58 after twenty-seven months of service, was decontaminated and repaired at a total cost for labor and materials of \$2,294.

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III. ORGANIZATION AND PERSONNEL

A. Safety

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

B. Security

No security violations were reported.

C. Personnel Activities

M. H. Campbell, Analytical Chemist, was promoted to Process Chemist on August 1.

J. Mishima, Chemist, was on loan to AEC, Arco, Idaho, for a special assignment from 8-10-59 through 8-28-59.

S. E. Wray, Supervisor, Analytical Control, terminated August 31 to return to school.

M. L. Madeen accepted a permanent assignment as Junior Chemist in Analytical Control on August 3.

D. Visitors

The following personnel visited the Purex facility during the month.

August 26 - Nine Naval Reactor Engineers:

LCDR R. W. Bass
Lt. J. F. Pearson
Lt. R. T. Herkner
Lt. R. B. Hayman
Lt. W. E. Campbell

Lt. J. H. Webber
Lt. Richmond Gardner
Lt. T. J. Walters
Lt. V. W. Panciera

Manager-Purex

PR McMurray:EAF:gt

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CHEMICAL PROCESSING DEPARTMENT
SPECIAL SEPARATION PROCESSING & AUXILIARIES
AUGUST, 1959

I. RESPONSIBILITY

Authorization was received this month to re-title the present Redox Operation to the more applicable title, "Special Separation Processing and Auxiliaries Operation." The title change was made to adequately reflect the particular functions now assigned to the Operation, and is to be effective as of August 1, 1959.

II. ACHIEVEMENT

A. Processing Operation

Operations were conducted as scheduled over the July month end with the processing of depleted uranium which had been started on July 27, 1959. A total of 17.7 units of depleted uranium was processed and followed with a ten percent nitric acid flush of the cell equipment before reverting to the processing of E-Metal on August 10, 1959. Operations were continuous except for a 92 hour period during the first part of the month when a plugged H-10 to 241 jet caused a delay in dissolving operations. In addition to the depleted uranium production, 95.4 percent of the monthly E-Metal commitment was achieved. Total production for the month was 79.7 units, while operating 56.6 percent of the total hours available for column operation. To provide the metal necessary for the production achieved, the dissolvers were operated on a sustained basis, including week-ends, when the building is normally scheduled for stand-by. The mechanical efficiency for the month was 75.6 percent.

The quality of both product streams was under satisfactory control during the month. One batch of plutonium solution was returned to the third plutonium cycle for reprocessing due to a high gamma ratio. Three batches of UNH solution were also ozonated and processed through silica gel because of high gamma ratios. However, the decontamination of these three batches was not sufficient to meet shipping specifications and additional processing will be required. No conclusive reasons for the high gamma ratios on these particular batches have been established.

An almost simultaneous failure of the H-10 coating waste tank weight factor line and the H-10 to 241 jet-out line resulted in an overflow of coating waste to the H-cell floor. This was discovered when routine processing of H-cell sump waste disclosed the presence of a highly caustic solution. By utilizing the D-1 tank as a decanter, it was possible to effect direct discard of the bulk of the waste, but some rework was accumulated. This condition caused some delay and special routing of material during the first week of the month; however, no serious problems were encountered. The sump heels, which undoubtedly still contain some solid material, will be recovered as time and processing conditions permit.

During the latter part of the month eight buckets of enriched uranium (100 Area test material) ranging from 1.44 to 1.74 weight percent U-235 were charged to the C-2 dissolver in six chargings. No difficulties were encountered with the charging or dissolution operation on this special material. Processing of the resulting metal solution will be accomplished by blending with irradiated E-Metal during the September production run.

B. Maintenance Operation

There were no major equipment failures experienced during the month. However, five jumper installations were made in the 202-S Canyon. One was a new installation and four were replacements for plugged jets or weight factor lines.

After several previous unsuccessful attempts, the broken thermohm wall connector to the H-7 metal solution blending tank was finally removed this month. An improved mechanical device used in conjunction with a special TV camera was responsible for the success. Unfortunately, during the removal operation two of the guide pins were pulled out of the plug and remain in the wall receptacle. However, it is not expected that these will be very difficult to remove. As a last resort the wall connector can be utilized in its present state and a new connector adapted to it.

Other significant maintenance work completed during the month included:

- (1) The installation of a new panel section at E-cell operating board in preparation for mounting new E-12 sampling tank weight factor and specific gravity manometers. When completed more accurate readings on the E-12 tank should be possible, thus improving accountability control;
- (2) installation of a one inch vacuum line from the 202-S Building operating gallery to the 233-S Building to improve the vacuum on the air samplers;
- (3) replacement of the 233-S Building exhaust fan bearings;
- (4) installation of all non-radiation zone piping and instrumentation in connection with the ozonator installation in E-cell and
- (5) replacement of the diaphragm operating valve in the 233-S Building vent condenser system.

C. Waste Handling and Decontamination Operation

1. Waste Handling

Redox Coating Waste Received (S Farm)	13,981	gallons
Redox Salt Waste Received (SX Farm)	113,197	gallons
Total Gallons Boil-Off Salt Waste	172,794	gallons
Waste Received at TX (From 221-U)	38,813	gallons

Leaking jumper heads in the 240-S Diversion Box, which developed during the month, necessitated replacement of both condensate jumpers from the Redox D-1 and D-2 tanks. Exposure at the edge of the diversion box with the blocks removed was 3 rads/hr. Considerable difficulty was encountered in getting the flexible jumpers to make up properly, but the job was completed without incident.

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A significant reduction in the flow of Redox cribbable waste through the 216-6 Weir was observed at mid-month. Subsequent investigation revealed that the weir recorder float had failed. A new unit was installed and the recorder recalibrated. Flow rates through the weir have since returned to the normal average of approximately 150,000 gallons per day.

The July month end inventory of static waste tanks indicated that a possible leak existed in the 106-TY tank, since measurements revealed a decrease of approximately 14,000 gallons during the month. Daily checking of the tank contents, which was started immediately, continued to show a loss of approximately 500 gallons per day. The decision to pump the contents of the 106-TY tank, containing unscavenged TBP waste with an activity of approximately 0.2 curies per gallon, to other tanks was made on August 27, 1959 and pumping was actually started on August 28, 1959. To date approximately 75,000 gallons have been pumped to the 101-TY tank.

2. Equipment Decontamination and Repair

a. Regulated Steam Pit

Four vehicles, three pieces of heavy equipment and several miscellaneous items were decontaminated at the regulated steam pit during the month. A total of 32 man-hours was charged to this operation.

- b. Twelve man-hours were charged to decontamination and operational coverage for repairs to equipment at Riverland during the month.

c. 221-U Canyon

One jet jumper (H-T-35-H-6) and two trap jumpers (G3-DW & F2-15) were decontaminated and/or repaired for the Redox Plant during the month. Process jumper, H-2-30138, for the 240-S Diversion Box, was also decontaminated and rebuilt.

Run-in of the Purex F-10 pump (JG-4196) was completed and the unit returned to the customer. Decontamination work on the Purex F-6 concentrator tube bundle was also completed this month and a portion of the tube bundle cut out for corrosion studies by the Facilities Engineering Operation. Dose rates of 200 mr/hr at two inches were encountered during the cutting operation.

Twelve reactor pigtails were decontaminated for the Reactor Technology Group and one trailer tank-truck was decontaminated for the Hanford Laboratories Operation.

d. 221-T Canyon Building

The entire canyon ventilation system is now in operation. Stack fans, canyon carrier units and water seal are all in use. Minor Construction Forces are currently installing the supply system for the fresh air masks.

D. Analytical Control Operation

In the course of a routine analysis of the Redox D-1 sump receiver, it was observed by the Analytical Control shift personnel that this sample was very similar in appearance to the H-10 coating waste material. This observation led to the uncovering of a malfunctioning weight factor jumper and the overflow of the H-10 tank. Subsequent processing of this material plus assistance to process in resolving high uranium in plutonium streams and high gamma (Zr-Nb) in the uranium streams resulted in numerous special analyses to aid in restoring normal processing conditions.

Analytical support was given to Chemical Research and Development Groups studying dissolution of stainless steel cladding, uranium-molybdenum core fuel elements, and in ascertaining the feasibility of dichromate oxidation of plutonium in thermally cold dissolver solution in storage.

Analyses of neptunium oxide samples were also made for the Process Chemistry group this month. These samples were analyzed for alpha emitters on the alpha energy head of the 256 Channel Analyzer and by coulometer and x-ray, and in addition were analyzed for gamma, uranium and total thorium.

E. Radiation Monitoring Operation

Three radiation occurrences were recorded during the month. Most significant was the plutonium skin contamination to the hand of a laboratory technician to greater than 40,000 d/m. The contamination was reduced to 1,000 d/m in the field and subsequently reduced to 500 d/m by an industrial physician at Kadlec Hospital. Investigation of the occurrence revealed that the contamination was apparently contacted by the employee from the leaky cap of a plastic sample bottle. A cap gasket has been selected for evaluation with the expectation that leaks from this source can be eliminated.

Six cases of personnel skin contamination were experienced and with the exception of the radiation occurrence discussed above all were low level and the contamination was readily removed.

A deposition of particulate contamination around the Redox 291-S stack area which occurred during the month increased the background level of contamination on the ground from 10,000 c/m up to 30,000 c/m with isolated specs in excess of 100 mrad/hr. The contaminated earth was plowed under and all walks and roadways were water flushed. This work reduced the background level of contamination to 5,000 c/m on the ground and only a few specs of fixed contamination remain on the roadways. By analysis the particulate matter was determined to be largely ruthenium (Ca. 95 percent), and samples of white particles collected analyzed ammonium nitrate. The dissolver off-gas lines at the breech of the stack were subsequently fitted with pipe connections and water flushed. No fall-out of particulate matter has been observed since this installation.

Fission product contaminated air exceeding the limit of assault masks was encountered this month during the decontamination of the failed Redox dissolver in the 221-U Canyon Building. Two spots up to 300 r/hr have been measured on the bottom of the dissolver. At this time it is not known if these high radiation sources are from undissolved pieces of irradiated slugs or from deposits of contaminated sludge. Decontamination efforts in the meantime have been intensified in an effort to reduce or remove the high radiation sources and thus restore the canyon air status to normal conditions.

In conjunction with the investigation of a possible leak in the 106-TY waste storage tank a series of samples was taken at various levels in the tank. Maximum radiation exposure on the sample bottles was 600 mrad/hr. Dry wells in the TY Tank Farm were also measured for radioactivity, however, no positive results were obtained.

F. Improvement Experience

1. Process Tests and Revisions

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

2. Inventions or Discoveries

There were no inventions or discoveries of a patentable nature reported during August, 1959.

G. Events Influencing Costs

The unscheduled processing of approximately 35 units of normal depleted uranium during the latter part of July and the first part of August will result in an increase of chemical costs which were not forecast in the original FY 1960 budget submittal. However, the increased production will affect a compensating decrease in unit costs and it is not anticipated that the Redox Manufacturing Budget will be overrun.

H. Plant Development and Expansion

1. Preparatory Engineering

Redox Inert Gas System

The purge line of the silica gel dryer was re-routed through the ceiling of the compressor room this month. This change should

eliminate any possibility of gas hazards within the compressor room and at the same time eliminate water in the compressor vent system.

A proposal to use glycerine lubricant on the inert gas compressors, to eliminate the oil problem, has been temporarily abandoned in favor of a proposal to use teflon piston rings. This will mean a new piston design which is currently under study.

221-U Waste Handling & Decontamination Relocation

The Contingency Maintenance Request for \$60,000 to relocate the Waste Handling and Decontamination Facilities from 221-U to 221-T has been approved by the General Electric Co. and the HOO-AEC.

2. Design and Construction Liaison

CG-686 - In-Line Monitoring Instruments, Redox

The project was closed out at the end of July with accruals for the remaining work to be completed.

CG-772 - Multi-Purpose Dissolver, Redox

Detail design of the dissolver started on August 5, 1959. It is anticipated that the design will be sufficiently complete to permit fabrication to start at the end of six weeks.

CAC-812 - Equipment Decontamination Building, 2706-W

The building has been completed except for lathing and plastering on the inside which is now under way. Piping and completion of concrete work is on schedule. Completion and beneficial use of the facility should be achieved within six weeks.

CAC-783 - Additional Fire Protection, 222-S Building

Correction of exceptions to the Washington Rating Bureau's inspection have been completed. This is the final report on this project.

AR-59-CPD-32 - High Level Radiation Alarms

The additional sirens have been installed in the 222-S Building. This completes the Redox phase of the appropriation request.

I. Reports Issued

No secret reports were issued by Special Separation Processing and Auxiliaries personnel during the month of August, 1959.

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III. ORGANIZATION AND PERSONNELA. Safety

There were no disabling injuries, serious accidents or injuries in Special Separation Processing and Auxiliaries Operation. Six medical treatment injuries were reported during the month.

B. Security

There were no security violations in the Special Separation Processing and and Auxiliaries Operation during the month.

C. Personnel Activities

Eight visitors were conducted through the Redox Waste Handling and Decontamination Facilities at the 221-U Building during the month to observe equipment decontamination and reclamation procedures. They included the following:

<u>Name</u>	<u>Company</u>	<u>Date</u>
Mr. Humberstone	Air Reduction Corp.	8-12-59
Mr. Mueller	Air Reduction Corp.	8-12-59
Mr. Zuckert	Martin Company	8-12-59
Mr. Rauth	Martin Company	8-5-59
Mr. Messer	Todd Shipyard	8-5-59
Mr. Devine	Maryland Ship Building and Dry Dock	8-5-59
Mr. Williams	Esso Standard Oil	8-5-59
Mr. Keuitz	U.S. Merchant Marine Academy	8-5-59

E. T. Grosz with
By [Signature]

Manager -
Special Separation Processing
and Auxiliaries Operation

CT Groszwith:HWM:mh

CHEMICAL PROCESSING DEPARTMENT
FINISHED PRODUCTS OPERATION
MONTHLY REPORT

AUGUST 1959

I RESPONSIBILITY

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

II ACHIEVEMENTS

A. Processing Operation

Production of unfabricated plutonium reached a new record high during August, with output being 2.5% greater than that in any previous month in the history of the button line. The forecast (HW-61036) was exceeded by 27%, and the monthly schedule (HW-61385) was exceeded by 4%. Shipping schedules for this material as stated in Document CXXX-1700 were met. Production from Recuplex (Recovery) was 115% of schedule (HW-61385). Shipping schedules for uranium oxide powder were met with production being 111% and 95% of forecast (HW-61036) for normal and enriched uranium respectively. A total of 777,383 pounds of 100% nitric acid was sent to Purex from the 224-U recovery facility.

The supply of feed for the unfabricated plutonium production equipment was good both in quality and quantity during August, permitting nearly full-time operation of the processing equipment. All incoming feed is now being loaded into the new 6-C hood. This new system permits the unloading of nine cans of feed at a time, making a significant improvement in feed uniformity for the continuous strike in hood 9-A.

The Recuplex (Recovery) facility performed very satisfactorily during the month. This good performance together with only normal receipts resulted in a 40% reduction in the active backlog of currently recoverable material, the backlog now being lower than it has been in the past several years.

The Uranium Reduction Operation continued to operate routinely with few troubles other than routine maintenance problems.

B. Fabrication Operation

Production requirements for 65 model assemblies, as outlined in the forecast (HW-61036) and in the monthly schedule (HW-61385) were exceeded by 1.3%. Delivery requirements, as outlined in Document CXXX-1700, were satisfied. In addition, 17.5% of the September delivery requirements were shipped in August.

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HW-61736 DEL

B. Fabrication Operation (Cont'd)

The fabrication of parts progressed satisfactorily during August. The overall reject rate was improved by approximately 15%. This improvement was due mainly to better performance in the melting operation which resulted in higher quality machining stock.

Early in the month, essentially all melting for ball castings was done in the Task IV resistance furnaces. During the latter half of the month, the work load was shifted to the Prototype 3-Station induction heat furnace. This move was made in order to gain additional experience in the operation of this equipment which had proved to be successful on a test basis. During the last few weeks of testing with experimental melts, 100% of the castings produced were of high quality and suitable for machining.

Cold testing, using stand-in material, was conducted during the month in the program of preparation for the fabrication of the newer design of weapon parts. Most of the work done this month was conducted on the machine purchased especially for this purpose and installed on the top floor of the building.

C. Maintenance Operation

Operation of the equipment used in plutonium metal preparation was satisfactory during the month. Maintenance was of a routine nature, the only unusual difficulties involved the fluorinator off-gas system. The Recuplex (Recovery) Operation performed more satisfactorily this month than in the several previous months. Valves remain the major repair item in this facility. Maintenance of the machining equipment was routine during the month.

Uranium Reduction plant equipment operated very satisfactorily again this month with no major troubles on the calciners. The plugging of feed points continues as a problem, but improved during August. Other equipment in the plant operated satisfactorily with only normal maintenance being required.

D. Control Operation

One hundred and forty-eight plutonium buttons were analyzed spectrochemically and accepted with an average impurity content of 1317 ppm including carbon. Average purity for the 6506 and 6507 parts was 99.87%. The gaging acceptance on these parts was respectively, a marked improvement for the 6506 parts. There have been no specification waivers reported by Dow for parts shipped in July and through mid-August.

The work load in the Analytical Laboratory increased sharply with the return of the plant to higher production. The 8,242 analyses made during the month represented an approximate 30% increase over the average for the past year. It is significant to note that the quality control on the chemical assay of fabricated parts has been good enough to allow a cutback from six to three analyses on each sample, and at the same time meet the statistical specification.

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D. Control Operation (Cont'd)

There were eight radiation occurrences, twenty-two cases of skin contamination, two cases of clothing contamination and three positive nasal smear results experienced by the employees of the Finished Products Operation. Three minor injuries which occurred during the month were of a serious nature due to associated contamination. In two of the cases, it was necessary to excise the wound to reduce the potential body burden of plutonium to satisfactory limits.

The control of radioactive stack emission was good in both Z and U plants during the month, there being an average of 12.4 microcuries per day and 9.5 microcuries per day discharged respectively.

E. 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.

F. Events Influencing Cost

Nothing significant to report.

G. Plant Development and Expansion

1. Projects - Study, Scoping or Approval Phase

The following projects are included in this phase of the Finished Products capital expenditure program.

a. Project CGC-734, Revision 2, RMC Button Line

This project proposal revision provides supplementary radiation shielding and other improvements in radiation protection in the RMC Button Line area.

b. Project CGC-811, Phase II, Additional Fabrication Equipment

This has been forwarded for Commission approval.

c. Project action is being scoped to provide a button line capable of processing fuels with exposures from 1000 to 10,000 MWD/T. Priority of other work is delaying this scope presentation.

G. Plant Development and Expansion (Cont'd)2. Projects - Construction

Construction funds have been made available for the following projects. The work being conducted on the various projects is classed as detail design, procurement or installation.

CG-734, RMC Button Line
CGC-800, Reduction of Radiation Exposure, RMA Line
CGC-811, Phase I, Additional Fabrication Equipment
CG-789, Additional Fire Protection, 234-5
CG-723, Conversion of Recuplex to a Manufacturing Facility
CG-767, Miscellaneous Improvements, UO₃
CGC-843, Disposal of UO₃ Condensates
CGC-813, Pu Recovery from Contaminated Waste
CGC-826, Phase II, Vacuum System Improvements

The installation of high level radiation detection devices is complete at the 234-5 Building and the UO₃ plant. The funds are available from Appropriation Request, AR-59-CPD-32. Additional alarms or sirens are to be installed and funded from the original appropriation.

3. Projects - Completed

There were no capital expenditure projects completed during the period.

III ORGANIZATION & PERSONNELA. Organization Changes

R. E. Slater, Analyst, Radiation, Control Operation, was transferred to a similar position in the Irradiation Processing Operation, 100-K Area.

B. Safety Experience

There were no disabling injuries or near serious accidents experienced in the Finished Products Operation during the month. Eight medical treatment injuries occurred, the same number as in July. Three of these injuries involved puncture wounds incurred in the processing hoods, and as a result have led to a thorough review of hood practices and procedures.

C. Radiation Experience

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

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D. Security Experience

One security violation, the first in over a year and a half, occurred when a Process Specialist allowed his note book, which contained file combinations, to remain unattended on his desk.

E. Personnel Activities

Arrangements have been completed for a series of scientific lectures on equipment related to both the analytical and radiation monitoring fields. This series which is for CPD exempt personnel, was conceived and planned by L. M. Knights, Manager, Control, Finished Products Operation, with ideas and help from the Redox and Purex Managers, Control.

W. A. Rice, Radiation Monitor, Control Operation, Finished Products Operation, showed an AEC information motion picture to the Prosser Junior Chamber of Commerce.

W. N. Mobley, Manager, Finished Products Operation, visited the Union Carbide Nuclear Company, Paducah, Kentucky, for the purpose of discussing Hanford uranium oxide processing. He also visited E. I. duPont, Savannah River Plant, Aiken, South Carolina, to discuss plutonium processing and recovery, and uranium reduction.

WN Mobley
Manager - Finished Products

WN Mobley:JPT:jjh

CHEMICAL PROCESSING DEPARTMENT
POWER AND GENERAL MAINTENANCE OPERATION

AUGUST 1959

I. RESPONSIBILITY

There were no significant changes in the responsibilities assigned the Power and General Maintenance Operation during the period covered by this report.

II. ACHIEVEMENT

A. Operating Continuity

Steam, water and emergency electrical services were supplied the prime production facilities in a manner sufficient to sustain continuity of operation for the entire month.

B. Inspection, Maintenance and Replacement

Fabrication of the Purex HS Pulse Column has been completed, with exception of the sieve plate cartridge. Delivery of the stainless steel sieve plates is scheduled for October 5, and assembly of the cartridge will be completed within one week of receipt of the plates at the job site.

Partially complete at month's end were two tube bundles for the concentrators at the Purex Facility. Upon completion, they will be placed in standby status to augment the current spare parts supply, which on August 31 totaled three.

An electrical off-gas heater of new design was fabricated for the Redox Facility. The unit differs from existing models in that it is designed for wall mounting. It was placed in standby status to await the imminent failure of an in-service unit.

Satisfactory progress is being made on the fabrication of an absorber tower for the Redox Facility. At month's end, the unit was an estimated 35 per cent complete.

Installation of an electric hoist over the X-19 filters at the Uranium Oxide Facility and flood lights in the Metal Storage Area (203-U) was completed under Project CG-767.

Four plexiglass panels, housing the SE and Tub Hoods of the Recuplex Facility, were replaced with new panels to enhance visibility of the operation performed within the hoods. The work proceeded under rigid contamination control procedures, and was completed without incident.

Two air lock hoods, complete with conveyors, are being fabricated for the Finished Products Operation under Projects CG-745 and CG-811. The units are designed to transport production components from the main RMC conveyor line to hoods which are to be operated under inert atmospheres. Shop fabrication and assembly is 40 per cent complete at this time.

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Extensive modification work is currently in progress on the prototypal high-vacuum casting furnace which was installed for the Finished Products Operation during May of 1959. The modifications are necessary to prepare the unit for production operation, and include revisions to the manual conveyors, the hydraulic turn table, the ventilation systems, and the induction heating system.

Fabrication and installation of a 26" vacuum system for the Analytical and Developmental Laboratories at the 234-5 Facility is in progress under authorization of Project CG-826. Estimated completion was 35 per cent at month's end, with total completion scheduled for October 19.

All work agreements between the Power and General Maintenance Operation and the Hanford Laboratories Operation concerning a Whitney Weapons program have been completed.

Fabrication of all component parts for Hanford Laboratories Operation's Electron Beam Furnace has been completed, and assembly is in progress at the 231-Z Facility. Mid-September is the target date for final completion.

The Nuclear Excursion Alarm System, installed in the 231-Z Facility in May, was extended to provide a siren in Room 7, duct level area. Need for the additional siren was established during audibility tests.

Extensive repairs were necessary to the contaminated sewer line, extending from the 200 West laundry (2724-W Building) to the 221-U retention basin. Restrictions in the line necessitated considerable excavation and subsequent removal of portions of the existing line. New vitrified pipe was installed as required to rehabilitate the line.

The program of replacing defective steam line support poles continued during the month. Ten partially decomposed wood poles in 200 East Area were replaced with steel posts set in concrete.

Special emphasis was placed on a program for improving 200 Area walkways, parking compounds, lawns, etc., the results of which reflect substantial improvements.

Successful negotiations with Security and Patrol Operation resulted in No. 814 Gate in the 200 East Area being reactivated and opened to vehicle traffic on the day shift, effective August 31. This action was initiated by the Power and General Maintenance Operation to satisfy the need for a more direct route between the 200 East and 200 West Areas. No. 814 Gate is located in a direct line between the two areas. A small frame structure was withdrawn from the excess yards, renovated and placed at the gate site to serve as a Patrol Sentry House, and will be known henceforth as Building No. TC-62.

No. 5 boiler in the 284-E Power House was given a third-party (Travelers Insurance Co.) inspection, and was observed to be in a good state of repair. This completes the third-party inspection of steam generating units in the 200 Areas for the calendar year 1959.

Daily inspections of the raw water export lines have been made since August 17, when seismoscopes at all 100 Area reactors registered a high sensitivity alarm,

establishing an earthquake with an intensity of at least 2 (scale 1-12). Arrangements have been made for Power shift supervisors to receive notification of future earth tremors, in order that water lines may be immediately inspected.

P&GM Ventilation Balancing personnel continued to render assistance to the Irradiation Processing Department in rebalancing ventilation systems in the 105 and 115-F Buildings, and to Hanford Laboratories Operation in rebalancing the 108-F Building ventilation system.

Contaminated platinum, in the amount of 4,462.65 grams, and contaminated gold, in the amount of 637.38 grams, were shipped offsite for reclaiming, thus reducing the Chemical Processing Department's precious metals inventory to 28,748.9386 grams of platinum and 2,589.7872 grams of gold.

Flowed under to diminish ground contamination was an area comprising approximately fifty acres lying east of the Redox Plant. The areas affected included the stack, propane storage and roadways along the perimeter fence. Fallout from the Redox stack was the principal contributing factor.

III. ORGANIZATION AND PERSONNEL

A. Personnel Activities

W. W. Wahl attended a seminar on "Principles of Real Estate Management," held in Denver, Colorado, August 17 through 22.

B. Safety and Security

The Operation experienced no disabling injuries during the period covered by this report.

There were nine medical treatment cases reported in August, which reflects a frequency rate of 2.14 per cent.

No security violations were incurred.

 Manager-Power and
 General Maintenance

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CHEMICAL PROCESSING DEPARTMENT
FINANCIAL OPERATION

AUGUST, 1959

I. RESPONSIBILITY

There was no change in the responsibilities assigned to the Financial Operation during the month.

II. ACHIEVEMENT

A. Production Cost

Advance notices were sent out to section managers advising that the schedule for midyear budget submissions should be received from Contract Accounting in a few weeks. The notice was sent out with the thought that sufficient time would be allowed for proper planning of the submission. Approximately 22 individual alterations to the Revised FY 1960 Budget have been received and the majority given effect to in our reports. Overall end function and total costs remain the same.

Work was completed in September on the breakdown of the FY 1960 Target Budget by quarters, months, sections and subsections, taking into account seasonal costs, salary escalation, production estimates and known material input timing. This measure should make monthly comparisons with target more valid as a progress measurement. A department review on equipment requirements was conducted in connection with (1) determining whether any surplus funds would be available for the proposed Purex Fission Products installation, and (2) whether the financial plan equipment reduction proposed by the HAPO General Manager could be accommodated without jeopardizing continuity of operations.

A study of CPD operating costs involved under New Production Reactor "power only" conditions in 1972 was completed. This study was made at the request of the Federal Power Commission and information generated will be integrated with that from other HAPO departments for a single submission. Close liaison was maintained with Research and Engineering and Production personnel in the study.

A study presenting costs on five alternative methods of increasing CPD plutonium reclamation capacity was completed. This study was undertaken in cooperation with Finished Products, Redox, Production, and Facilities Engineering. The study and the document now being issued by Facilities Engineering resulted from a request by Mr. E. J. Bloch during the recent visit he made to the Recuplex facility.

An instruction letter was prepared and distributed to all CPD exempt personnel covering use of new HAPO-wide general ledger charge codes on source documents effective September 1. These codes replace the subsidiary 6000 series cost codes used in the past to accumulate charges for Equipment and Construction Work in Progress, Essential Materials,

Special Requests and Backcharges, and Accrued Costs-Closed Projects. Changes in Fabrication Work in Progress coding also were covered in the letter.

A study of the monthly variances in indirect manufacturing expense was prepared for the Shops Subsection of Power and General Maintenance. The study illustrates the effect on IME of paid vacations and holidays not worked. Payments for these items appear as part of the IME, rather than as direct and applied labor.

The purchase order has been received on a Special Request for a critical incident alarm system by the Los Alamos Scientific Laboratory of the University of California. The item in question was available for shipment on receipt of the purchase order.

We have been advised that, effective October 1, Stores overheads, previously carried as additive to Stores material costs or in IME, will be distributed as an overhead directly to end functions. It is anticipated that this method of distribution will increase HAPO production and Research and Development costs in FY 1960 by approximately \$200,000.

B. Personnel Accounting

Under FICA Tax Law there is a stipulation which classifies payment for sick leave as not subject to the Social Security Tax; however, under the terms of the General Electric Pension Plan it is classified as money subject to pension deductions. Because of these opposing positions many inquiries are received from employees wondering why Social Security year-to-date gross earnings are in excess of \$4,800. Questions on this subject are particularly heavy at this time of the year because so many employees on the payroll are reaching a \$5,000 year-to-date total.

Five educational loans have been approved by the General Manager for CPD employees. Four of the loans are for dependent children and one is for an employee. All of these should be disbursed within the next 30 days.

C. General Accounting

The following construction projects were unitized:

CA-764	Test Wells 216-BC Crib Area	\$ 83 896
CA-750	Office Annex to 234-5 Development Laboratories	56 469
CA-783	Additional Fire Protection - 222-S	21 096
CA-773	Interim Waste Crib - Purex	<u>117 648</u>
		<u>\$279 109</u>

These projects were transferred to CPD plant accounts by the Commission in June, 1959.

Work necessary to implement the new material and package pass procedure, which will go into effect October 1, 1959, included determining who would

require one day passes and the number of these passes needed, obtaining requests for extended passes, and arrangements to collect all obsolete passes immediately after September 30, 1959.

Depreciation forecasts were provided for the cost study of Plutonium Reclamation Alternates. This involved providing forecasts for five alternate plans, which included new construction as well as the use of portions of existing facilities.

During August one project was authorized by the AEC -- CGC-872, Palm-olive Fabrication and Reprocessing Facilities, 200-E Area, for \$70,000 to cover Design, Title I services and related management.

A Physical Completion Notice was received on Project CG-686, In-Line Monitoring Instruments - Redox and Purex. Final Cost Closing Accruals were established for Projects CG-725, Liquid Waste Handling Facilities, UO₃ Plant, and CG-745, RMC Fabrication Line, 234-5 Building.

One Appropriation Request for \$7,551 was approved in August. This was for a refrigeration unit for the Purex Laboratory.

A detailed analysis of all travel incurred by CPD from September 1, 1956, through June 30, 1959, was prepared and submitted. Also, an analysis was made of travel applicable to the control budgets for Professional and Trade Society Meetings and Attendance at Off-Site Courses and Seminars for the same period.

CPD section managers were furnished detailed analysis of all travel applicable to their component's budget for FY 1957. Analysis of FY 1958-59 was previously submitted.

The FY 1960 control budget for Attendance at Meetings of Professional and Trade Societies and Attendance at Off-Site Courses and Seminars was allocated to the section managers by the General Manager on August 19.

D. Auditing

Field work was completed in connection with an audit of materials furnished Mowat Brothers Construction Company under the terms of Contract AT(45-1)-1402, Project 719 - Additional Facilities for Purex Tank Farm Vapor Wastes. Materials furnished the contractor were in strict accord with provisions of the contract; however, it appears at this time that materials purchased over and above project requirements are excessive, and a minor piece of equipment could not be accounted for by J. A. Jones Construction Company. This shortage was referred to the Manager - Finance, CE&U, and a credit was received.

At the request of Facilities Engineering an analysis was made of Plant Improvement Projects for FY 1957 through FY 1959, and a forecast was made of estimated expenditures for FY 1960 through FY 1964.

E. Measurements and Procedures

The CPD Measurements Report covering progress toward achievement of goals during the six months period ended June 30, 1959, was prepared and issued.

At the request of the Manager, General Stores and Excess Property and the Supervisor, Inventory Systems and Control, CPD's Procedures Analyst provided technical assistance as to the feasibility of purchasing a Friden Flexowriter and Computyper. As a result of the knowledge gained at the recent Friden seminar in Rochester, New York, Mr. Burnside was able to provide the basic information so necessary to consider before making the decision to purchase the equipment.

The procedural work on first phase of the current Industrial Engineering work sampling program was completed. Excellent cooperation on the part of Data Processing personnel made possible the prompt tabulation of the statistics. A total of 12 reports were prepared for approximately 4,000 observations.

III. ORGANIZATION AND PERSONNEL

A. No medical treatment, disabling injuries, or security violations were experienced during the month.

B. Reports Issued

HW-61524	CPD Cost and Production Analysis for July	KG Grimm
HW-61525	Redox Cost and Production Analysis for July	FA Fieser
HW-61526	Purex Cost and Production Analysis for July	FA Fieser
HW-61527	Finished Products Cost and Production Analysis for July	FA Fieser

Manager - Finance

CHEMICAL PROCESSING DEPARTMENT
FACILITIES ENGINEERING OPERATION

August, 1959

I. RESPONSIBILITY

There was no change during the month of responsibility and accountability assigned to Facilities Engineering.

II. ACHIEVEMENTS

PUREX OPERATION

A. Research and Development

Fission Product Recovery

An engineering study of the fission product container and filter assembly was completed. This unit, proposed for shipment of crude rare earth fission products to ORNL, is a twelve-pointed, star-shaped filter element about 12 $\frac{1}{2}$ -inches in diameter by 36-inches long. The filter is enclosed by a $\frac{1}{4}$ -inch thick stainless steel cannister of the same configuration. Fission products will be collected in the $\frac{1}{2}$ -inch annulus between the filter element and the cannister. This geometry will maintain the powder temperature at or below 840° F during shipment.

Preliminary design of the lead shipping cask was virtually completed. This shipping cask, containing the integral filter element, cannister and lid described above, will be an air-cooled, externally-finned cask with 11-inch thick lead shielding walls. The cask is approximately 4-feet in diameter and 5-feet high and has a gross weight of nearly 20 tons. The exterior of the cask is finned with 2-inch by $\frac{1}{2}$ -inch fins on 2-inch centers. This extended surface will allow the dissipation of the required 46,000 BTU/hour decay heat with a surface temperature of 195° F above that of the ambient air. Inside the cask is a cylindrical well approximately 18-inches in diameter by 36-inches deep which contains the fission product cannister.

Mercury within the cask well serves to transmit the heat by conduction from the cannister to the cask walls. The design specifies the use of stainless steel clad carbon steel for the cask envelope. This feature provides an exterior surface of stainless steel which can be readily decontaminated while permitting an interior surface of carbon steel which is far superior for the lead bonding needed for acceptable heat transfer.

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An engineering study covering the Fission Product Loadout facility on the south side of the Purex Plant was completed. Current plans for the need of this facility rest primarily with the shipment of the crude rare earth fission product cut to the Fission Product Pilot Plant at ORNL. Another important use concerns the supply of LWW to the Hanford Laboratory Radio-Chemistry Program.

In-Line Pu Monitor, LEXP Stream

The design for a LEXP jumper-mounted installation of a neutron counter has been completed, and comment prints of the drawings are being circulated. An ionization chamber has also been included on the instrument jumper to obtain readings of gamma activity in the cell. Additional development work was done on the neutron counter amplifier to provide more amplification, permitting the use of some existing count-rate-meters and resulting in lower prototype equipment costs. The amplifier circuitry is all transistorized.

B. Process Technology

Concentrator Titanium Tube Bundle

The review of vendor proposals on a titanium reboiler on Purex concentrators was completed. The bent tube design proposed by the Griscom Russell Company offered considerable promise, and additional correspondence was conducted with them to clarify several points prior to preparation of revised specifications needed for a design and fabricate contract. The Griscom-Russell design featured an internally shrouded bent tube bundle with a floating tube sheet at the bottom and a single condensate return line. Process solution would flow on the shell side between the tubes and the tube bundle shroud, with service steam on the tube side. The improved thermal conductivity and corrosion resistant properties of the titanium permitted a substantial reduction in heat transfer surface. Detailed designs and cost estimates must be completed before a complete economic analysis of the use of titanium can be made. Investigation was continued of methods to increase service life of the unit and to make a more economical application of titanium. Two specifications, one dealing with function (HW-61877), and one with fabrication (HWS-6151), were revised for submittal to the vendor of the replacement reboiler unit.

XAW Alpha Monitor

Assistance was given in setting up the in-line alpha monitor on the XAW stream. The concentration on this stream is very high compared to that for normal usage of this type of instrument. Operation at a gram per liter or more is feasible, however.

Waste Carton Monitor

Preliminary development and design work was started on a neutron counter to provide an indication of the amount of plutonium in waste cartons. Waste from the PR and N cell hoods is of particular concern to the Purex Operation, particularly for accountability control.

Teflon Lining for Piping through Concrete

Investigation was made of the availability and cost of thin-wall Teflon tubing for use in lining steam pipes through concrete in the Purex Plant. Two 23-foot lengths of special tubing are being ordered for shop and plant testing.

C. Plant Engineering

Canyon Ventilation

Design work is essentially complete on the relief damper installation for the Purex canyon. Gravity dampers will be installed to allow outside air to bleed into the canyon should the canyon air pressure reach a sufficiently negative value.

High-Level Cave Design

Design was initiated on a lead cave for high-level sample analyses for the Purex Laboratory Operation. Floor loading analysis indicated the cave should be located in the sample gallery, rather than in one of the laboratory rooms. Scope design of the cave structure, service piping, and appurtenances has been initiated.

In-Canyon Storage Rack

Design and drawings have been completed for an in-canyon pump and agitator storage rack. The rack has been designed to hold seven pumps or agitators to be installed in the hot pipe trench adjacent to "A" cell.

D. Project Activities

CG-850 - 216-A Crib Replacement

The bid package information was forwarded to the Commission August 14. At the present time the Commission is delaying sending out Invitations to Bid in order to combine this job into a single bid package with some work in the 100 areas. This will delay project CG-850 completion by approximately 1½ months.

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CGC-873 - Fission Product Loadout Facility

This project proposal (HW-61205) was transmitted to the AEC on August 27, 1959. It requested \$66,000 total project funds. A directive (HW-497) for interim funds in the amount of \$10,000 was received on August 31, 1959.

AR-60-CFD-5 - Fission Product Equipment Items

The subject appropriation request was prepared and approved on August 31, 1959. It provides \$87,500 (Equipment Budget) for 25 process jumpers and a shipping cask (including a filter) for preparation of crude cerium for ORNL. This request is directly related to CGC-873 above and the HLO proposal (HW-61540) for a 325 Building radio cerium recovery facility.

REDOX OPERATION

A. Research and Development

Pu Concentration Monitor, 2BP Stream

A neutron counter was placed in operation on the 3BP sample line. The detector is located in the sample box and is on the sample line in series with a gamma monitor. A calibration is being obtained over a period of time from laboratory analysis of samples. Enough points have been obtained to date to indicate the calibration, but additional ones are being taken for confirmation.

Pu Concentration Monitor, L-16 Tank

The monitor on the L-16 tank in the 233-S Building has continued to operate satisfactorily. The monitor has detected errors in the sampling laboratory analysis on several occasions.

B. Process Technology

Off-Gas Iodine Monitor

Evaluation of a transistorized single channel energy analyzer has continued in the instrument laboratory. Stability problems are being overcome, and plans are to set up for a field test.

Cell Equipment Viewing

The television camera was again lowered into H-Cell to view the attempt at removing the stuck jumper by means of a specially constructed hook. The jumper was successfully removed. Observations of the wall connector were made and no damage to the connector was found other than the two small dowels which are part of the jumper connector that were still in the wall connector.

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C. Plant Engineering

Dissolver Time Cycle

In this joint effort with OR&S and Redox Technology, a break-through was made by successfully fitting a Riccatti-Bernoulli differential equation to the time-specific gravity relationship. The importance of this achievement is the possibility of making reasonably accurate predictions of the reaction status in portions of the time cycle, from which there was previously no data available. This equation closely simulated actual observed conditions for first and second cuts of both downdraft and non-downdraft dissolvers. It will be used as an intermediate step in solving the relationships of the other numerous dissolver variables.

D. Project Activities

CGC-772 - Redox Multi-Purpose Dissolver

A review of the nuclear safety parameters of the Multi-Purpose Dissolver for the Redox Plant indicated that the cadmium layer on the neutron plug specified by the original process design will not be required. The concrete section of the plug must be installed, however, to prevent nuclear interaction between opposite sides of the annular section of the dissolver. A scope review was prepared to cover this change. The cost of the dissolver will be reduced by about \$2,500. This change eliminates a major design and fabrication problem.

Directive Modification No. 2 has been received authorizing the additional funds of \$235,000, making the total authorization \$265,000 - the estimated amount of this project.

Detail design is proceeding, and six drawings for the dissolver vessel have been issued for comment.

FINISHED PRODUCTS OPERATION

A. Research and Development

Z Plant Radiation Study

Gamma radiation from Z Plant samples has been analyzed by emitted energies for attenuation through common shielding materials. This shielding data has now been extrapolated for NPR plutonium, and the following conclusions have been drawn.

1. For NPR plutonium of relatively low fission product content, the cladding of steel equipment with $1\frac{1}{2}$ -inches of lead will reduce total gamma radiation at 4-inches to approximately 0.1 mr/hour.

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2. For all Z Plant plutonium compounds which are not high neutron sources, the zirconium content of the feed rather than the NPR plutonium higher isotope content governs the extent to which gamma radiation can be reduced.
3. For all of the Task III powders studied, the 1.27 mev gamma, presumably from Na_{22} formed through the alpha-neutron reaction, governs rather than the 0.75 mev gamma of zirconium. This higher energy can increase the dose rate for Task III powders by a factor of three over that produced by the maximum zirconium content as presently accepted.

Interim Z Plant Radiation Study Report No. 5, now being issued with these new findings, recommends: (1) greater accent on zirconium as such for control specification in separations plant product; and (2) early elimination of high alpha-n products in the Z Plant process for gamma as well as neutron reduction.

Final Inspection Neutron Counter

The mechanical drawings (Project CGC-811) of the hood and chamber for neutron counting have been reviewed, and the additional information required for the electrical drawings has been prepared. Drafting has started on the instrument arrangement. The pre-amplifier development work is in progress, with a laboratory prototype being assembled for test.

Neutron Counter for Energy Analysis

The shop work is nearly complete on an assembly of instrumentation for neutron energy analysis by the double moderator method of counting. This is an interim instrument assembly, for which all major components were borrowed for a limited time in order to permit test work to start at an early date. Initial tests of the equipment are being made in the laboratory of the HLO Radiological Physics Operation.

Chemical Processing and Reduction

The review of the present vibrating tube and further study of the proposed vibrating tube reactor have shown the need for a new approach to this piece of process equipment. Two conceptual designs have been evolved, utilizing a magnetically-driven screw to convey and expose the powder to the reacting gas. No insurmountable problems are foreseen; and plans are being made to advance the approach, perhaps to the stage of building and testing a prototype.

Drawings on the critically-safe centrifuge have been received from the vendor for review prior to start of fabrication. In general, the design appears quite promising.

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The powder recycle system being developed by HLO was demonstrated during the month, and very encouraging results were obtained. The system was capable of transferring several grades of powder mixed in with $\frac{1}{4}$ -inch steel balls. Further work will continue toward correcting some minor "bugs" associated with the powder discharging chamber. It appears that the system will handle almost any grade of powder as long as it is dry; however, the present opinion is that a moist powder or use of a moist gas would lead to plugging difficulties.

Scope and preliminary engineering work was started during the month on a Palmolive Fabrication Facility to be installed in the 276-C Building. This effort is being planned and organized in order to transmit to the Commission a Title I package by October 1, 1959.

Weapons

Five additional drawings on the prototype dry atmosphere hood were completed, approved and issued during the month, and this completes the engineering work and drawings for the PD&D portion of the job.

Leak rate tests were continued during the month with the prototype glove box. The first phase of these tests was completed and final reports are being prepared. A general conclusion has been reached that the standard hood construction methods now employed will be satisfactory for the dry atmosphere hood.

B. Process Technology

Radiation Level Recording

Installation work is continuing in the 234-5 Building to provide several instrument cable connections from Zone 2 to Zone 3 for flexibility of radiation level recording. Assistance was given HLO Instrument Research & Development in making measurements in the 234-5 Building in Room 233 with a 200-channel gamma energy analyzer. Additional measurements are planned later in Zone 3.

RMC Button Line

Cold testing of Hood HC-11 and HC-18BS was completed. Design revisions made during the month included the following: (1) crucible holder in Hood HC-12S; (2) lowering the speed of the HC-1 conveyor; and (3) eliminating noise interference on the HC-15 count rate meter instrument. A recently-recognized problem not yet resolved is the excessive speed of the motors actuating the conveyor-hood sweep arms; it is planned to try reducing the speed by voltage reduction.

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C. Plant EngineeringLaboratory By-pass Header

Design work was completed on the laboratory by-pass headers for the 26-inch vacuum system in CG-826 and construction is in progress. Design has been initiated on the new vacuum lines to 291-Z Building and the filter modifications.

D. Project ActivitiesCG-723 - Conversion of Recuplex to a Manufacturing Facility

Field work is estimated to be 92 percent complete. The remaining work consists of completing testing and installation of the T-H3 disengaging section and installation of one line for the H-1 scrub addition.

CG-734 - RMC Button Line - 234-5 Building

Project proposal, Rev. 2 was given final Department approval on August 31. All sections of the water shielding barrier and shielding glass have been installed. Sixty percent of the transparent panels in Hood 9-B have been changed out. Cold testing and correction of minor functional problems are underway on all the hoods and equipment.

CG-767 - Miscellaneous Improvements - UO₃ Plant

Work in "G" cell by plant forces was started August 31. This work consists of electrical, piping, and other preparatory work to installation of the equipment. The load out conveyor arrived on site August 25. Two active orders remain which cover a batch weighing system.

CG-789 - Additional Fire Protection - 234-5 Building

The information for bid package for the sprinkler system part of this job was transmitted to the AEC August 25.

CGC-800 - Reduction of Personnel Exposure, RMA Line - 234-5 Building

All sections of the water shielding barrier have been shipped by the vendor, and installation of the viewing window glass and fitting of barrier sections in place is in progress by the CPFF contractor forces. Installation of this work is expected to be complete by September 18.

CGC-811 - Additional Plutonium Fabrication Facilities, 234-5 Building

Procurement has started, and nine firm orders have been placed in the total amount of \$420,000. There are 14 open requisitions for hoods and auxiliary equipment.

CG-812 - Equipment Decontamination Facility

The steel building was essentially completed, and is now being finished by lathing, plastering, and painting. All embedded conduit is satisfactory, and all piping has been repaired after testing. Paving was begun around the building and on its approaches.

CGC-830 - Plant Modifications for Reprocessing Non-Production Reactor Fuels

Revision 2 of this project proposal was prepared and is routing for approvals. It requests interim authorization of \$70,000 for procurement of the special centrifuge. Cost estimates, project schedules, and work methods are being prepared for Revision 3.

The contract for performance of engineering services by the Vitro Engineering Company for a portion of the NPF Project (everything in and adjacent to the 221-U Building) was signed and executed August 18, 1959.

GENERAL ACTIVITIES

A. Research and Development

NPR Reprocessing

Definitive criteria on cannisters required for charging NPR fuel to the Redox Multi-Purpose Dissolver were forwarded to IPD to permit continued integration of NPR fuel handling requirements. IPD is currently scoping the NPR fuel handling equipment including the slug basin and crane and the transfer casks and well cars.

Preliminary scope drawings of the NPR casks and well cars, prepared by IPD, were reviewed by interested CPD personnel and comments were forwarded to IPD. The CPD nuclear safety review of the cask indicated that experimental verification was needed to assure the nuclear safety of the design.

Palmolive

A joint engineering study was completed by Research and Engineering and Facilities Engineering personnel to review the bases for Project CGC-821, Palm Recovery - Purex, and to integrate Project CGC-821 with the proposed Palmolive facility. The results of this study were presented in HW-61697, "Re-Evaluation of Palm Recovery Project CGC-821 and Integration with the Proposed Palmolive Facility, Project CGC-872", S. J. Beard, R. J. Pence, and W. H. Swift, August 28, 1959.

The conclusions reached during the study were: (1) the present campaign-type recovery scheme for crude Palm at Purex is adequate for the current

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Palmolive program requirements, and new in-canyon Palm recovery facilities for the Purex Plant cannot be justified at this time; (2) a capital expenditure of \$260,000 would be required on Project CGC-821 to provide minimum Palm purification facilities in the Purex Plant, if Palmolive facilities are not installed at Hanford; and (3) if Palmolive facilities are installed at Hanford as proposed on Project CGC-872, the crude Palm recovered at the Purex Plant can be purified in Palmolive ion exchange equipment with no increase in the Project CGC-872 cost, and no capital expenditure would be required on Project CGC-821 to provide Palm purification facilities at the Purex Plant. Thus, installation of Palmolive facilities at Hanford as proposed on Project CGC-872 would permit a cost saving of at least \$260,000 on Project CGC-821.

Concurrent with the Palm Recovery - Palmolive study discussed above, Title I work has been progressing on the proposed Palmolive facility. A task force has been organized from Facilities Engineering, Research and Engineering, engineering and drafting personnel to complete the Title I work on the Palmolive facilities, Project CGC-872, and provide the local Commission with the final report by October 1.

Critical Incident Alarm

Several additional extension sirens are being installed beyond the original scope of the work to provide greater audible coverage. The installations are being reviewed for conformance with requirements.

A criticality instrumentation meeting was attended at which all major AEC sites reviewed their criticality instrumentation methods for information purposes. The CPD instrument installation was described.

B. Project Activities

Project cost information as of August 16, 1959:

Total Authorized funds - 18 active Projects	\$ 8,362,000
Total Cost-To-Date	3,476,000
Commitments and Open Work Releases	211,000
Unencumbered Balance	4,675,000
Costs charged to above active Projects 7-19-59 to 8-16-59	139,315

Projects dropped from Active status during this period were:

<u>Project Number</u>	<u>Authorized Funds</u>	<u>Total Cost</u>
CG-725	\$ 34,400	\$ 33,361
CG-745	1,050,000	939,488

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CGC-872 - Palmolive Reprocessing & Fabrication - 200 East Area

Directive HW-496, dated August 27, 1959 has been received. It authorizes \$70,000 for General Electric to perform Title I and related management services for the subject project. The proposal requested total project funds in the amount of \$1,800,000.

III. ORGANIZATION AND PERSONNEL

A. Personnel

C. Wesley Smith, Chemical Engineering Graduate on rotation, reported to Extraction Design and Development on August 14, 1959, for rotational assignment.

J. R. LaRiviere, Project Engineering, has been temporarily assigned to a task force Palmolive group starting August 31, 1959.

S. J. Beard and C. R. Cooley of HLO are temporarily working on the Palmolive task force starting August 31, 1959.

B. Safety and Security

The regular meetings for discussion of safety, security, and health topics were conducted. There was one security violation during the month.

C. Invention Reports - None

D. Reports Issued

HW-61510, "Project CGC-830 Plant Modifications for Reprocessing Non-Production Reactor Fuels, Design Criteria for Fuel Element Storage Facility, Building 221-U", M. E. Yates, August 17, 1959.

HW-61557, "Reprocessing of Power Fuels - Trip Report July 1959", W. A. Graf, et al, August 13, 1959.

HW-61697, "Re-Evaluation of Palm Recovery Project CGC-821 and Integration with the Proposed Palmolive Facility, Project CGC-872", S. J. Beard, R. J. Pence and W. H. Swift, August 28, 1959.

HW-60118, "Engineering Study - Interim Fission Product Recovery Facilities", J. M. Gerhart, August 21, 1959.

HW-61088, Project Proposal (CGC-872) "Palmolive Fabrication & Reprocessing Facilities - 200 East Area", dated August 17, 1959, by L. W. Finch.

HW-61148, "Cost Model of Steam Generation in the 200 Areas", by A. C. Morgenthaler, dated June 15, 1959.

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HW-61548, "Process Material Handling", by P. J. Norderhus, dated August 26.

HW-61392, "Plutonium Reclamation Facility (Data Sheet)", dated August 4, 1959.

HW-61205, "Project Proposal (CGC-873) - Fission Product Loadout Facility - Purex", dated August 26, 1959, by L. W. Finch.

HW-61468, Letter, W. K. MacCready to J. E. Travis, dated August 10, 1959, "Plutonium Reclamation Facility".

HWS-5586, "Specification for Reroofing Building 272-E, 200-East Area", by D. A. Snyder, dated August 14, 1959.

PEAR - Project CGC-872, dated August 17, 1959.

AR-60-CPD-5 - "Fission Product Equipment Items", dated August 31, 1959, by L. W. Finch.

Letter, H. P. Shaw to Section Managers, "Tentative Schedule of Project Proposals", dated August 21, 1959.

"CPD Forecast of Equipment and PA&C Project Work", dated August 3, 1959, by L. W. Finch.

"Construction Progress Schedule, CGC-826, Rev. 1, Vacuum System Improvements - 234-5", issued August 4, 1959.

"Design Progress Schedule, CGC-826, Rev. 1, Vacuum System Improvements - 234-5", issued August 4, 1959.

Letter, H. P. Shaw to J. S. McMahon, "Integration of NPR Fuel Handling Requirements", August 10, 1959.

Letter, E. R. Westberg to L. L. Zahn, "Adequacy of Existing Hot Semi-Works Facilities for Handling Irradiated Palmolive Target Elements", August 14.

Letter, J. B. Fecht to C. E. Kent, "Approved Scope for Project CGC-830, Plant Modifications for Reprocessing Non-Production Reactor Fuels, Design Criteria for Building 213-U Cask Transfer Facility", August 17, 1959.

Letter, L. L. Zahn to R. F. Jimenez, "Comments on NPR Cask and Cask-Car Drawings", Drawings SK-2-3364 and 65, August 20, 1959.

Letter, E. R. Westberg to R. A. Kennedy, "Mechanical Cell Water Treatment", August 21, 1959.

Trips

H. W. Stivers visited Mr. G. G. Goble in Seattle on August 18 to discuss strain gauges for concrete structures.

Visitors

Mr. J. M. Smith, Specialist - Lighting of General Electric Properties, Nela Park, Cleveland, Ohio, visited CPD August 10, 1959, to discuss special lighting problems.

Dr. Frank Neumann, Seismologist Consultant, visited HAPO on August 13 and 14, in connection with Consultant Agreement CA-204.

Manager
Facilities Engineering

HP Shaw: WWC:al

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CHEMICAL PROCESSING DEPARTMENT
RESEARCH AND ENGINEERING OPERATION

AUGUST, 1959

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PUREX PROCESS TECHNOLOGY -

Head End

An eleven percent reduction in the coating removal caustic consumption was effected by a change in the procedure which transferred the waste coating removal solution into the underground storage tank prior to the addition of the rinse water; thus, the need was eliminated for adding extra caustic so as to maintain five percent excess caustic in the resultant rinse-coating removal solution mixture while it was still in the building.

Removal of mercuric nitrate from the Head End vessels while processing 102 - 110 day "cooled" uranium increased the over-all iodine emission from 0.2 to 0.5 curies per day. The increase was wholly attributed to increased iodine release from the vessel vent system.

In addition to being processed unclarified, the dissolver solution is now processed directly as it comes from the dissolver without acid or uranium adjustment. This latest flowsheet adjustment was made to permit a larger 3WB flow which, in turn, lowered the nitric acid concentration in the 3WB Concentrator bottoms from 9.0 to 7.6 M and thus reduced the severity of corrosion in the concentrator.

Solvent Extraction

During the report period, mechanical performance of the Purex Plant equipment was excellent, and 100 percent of the month was spent in normal irradiated uranium processing. Typical performance data from the operating period are summarized below:

<u>Cycle</u>	<u>Log Decontamination Factor, dF*</u>		<u>Instantaneous Loss, Percent</u>	<u>Recycle, Percent</u>	
	<u>Plutonium</u>	<u>Uranium</u>	<u>Plutonium</u>	<u>Plutonium</u>	<u>Uranium</u>
First	4.3	3.9	0.05	-	-
Final	3.3	2.8	-	1.2	9.9
Ion Exchange	> 0.7	-	-	2.5	-
Overall	> 8.3	6.7	0.05	3.7	9.9

* Because of increased reactor power levels and slightly higher uranium concentration, the dF factors are based on an HAF gamma activity of 3.8×10^8 rather than the previous 2.5×10^8 micro-curies per gallon.

August plutonium decontamination performance was excellent, and all but one batch met gamma activity specifications (3.5×10^{-11} G/AT) with 75 percent

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of the batches analyzing less than 2×10^{-11} g/AT. The majority of batches which exceeded this value were formed by blending previously processed off-standard material with current production in order to avoid rework of marginal product.

Uranium decontamination failed to equal that for plutonium in that the gamma ratio of the final uranium product ranged from 5.5 to 1.9 with the majority being 2.5 - 4.5 (specification ≤ 2.0 gamma ratio). Although the 2D Column decontamination factor was from 500 to 700, the persistently high 2DF gamma activity (1500 - 2000 gamma ratio) prevented production of specification product. As in the past, minor flowsheet changes provided little improvement, but a ten cycle per minute decrease in the HA Column frequency (from 74 to 64 cycles per minute), coupled with lowering the interface level to purge contaminants from the column, provided improved decontamination performance. These operating changes, plus gradual purging of gamma activity from the system through continued operation, brought the final uranium product gamma ratio down to less than two by month end. However, the production of specification product was short lived when the gamma ratio again displayed an upward trend.

Waste loss performance was also excellent during the month. Despite the sensitivity of the plutonium loss to the HAW acidity and attempts to operate the HA Column at high uranium saturation for maximum decontamination, a new low value for the overall plutonium waste loss was established at Although a new minimum uranium loss was not established, the overall loss was 0.06 percent.

Other items of interest to solvent-extraction included:

- (a) The flowsheet change of processing unadjusted dissolver solution as HAF appeared to have no effect on process performance because proper adjustments were made in the 3WB flow and composition to maintain the same previous flowsheet conditions in the HA Column.
- (b) The Final Uranium Cycle was successfully operated at $CF = 3.2$ for fifteen days in order to reprocess stored out-of-specification uranium.
- (c) The sulfamic acid addition to the 2BX stream was terminated with no adverse process effects noted.
- (d) A correlation between rework of properly hydrolized waste and improved decontamination performance has been noted. Further testing for confirmation of this effect is currently planned.
- (e) The addition of Permacol, a filming amine which reduces rust in the steam and condensate lines, was restarted after being eliminated for about one month. No correlation between the presence of Permacol in the steam and the quality of the UO_3 powder was detected.

Neptunium Recovery

Neptunium recovery in the HA Column was erratic during the month. After two-thirds of the neptunium inventory was lost, minor adjustments were made in

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the following: (a) the HAW acidity (increased), (b) the HA Column uranium saturation (decreased), and (c) the amount of sodium nitrite in the IOO (decreased by 45 percent to 5×10^{-4} M). Although no greatly pronounced beneficial effects resulted from these changes, the neptunium recovery slowly returned to normal. Two batches of IWW were successfully reworked for neptunium recovery. Following cessation of the IWW rework, extensive neptunium refluxing was noted in the HA Column, although no refluxing was noted prior to the start of rework operation. As yet, no reason for the starting or stopping of the HA Column refluxing has been detected. Periods of high HAW neptunium loss correspond with periods of refluxing in the HA and HS Columns.

At first a 24 percent decrease in the 2DS flow produced no noticeable increase in the 2DU neptunium losses but did increase the 2DU plutonium content. The latter effect was counteracted by a three-fold increase in the 2DF ferrous sulfamate addition. As the plant neptunium inventory increased, the 2DU neptunium loss increased beyond acceptable limits, and the normal 2DS flow was restored which, in turn, permitted reduction of the 2DF ferrous sulfamate to flowsheet.

Plutonium Concentration

Smooth operation of the Plutonium Ion Exchange unit was experienced for the major portion of the month. Normal plutonium recycle losses ranged from one to three percent. Installation of a continuous monitor on the XAW stream now assists in rapid detection of high XAW plutonium content. Decontamination factors measured during plutonium throughput rates equivalent to CF = 6 were greater than five.

Solvent Treatment

Gamma activity of the No. 1 System solvent remained about 2000 to 3000 $\mu\text{c/gal.}$ for the major portion of the month but dropped to 1200 to 1500 $\mu\text{c/gal.}$ near month end. All samples analyzed for plutonium retention indicated excellent solvent quality. Failure of the bottom interface control float hampered smooth operation of the IO Column; and consequently, the organic centrifuge was restarted to guard against aqueous carryover from the IO Column into the turbo-mixer. To reduce further aqueous carryover, the nitric acid concentration of the IOS was increased from 0.036 to 0.072 M.

The quality of the No. 2 System solvent remained excellent with a gamma activity ranging from 30 to 100 $\mu\text{c/gal.}$

Waste Treatment

Operation of the Waste Treatment and Acid Recovery equipment has been excellent with no process nor equipment difficulties arising. When the dilution water addition was decreased from 220 to 192 flows during a test, the IWW flow increased from about 4 to 6.9 flows; however, increasing the operating specific gravity of the concentrator to 1.35 reduced the flow to near the normal flowsheet value of 5. Waste sent to the underground storage tanks averaged 45, 439, and 50 gallons per ton of uranium for neutralized IWW, solvent washes, and cell drainage, respectively. A new low overall plutonium waste loss of was established during the month while the uranium loss was 0.06

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percent. Plutonium and uranium coating waste losses counted for 37 and 57 percent of the overall losses, respectively.

Self-concentration commenced in TK-241-A-104 to which IWW additions were started on July 10, 1959, and at month end the boil-off rate was 2.6 gallons per minute. Self-concentration continues uneventfully in TKs 241-A-101, 102, and 103 at boil-off rates of 1.8, 17.5, and 1.0 gallons per minute, respectively.

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REDOX TECHNOLOGY OPERATION -Dissolving

For approximately one-sixth of the month's production, 60 percent nitric acid was used instead of the 48.5 percent acid reclaimed from the dissolver off-gases. This reduced the over-all dissolver time cycle per charge approximately 30 percent, corresponding closely to the previously estimated effect of acid concentration on the rate of uranium dissolving.

During the month, six special charges of enriched uranium fuel elements of standard HAPO design were dissolved. The initial enrichment levels ranged from 1.44 to 1.74 percent U-235, and charge sizes, well under the critical mass control limits provided by the nuclear safety engineer of the Advanced Process Development Operation, ranged from a minimum of about 200 pounds to 800 pounds. Each charge was individually and completely dissolved, with special care being taken to insure against tampering by an inadvertent charge of E-metal. Once in solution, these special batches were blended and processed with standard Redox production feed solutions.

The possible use of ferric nitrate as an additive to the nitric acid is being considered as a means of increasing the metal dissolving rate. Laboratory work so far has been in the low acid concentration range but it indicates that ferric nitrate should significantly shorten present dissolver time cycles. Additional data are presently being awaited with the hope that plant tests can be made in the next six to eight weeks.

Increasing particulate contamination of the environs was noted in the region of the gaseous-effluent stack until a water flush was made of the dissolver vent lines. These lines, re-routed approximately four years ago to avoid the formation of ammonium nitrate in the air tunnel to the stack, had never been flushed and were suspected of having internal accumulations of solid ammonium nitrate contaminated with fission products. This was largely confirmed when the flush solution was found to contain approximately 20 pounds of ammonium nitrate compared with an average of about one pound removed from the stack itself during the routine weekly flushes. No environs contamination has been detected since the completion of the line flushes.

Solvent Extraction

More frequent plant startups and shutdowns have resulted from the adoption of reduced production schedules and five-day-week operation. This and the attendant chemical costs spread over a smaller number of units of production, have helped to increase the chemical costs per unit of production. In the continuing effort to reduce costs, new startup and shutdown procedures were provided to Operations by Redox Technology Operation in June, 1959. These shutdown and startup procedures provide savings which are realized only when the plutonium and uranium inventory is not processed out before shutdown. Most of the week-end shutdowns are

made without depleting the inventory. It is estimated that \$500 - \$310 for chemicals and \$190 for waste storage - is saved for each shutdown and start-up. The new method has also generally provided the added benefits of both improved fission product decontamination and product recoveries on startup.

A prototype 3BP in-line neutron monitor was installed in July and was in the process of calibration at month-end. It is hoped that this instrument along with the 3BP in-line gamma monitor will provide information to permit better control of the quality and quantity of the plutonium product. This combination of instruments is expected to be particularly valuable following the installation of the prototype plutonium ozonator early in September.

The plutonium recycle tank neutron monitor recently indicated that the critical mass control limit (45 percent of the minimum critical mass) had been exceeded by about 20 percent when the transfer data on the material being put into the tank indicated that it would not be exceeded. Subsequent sampling and analysis of the tank contents confirmed the monitor reading, thus adding to the slowly increasing confidence in the instrument's utility and reliability.

Two unusual cases of product contamination occurred during the month. After a week-end shutdown, the 2AF on startup was found to be severely contaminated with uranium as were the 3AF and 3BP. Recycling the contaminated plutonium through the partition cycle successfully cleaned the uranium from the product, but exhaustive analyses of operational procedures, logs, instrument charts, flowsheets, etc., failed to uncover any clues whatsoever to the source of or reason for the contamination. The second incident happened the following week-end when the gamma ratio of the last uranium product batch of the week increased by a factor of nearly 500 over that of the preceding batch. Subsequent batches reflected only contamination that could be accounted for by heels from the high batch. Gamma scan analysis of the highly contaminated uranium showed only zirconium-niobium present. Silica gel treatment of this contaminated uranium gave an arithmetic gamma decontamination factor of 30, and an analysis of the residual fission product contamination indicated that only cesium-137 remained. Cesium is not normally found at this point in the process, and up-stream process samples taken immediately before the highly contaminated product was discovered showed that the principal fission product contaminant in the feed to the final uranium cycle was ruthenium (greater than 95 percent) as usual. From this it is concluded that the contaminant did not reach the final product through the normal process channels. There was absolutely no evidence of pressurization in the system, no overflow of column interface, and no logical explanation of the phenomenon. Investigation is continuing.

In the report for July, 1959, it was pointed out that a special flowsheet had been developed and used to process concentrated salt waste through the extraction system since January, 1959. At current low production rates this can be done concurrently with normal feed processing and without production delays by the use of the two parallel HA Columns, one for metal solution and the other for waste solutions. With this arrangement it has been possible to

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rework almost any waste; thus it has also been possible to keep the over-all average product losses, on a percentage basis, at the same low level as in CY-1958 despite the increased instantaneous losses resulting from the five-day week start-ups and the increased loss-to-feed ratio resulting from the drastically reduced production load. In the course of maintaining a constant percentage product loss, the absolute loss of both uranium and plutonium products has been significantly reduced. It is hoped that an analysis of the actual data can be made available in the near future.

Plutonium Concentration

A new all-time low for the Redox plant of 10,000 parts of iron per million parts of plutonium in the concentrated plutonium product was attained this month. When batch concentration was instituted in March, 1959, the stream flow to the L-2 Stripper was increased to the point where some plutonium concentration was being achieved in this vessel. This steam flow was recently returned to normal to prevent concentration and the attendant corrosion of stainless steel in L-2. With all concentration thus being accomplished in the new titanium-tantalum L-3 concentrator loop installed last month, further reduction is anticipated in the amount of metallic impurity in the final plutonium product.

Waste Storage

In order to reduce the volume of dilute, non-boiling neutralized salt waste presently in Redox underground storage, and thereby increase the ultimate capacity of the present tank system, it is planned to divert Redox waste from the currently receiving tank (whose contents are boiling) before the hydrostatic head limit is reached. The heat in this tank will then be used to concentrate the dilute non-boiling waste pumped in from other tanks.

It is scheduled to divert waste from the currently receiving tank, 111-SX, to the 115-SX tank in November, 1959. At that time there will be sufficient heat content and reserve capacity in the 111-SX tank to receive and concentrate by a factor of two, 330,000 gallons from the 112-SX tank over the period of the subsequent 12 months.

At present there are 2,400,000 gallons of dilute, non-boiling waste in the 103-SX, 109-SX, and 112-SX tanks. Based upon current conditions and production rates, the above plan can be extended to permit this dilute waste to be concentrated by a factor of at least two over the period of the next four years.

FINISHED PRODUCTS TECHNOLOGY - R. E. SmithURANIUM CONVERSION OPERATIONProcess Performance

All UO_3 shipped met product specifications.

One thousand thirty six (1036) pounds of nitric acid per ton of uranium processed (98.3% of theoretical) were recovered at an average concentration of 47%. Twenty-four (24) carloads of acid, averaging 47.5%, were shipped to Purex.

The average operating rate of the calciners was 6.7 tons uranium per unit for each day on the line. The overall calciner operating efficiency was 98.1%.

Process Improvement

A new sulfuric acid addition pump, with a capacity of about one-third the previous pump, was installed in the normal uranium service. Limited experience indicates closer control of the sulphur content of the UO_3 at all production rates than was possible with the previous pump.

An intermittent sampler was installed in the condensate (C-5) pump-out line in order to obtain more accurate measurements of the low level uranium values sent to the crib.

The third phase of the K calciner programmed operation study was installed during the first week of the month. Furnace power control, in addition to steam and air purging of the feed lines, is incorporated in this unit. Several start-ups and shut-downs were made to test various furnace control features. Operation of the unit was very satisfactory. Start-up feed flow control will be possible when magnetic flowmeters are installed.

The wye diverter valve, installed last month at the inlet to the cyclone, failed by erosion after fourteen operating days. Mechanical performance was very satisfactory. A Hanford fabricated valve has been in operation two weeks with continuing satisfactory performance.

METAL FINISHING OPERATIONRecuplex

Sixty nine (69) runs, consisting of crucibles, fragments, powders, and clean-outs, were processed through the S & C Hood. Slurry losses to the crib averaged 0.12% of the recovered plutonium.

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The slag and crucible charge per run was increased from eight to ten crucibles during the latter portion of the month. The flowsheet was previously tried during the latter part of 1957, but was discontinued due to coincident flooding conditions in solvent extraction. An improved solvent extraction flowsheet, using Mistron as an emulsion prevention agent (initiated in October, 1958), has thus far handled the increased solids at no loss in rates and with no flooding.

The SE Hood processed 1640 liters per day at 90% operating efficiency, for an average instantaneous rate of 1910 liters per day. Waste losses to the crib averaged 0.0033 g/l (0.20% of the feed plutonium).

Semi-continuous contacting of the organic with an aqueous wash (0.5 M ferrous ammonium sulfate, 0.1 M sulfamic acid, 1.0 M nitric, 0.5 M sulfuric) has improved solvent extraction performance. The sulfuric acid accelerates the decomposition of the Pu-DBP complex and results in a recycled organic containing effective free DBP. Extraction coefficients at the dilute end of the extraction column have increased from about 20 - 100 to 100 - 400 with a resultant two-fold improvement in waste losses. The sulfuric acid addition to the semi-continuous organic wash has also resulted in a reduction in the need for batch carbonate washing of the organic from an average of 9 to 3 times per week.

Task I - II

Two hundred sixty three (263) runs were processed with an average filtrate recycle of 2.67%.

Operation of the continuous unit was generally good except for one start-up when an extremely poor strike and wet cake prevailed. Approximately 40% of the filtrate recycle for the month was generated during the above instance. A physical clean-out of the precipitator vessel was necessary before normal processing could be resumed. Prior to the incident, the unit ran for two weeks with an average filtrate recycle of 0.94%.

Task III

Reduction yields averaged 98.7% for the month. Four buttons were rejected due to low density. The impurity content of accepted buttons averaged 1250 ppm by spectrographic determination.

PROCESS CHEMISTRY -NEPTUNIUM PROCESSINGNeptunium Purification

Six hundred seventy grams of neptunium from Union Carbide Nuclear Company, Paducah, Kentucky, were processed in the anion exchange facility during the month. As a test of the feasibility of an intermittent schedule, the processing operation was restricted to a single shift per day. No significant difficulty was encountered, although shutting down during the plutonium wash made subsequent plutonium removal more difficult. For future runs, it is recommended that the column, after being loaded, not be allowed to stand except between the reducing plutonium wash and the HF wash, or between the HF displacement wash and the elution step.

As the plutonium, thorium, and uranium contents of the feed were low $[(Pu + Th + U)/Np = 0.47]$, a resin loading of 54 g Np/l of resin (compared with the standard loading of 27 g/l of resin) was tried. The measured loss of neptunium to waste was only 0.15 per cent, proving that higher resin loading capacities may be successfully used when the total plutonium, thorium, and uranium contamination is low.

ANALYTICAL ASSISTANCEAlpha Counting of Liquid Samples

At the request of the Redox Technology Sub-Section, efforts to develop a rapid alpha counting method for liquid samples were renewed. A high-speed, alpha-scintillation counting system using a filter paper source saturated with the sample is currently being tested for use on Redox 3BP (E-3) samples. The method consists of mounting the liquid sample on a 3/4 inch diameter piece of thick filter paper contained on a stainless steel counting dish, placing the dish under the detector, and counting for one minute. Sample manipulation and counting time for a single analysis totals about two or three minutes.

Initial results using this system have been quite erratic due to sample evaporation from the filter paper. If this effect can be reduced, it is expected that the method will have a standard deviation of about $\pm 10\%$.

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234-5 DEVELOPMENT

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Direct Calcination of Plutonium Nitrate

Direct calcination of plutonium nitrate to the oxide is being scouted as a possible replacement for the Task I process. This consideration is possible because ion exchange product purity now approaches that required for buttons.

Samples of Purex plutonium nitrate were processed through the continuous agitated bed set-up. The oxide bed remained a fine powder, as contrasted with the coarse granular material obtained when using a laboratory prepared stock solution. Measurements of bed temperature show that calcination is occurring at around 225 C, rather than 300 - 350 C which was estimated earlier.

Spectrographic analyses were made of oxides calcined batchwise and continuously in a stainless steel beaker. The results, while ambiguous, do indicate considerable contamination from the batch process but almost none from the continuous method.

Continuous Task I

The effect of elevating the strike temperature to 50 C was studied in three runs.

In the first run the plutonium nitrate was simultaneously reduced and precipitated at 50 C. The cake was excellent from the start to end of the run. The second and third runs used prereduced feed. The second run employed a room temperature strike and the third run a 50 C strike. Samples of slurry were taken from both runs and the particle size distributions were determined by the sedimentation method. The distribution in the higher temperature run was shifted appreciably toward the larger sizes. No effect was observed on purity or losses, which were extremely low.

Continuous Chlorination

The demonstration chlorinator was operated at rates up to 320 g Pu per hour. Higher rates have been prevented by scrubber and off-gas filter problems. Redesign of the filter housing is expected to provide relief.

Laboratory analyses of sixteen samples from the demonstration chlorinator indicate that the average conversion corresponds to the formula $\text{PuCl}_{2.9}$. Impurity pickup from the Hastelloy B reactor has not been excessive. Molybdenum evidently is volatilized and is not seen. Nickel appears in the order of 500 ppm, a tolerable level.

Continuous Task III

Two additional tests of the electrodeposition apparatus were made. One resulted in a significant yield of metal.

The first test, performed in an alumina cell, terminated when a pinhole leak developed in the vent tube, allowing the cell contents to drain. A total of 16 grams of metal was produced, representing 12 percent efficiency. The metal analyzed high in aluminum and was low in density. Thus recrystallized alumina will not be a suitable cell material.

The second test was performed in a zirconia cell. A short developed between the electrodes causing overheating above the cell, leading to gasket failure and termination of the run.

Critical Mass Fuel Preparation

Pressed plutonium oxide - plastic cylinders are being examined for stability upon storage. The cylinders are in a sealed container equipped with pressure gauge. The gas involved is assumed to be hydrogen.

After 14 days the atomic ratio (H/Pu) in the plutonium oxide - polyethylene test cylinders has been reduced by 1.0 percent, while the plutonium oxide methyl methacrylate cylinders showed a 0.47 percent reduction. No dimensional changes are yet apparent. Thus corrections for atomic ratio changes may be required during critical mass experiments if the cylinders are retained for more than a few days.

Ceramic Development

Work was completed on the RS-201 reduction liners for Product Design and Development. Four liners were fabricated and problems of firing were solved.

Thermal shock tests were carried out on two calcium fluoride crucibles, one slip cast by the Hanford procedure and the other supplied by Rocky Flats Plant from a coarse mix slip. The crucible made with the coarse fraction showed greatly improved thermal shock resistance, surviving a shock from 1100 C, whereas the crucible prepared from the standard mix failed when shocked from 700 C.

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ORGANIZATION AND PERSONNEL

Personnel

Effective August 24, 1959 L. A. Bray transferred to Chemical Research and Development Operation, Hanford Laboratories from the Process Chemistry Operation.

Trips

M. J. Szulinski visited C. A. Powell of the Union Carbide Nuclear Co., Paducah, Kentucky on August 3 and 4, 1959 to discuss Hanford UO₃ processing.

M. J. Szulinski visited J. J. Urban of the E. I. du Pont, Savannah River Plant, Aiken, South Carolina on August 5 and 6, 1959 to discuss plutonium, UO₃, and ion exchange technology.

H. E. York visited R. J. Dorr of the General Electric Company, Detroit, Michigan on August 24 and 25, 1959 for a cutting tool consultation; porous chuck material and grinding equipment consultations.

H. E. York visited the Chrysler Corp., Detroit, Michigan on August 26, 1959 for a cutting tool consultation; porous chuck material and grinding equipment consultations.

H. E. York visited Alan Sweeney of the Devlieg Machine Co., Detroit, Michigan on August 27 and 28, 1959 for a cutting tool consultation; porous chuck material and grinding equipment consultations.

S. J. Beard visited W. W. T. Crane of The Martin Company, Baltimore, Maryland on August 18, 1959 to discuss fission product applications.

S. J. Beard visited J. W. Morris and R. I. Martens of the E. I. du Pont, Savannah River Plant, Aiken, South Carolina on August 19, 1959 to discuss separations processes including Palmolive program.

S. J. Beard visited E. E. Lamb and F. L. Culler of the Oak Ridge National Laboratory, Oak Ridge, Tennessee on August 20 and 21, 1959 to discuss fission product recovery and NPF processing.

C. A. Colvin is on special assignment to the Idaho Operations Office, Atomic Energy Commission, Idaho Falls, Idaho from August 31, 1959 through September 11, 1959 to aid in analytical studies.

Visitors

K. Huntington and W. Burkhardt of National Lead of Ohio, Fernald Plant visited M. J. Szulinski, R. G. Geier and G. C. Oberg on August 17, 18 and 19, 1959 to discuss continuous calcination.

J. E. Burch of Pratt & Whitney, Hartford, Connecticut visited A. E. Smith, E. F. Kurtz, W. B. Weihermiller and R. E. Sharp on August 19 and 20, 1959 for a gage consultation and set-up.

C. S. Schlea and T. A. Colven of E. I. du Pont, Savannah River Laboratory, Aiken, South Carolina visited E. R. Irish, B. F. Judson and S.J. Beard on August 10 and August 12, 1959 to discuss separations processes.

Joe Humberstone and Albert Muller of Air Reduction Corp., New York; J. Don Rauth of The Martin Company, Baltimore, Maryland and Eugene Zuckert, Consultant visited V. R. Cooper, E. R. Irish and B. F. Judson on August 11 and 12, 1959 to discuss fission product recovery.

T. A. Prater of the General Electric Research Laboratory visited V. R. Cooper, H. H. Hopkins, Jr., R. C. Smith and R. S. Rosenfels on August 26, 1959 to discuss ceramic fabrication and development.

T. A. Colven of E. I. du Pont, Savannah River Laboratory, visited W. H. Swift and G. C. Oberg August 10 through August 12, 1959 to discuss fission product recovery.

C. S. Schlea of E. I. du Pont, Savannah River Laboratory, visited W. H. Swift and G. C. Oberg on August 12, 1959 to discuss fission product recovery.

E. Messer of Todd Shipyards Corp., R. T. Williams, Jr. of Esso, Standard Oil Company, M. W. Hirschowitz of U. S. Merchant Marine Academy and W. B. Devine of Maryland Shipbuilding & Drydock Company visited J. P. Duckworth on August 14, 1959 for orientation talk on separations processes.

V. Callahan of the Oak Ridge National Laboratory, Oak Ridge, Tennessee visited G. C. Oberg on August 19, 1959 to tour Purex plant.

Lt. J. F. Pearson, Lt. R. T. Herkner, Lt. T. J. Walters, Lt. J. H. Webber, Lt. R. B. Hayman, Lt. W. E. Campbell, Lt. Richmond Gardner and Lt. V. W. Panciera, all Naval Reactor Engineers visited J. P. Duckworth on August 26, 1959 to discuss Purex processes.

W. Birch and C. E. Guthrie of the Oak Ridge National Laboratory, Oak Ridge, Tennessee visited M. K. Harmon on August 5, 1959 to tour Redox plant and discuss separations processing technology.

Inventions - None

V. R. Cooper
Manager

Research and Engineering

RELATIONS PRACTICES OPERATION
MONTHLY REPORT - AUGUST 1959

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I. RESPONSIBILITY

There were no changes in responsibility during the month.

II. ACHIEVEMENT

A. Communication

Communication Workshop interviews with three Department supervisors were completed during the month. A report of the interviews conducted with section and sub-section managers was prepared and mailed to each participant.

A number of arrangements including a luncheon, refreshments breaks, and physical facilities were provided for the visits of the Military Liaison Committee, and for a group of executives from Air Reduction, and the Martin Company.

A GE News article during the month featured a Radiation Operation Supervisor.

B. Salary Administration

Revised Structural-Functional Organization Charts (July 1, 1959) for the Chemical Processing Department were issued.

Revised Position Relationship Data charts (August 1, 1959) for the Chemical Processing Department were issued.

Analysis of the Relations Operation's proposed Salary Administration Guide lines was made. Use of such data as a guide in developing Department salary action plans was recommended.

Meetings with other HAPO Department's Salary Administration were attended for the purpose of revaluating and reconciliation of selected exempt positions. Additional meetings are scheduled for completion of this work.

Revaluation and reconciliation resulted in an authorized change of level for one exempt position.

C. Wage and Benefits

Three secretarial jobs were reviewed with appropriate action taken.

A new clerical job in Finished Products Maintenance which is a combination of two previously existing jobs was evaluated and established.

One employee retired during the month.

Informational material and instructions for completion of the Savings and Security resolicitation effort were completed and distributed to Section components.

D. Personnel Placement

Excess personnel in the Millwright, Pipefitter, Instrument Technician, and Radiation Monitoring Journeyman classifications have been taken care of through placing in appropriate openings.

Forecasted requirements of Technical Graduates for permanent placement during fiscal year 1961 were received from each of the Sections in the Department. Based on these forecasts, it appears that Chemical Processing Department will place 14 Technical Graduates in the Department during fiscal year 1961. This appears to be an appropriate number, based on the average annual technical losses during the past three years.

The names of two Chemical Processing Department personnel were selected from the Manufacturing Inventory as candidates for specific positions in other Company components. Interviews were requested and to date, one of these persons has accepted an offer and will report to Manufacturing Services in Schenectady, New York, in a new assignment.

An offer was extended to an experienced chemist for a position in the Redox Analytical Control Laboratory. Since additional chemists will be required by the Redox Section over and above the chemists available on the Technical Graduate Program, it has been necessary to seek experienced candidates outside of the Company in order to satisfy needs in this area.

<u>EMPLOYMENT</u>	<u>EXEMPT</u>	<u>NONEXEMPT</u>	<u>TOTAL</u>
<u>Additions</u>	1	3	4
New Hires	0	0	0
Reactivates	0	0	0
Re-Hires	0	2	2
Re-Engages	0	0	0
Transfers from other Components	1	1	2
<u>Removals</u>	2	11	13
Retirement	0	0	0
Leave of Absence	0	1	1
Illness	0	0	0
Transfer to other components	1	9	10
Resigned	1	1	2
<u>Requisitions (Nonexempt)</u>			
Number on hand at beginning of month		10	
Number received during month		6	
Number filled		6	
Number on hand at close of month		10	

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Requests for Transfer (Exempt)

EXEMPT

Number on hand at beginning of month	5
Number received during month	0
Number transferred	0
Number closed out	0
Number on hand at close of month	5

Applications for Employment (Exempt)

Applications received during month	1
Hired	0
Closed out	0
Applications on hand at close of month	3
Open Requisitions	1

E. Health, Safety, and Radiation

An audit of the department's emergency evacuation procedure and disaster rescue training program was conducted. Revision of procedures was begun; recommendations were made to strengthen complement of trained manpower; rosters of current emergency stand-by personnel were developed; training needs and programs were reviewed with CE & UO Fire Protection Operation.

The Chemical Processing Department achieved its Sixth President's Safety Award on August 8, 1959. Consecutive injury free hours from the last Disabling Injury on February 7, 1958 totaled 4,200,000.

Services in support of the department's August Safety Program, The Yellow Flag, included procurement of visual aids, publicity, and integration of Program Council activities.

Chemical Processing Department	<u>August</u>	<u>July</u>	<u>Year to Date</u>
Disabling Injuries	0	0	0
Serious Accidents	0	0	3
Medical Treatment Injuries	30	29	299
Technical Overexposure Incidents	0	0	0
Radiation Occurrences	17	19	144
Contaminated Wounds	3		
Fires	0	2	5
Security Violations	2	2	15

Three contaminated wounds were sustained by two process operators in 234-5. Superficial injury to the hand resulted in each case while work was being performed through hood glove ports. In two of the incidents, the Industrial Physician excised a small amount of flesh to complete the decontamination procedure. Bioassay results on one case indicates internal plutonium deposition of approximately 5 per cent of the Maximum Permissible Limit. Estimates of the other two cases indicate negligible deposition.

III. ORGANIZATION AND PERSONNEL

The Specialist, Health, Safety and Radiation attended a two day Criticality Instrumentation meeting in the 300 Area, hosted by HLO. Eleven off-site contractors, and several AEC Operations offices were represented.

There were no medical treatment injuries in Relations Practices during August, and there were no security violations.

R. B. Britton
R. B. Britton, Manager
Relations Practices

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