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HW 59849-DEL

This document consists of
72 pages.

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
FOR

MARCH, 1959

HW--59849-Del.

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Compiled By
OPERATION MANAGERS

April 20, 1959

By Authority of CB-PR-2
Robert J. Stone 6/25/92
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HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON

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

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

MARCH, 1959

GENERAL SUMMARY

PRODUCTION

The production of plutonium from the separations plants during March was 119 per cent of the monthly commitment. The output of plutonium during the third quarter of fiscal year 1959 was 104 per cent of the Official Forecast.

Production of UO_3 was 110 per cent and 103 per cent, respectively, of the Official monthly and quarterly forecasts. Shipments of UO_3 conformed to the established shipping schedule.

The production of unfabricated plutonium metal product was 94 per cent and 108 per cent, respectively, of the monthly and quarterly Official Forecast. Shape production, as compared to the Official Forecast, was 103 per cent and 100 per cent, respectively, for March and the third quarter of fiscal year 1959.

ENGINEERING

A second attempt was made at Purex to recover zirconium-niobium by separating the solids from LWV and leaching them with oxalic acid. Preliminary data indicate that about one third of the available zirconium-niobium was recovered, contaminated with about one per cent of the cerium.

Palm losses to the Purex uranium product were virtually eliminated by operating the 2D column without acid addition to the scrub section. The plutonium content of uranium product was also reduced 5 to 10 fold, and decontamination was not affected.

Routing the dissolver rinses into the 3WB concentrator permitted an improved rinsing efficiency at Purex; uranium and plutonium losses to the coating waste were reduced 3 and 1.5 fold, respectively.

Unclassified feed was successfully processed through the Purex HA column for fifteen days with no adverse process effects observed.

In a test to determine the feasibility of using boron for increased nuclear safety in the Redox system, it was determined that boron was routed to the waste almost quantitatively. Boron introduced with the feed was not detectable in the product streams beyond the first cycle.

About 1000 grams of Palm were purified and converted to the oxide. The reduction of Palm VI with hydrazine or semi-carbazide was found to be too slow for use in an operating plant, but the addition of catalytic quantities of ferrous ion accelerated the reduction markedly.

A study of the coordination of E-metal and NPR reprocessing at Redox in a multi-purpose dissolver installation was completed. It was determined that, although the current design would be suitable for E-metal and normal metal, refinements for NPR reprocessing would be in order.

Preliminary designs, cost estimates and project schedules were obtained for an interim fission product recovery program at Purex. This program would be directed toward low-efficiency collection of Promethium-147 within Purex canyon equipment and shipment from HAPO. The total project cost was estimated to be \$100,000, of which \$30,000 represented Purex in-cell equipment and \$70,000 was the cost of the shipping cask, railroad car and auxiliaries.

The location for critical incident alarms in CPD facilities were selected. Thirty gamma detection instruments with integral audible alarms are to be installed and five spare instruments are to be provided under the current appropriation request.

A composite scope basis for the Hanford NPF Reprocessing Program, incorporating comments from all interested CPD and HLO personnel, was completed. This basis was issued to permit definitive scoping of these facilities to begin upon the availability of project funds expected this month.

Installation of equipment in the 200 Area Power Houses designed for use in treating process steam with a filming amine was completed.

GENERAL

The completed budget for FY 1961 and Revision for FY 1960 was reviewed by the CPD General Manager and accepted.

The HAMTC gave notice that it wished to proceed to arbitration immediately on the H. A. Burton case. This involves the installation of floor type push button controls on the 200-West Shop crane.

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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, Redox Operation C. T. Groswith
Manager, Finished Products Operation W. N. Mobley
Manager, Power & General Maintenance Operation T. G. LaFollette
Manager, Financial Operation K. G. Grimm
Manager, Facilities Engineering Operation H. P. Shaw
Manager, Research and Engineering Operation V. R. Cooper
Manager, Employee Relations Operation D. S. Roberts

CHEMICAL PROCESSING DEPARTMENT
NUMBER OF EMPLOYEES
MARCH 31, 1959

OPERATION	EXEMPT		OTHER		TOTAL	
	2-28-59	3-31-59	2-28-59	3-31-59	2-28-59	3-31-59
GENERAL MANAGER'S GROUP	10	10	1	1	11	11
PRODUCTION	6	6	3	3	9	9
PUREX	47	48	212	211	259	259
REDOX	50	50	221	220	271	270
FINISHED PRODUCTS	58	57	241	243	299	300
POWER & GENERAL MAINTENANCE	39	39	249	247	288	286
FINANCIAL	19	19	38	37	57	56
FACILITIES ENGINEERING	68	69	21	21	89	90
RESEARCH & ENGINEERING	61	61	24	24	85	85
EMPLOYEE RELATIONS	26	24	51	50	77	74
TOTAL	384	383	1061	1057	1445	1440

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CHEMICAL PROCESSING DEPARTMENTPATENT SUMMARY
FORMONTH OF MARCH, 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.

INVENTOR

NONE

TITLE

General Manager
Chemical Processing Department

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CHEMICAL PROCESSING DEPARTMENT
PRODUCTION OPERATION

MARCH, 1959

I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Production Statistics

1. Purex Operation

	<u>March</u>	<u>February</u>
Tons uranium processed	538.68	291.3
Average production rate during operation (T/D)	22.5	22.3
Total waste loss (%)		
Uranium	0.046	0.06
Plutonium	0.177	0.19
Average cooling time (days)	108	105
Minimum cooling time (days)	91	91
On-line efficiency (%)	81	46

2. Redox Operation

	<u>March</u>	<u>February</u>
Tons uranium processed	50.6	52.45
Average production rate during operation (T/D)	6.3	8.0
Total waste loss (%)		
Uranium	0.21	0.36
Plutonium	0.53	0.55
Average cooling time (days)	250	278
Minimum cooling time (days)	177	160
On-line efficiency (%)	35.7	40.1

3. 234-5 Operation

	<u>March</u>	<u>February</u>
Batches input to Task I	242	178
Runs completed through Task III	239	185
Batches through Product Recovery	64	47
Reduction yield (%)	98.8	98.5
Waste disposal (units)	395.75	687.66

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4. UO₃ Operation

	<u>March</u>	<u>February</u>	<u>To Date</u>
UO ₃ loaded (tons)	124.3-E	62.3-E	
	439.1	394.2	
UO ₃ approved for shipment (tons)	95.0-E	47.96-E	142.96-E
	454.1	399.37	32 156.20 *
UO ₃ shipped	95.37-E		95.37-E
	450.69	449.16	32 000.58 *
UNH backlog (tons)	43-E	111-E	
	248	191	

*Corrected figures

5. Power

	<u>200 East</u>	<u>200 West</u>
Raw water pumped (gpm)	9 778	3 313
Filtered water pumped (gpm)	936	886
Maximum steam generated (lbs./hr.)	243 000	135 000
Average steam generated (lbs./hr.)	198 547	94 609
Total steam generated (M lbs.)	147 719	70 389
Coal consumed, est. (tons)	9 179	4 580

6. Waste Storage

	<u>March</u>	<u>February</u>
Salt waste reserve storage capacity-Redox	3 777	3 827
Salt waste reserve storage capacity-Purex	32 882	33 407
Coating waste reserve storage capacity-Redox	30 812	30 862
Coating waste reserve storage capacity-Purex	45 483	46 008

E. Reports and Documents1. Prepared and Issued

HW-59442 RD	Redox Plant Production Schedule, March, 1959 D. McDonald
HW-59443 RD	Purex Plant Production Schedule, March, 1959 D. McDonald
HW-59444 RD	UO ₃ Plant Production Schedule, March, 1959 D. McDonald
HW-59445 RD	234-5 Plant Production Schedule, March, 1959 D. McDonald
HW-59553	Essential Materials Consumption-Purex, Chemical Processing Department for February, 1959, M. A. Thress

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HW-59779 Scheduled Shutdown, Purex Plant, J. H. Warren

HW-59598 Essential Material Area Report to Cost and Purchasing - Production Operation, Chemical Processing Department for February, 1959, M. A. Thress

HW-59586 Chemical Processing Department - Waste Status Summary for February, 1959, M. A. Thress

2. Prepared for Signature and Issuance

HW-59433 Production, February, 1959, W. E. Johnson

III. ORGANIZATION AND PERSONNEL

A. Safety

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

B. Security

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

Manager - Production

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CHEMICAL PROCESSING DEPARTMENT
PUREX OPERATION

March, 1959

I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Processing Experience

1. Production Statistics

a) Production - Percent of Monthly Commitment

Uranium	135 Percent
Plutonium	126 Percent

b) Production Rates

Processing rates during regular operation were maintained at a nominal 2.7 CF.

c) Operating Continuity

Uranium	81 Percent
Palm	7 Percent
Overall	88

d) Waste Losses

Uranium	0.05 Percent
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e) Uranium Re-treated Through Silica Gel 132 Tons

2. Normal Processing

Normal processing was started at 0530 on March 3, 1959 following completion of the Palm run, and was concluded at 1030 on March 28, 1959. The quarterly uranium commitment was exceeded by four percent. Twenty-five uranium batches which exceeded the 2.0 gamma ratio level were readily handled by blending or reprocessing through silica gel. The Palm recovery run was started at 0600 on March 30, 1959 and continued through month end. Based on the information obtained in the last experimental run a slightly modified flowsheet was utilized and results appear to be very satisfactory. Complete data on this operation is covered in the Research and Engineering Monthly Report.

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Waste losses are entirely satisfactory as evidenced by the

The iodine 131 discharge to the atmosphere increased to a nominal 0.8 curies per day and remained at this level until the plant shutdown. The increase in emission rate was attributed to the dissolver reactors and regenerations were scheduled in conjunction with planned shutdowns.

3. Special Processing

A plant test involving the by-passing of the head-end centrifuges was begun on March 10, 1959. No adverse effects have been noted during the relatively short test period to date.

The initial steps associated with Zr-Nb during the recovery run were completed without incident during the previous outage. Preliminary objectives were attained, including the determination of the bulk volume of IWW solids, selective leaching of specific fission products, and the clarification of IWW solution for an extended anion exchange recovery test.

Reworking the dissolver metal heel rinse water through the 3WB system was started during the month. This makes possible the elimination of a large portion of the coating waste loss, which previously comprised about 50 percent of the overall building waste loss. No adverse effects on the process were noted to date.

A special thiosulfate flush of the B-2 reactor was carried out during the shutdown in order to correct a high pressure drop condition. Regeneration is planned before startup.

4. Radiation Experience

The total iodine 131 emission for the month was 12 curies. The Purex weekly limit was not exceeded.

Three Radiation Occurrences were incurred during the month as compared to four in February and eight in January. Two occurrences were the result of failure to comply with Radiation Procedures and one resulted from loss of contamination control.

The A-6 crib again overflowed this month due to an excessive amount of cooling water added to the steam condensate header. The ground contamination which was entirely within the crib area was covered with dirt to reduce the radiation to an acceptable level. Water additions to the header are now controlled by an orifice as a means of preventing further crib overflows.

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C. Mechanical Experience

The failure and subsequent replacement of the H-4 right hand (east) concentrator tube bundle was the sixth during the fiscal year and the eighth since plant startup. This tube bundle was original equipment and its failure was expected since it has been in uranium service 30 months and acid service 9 months.

A 2½ inch Yarway-type steam trap was installed in the K-4 right hand position on March 30, 1959, replacing the original Armstrong compound-type trap assembly. The Yarway trap was installed for experimental operating tests in an attempt to overcome some of the long standing malfunction problems experienced with the compound trap assemblies.

The 1 HP agitator in the A-214 tank was modified by adding a lower graphitar guide bearing as a means of stabilizing the shaft and preventing vibration damage. Obsolete pump columns were readily adapted as bearing supports for the A-214 agitator, as well as for two other units which have given excellent service since their modification in 1958.

Piping tie-ins were installed between P-13-1 and two pump discharge headers and the No. 15 tank in the 203 area. This installation is designed primarily to permit recirculation of UO_3 acid to No. 15 tank when the pump delivery rates are below 3 gpm. Previous experience at reduced rates resulted in overheating of the pumps and frequent mechanical failures.

The failed tube bundle from the F-6 position has been decontaminated and inspected. Initial observations show generally widespread corrosion throughout the unit. Plans to attempt repair have been abandoned.

The feed pump for the 2A column (2AF) failed during startup of the plant on March 2 and required replacement.

Both the upper and lower loops of the N Cell ion exchange concentrator system were replaced after corrosion attack caused leaks in the upper loop. Although the lower loop, which has been in service only five months, was not leaking, inspection of the internal surfaces disclosed general corrosion of the system and severe attack in the heat-affected zones adjacent to welds. There was no evidence of corrosion in the titanium tube bundle of this system.

D. Analytical Performance

The analytical work load was heavier than normal due to neptunium recovery runs at the beginning and end of the month in addition to support for the fission product recovery study program. Novel methods were developed for counting high activity sources; namely, using #7 stairwell as the counting chamber and 14" 7" as the distance between the source and the detector. A method for analyzing Ce 144 was developed. New methods, using ion exchange and chromatography were undertaken.

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The laboratory gave special attention to all factors affecting plutonium accountability in the lab and overall building. Particular emphasis was devoted to recalibration of instruments, tighter control of standards, and a review of all procedures affecting accountability samples.

Procedures were instituted to return salvage product samples direct to F10 3WB instead of shipping to 234-5 Building. New procedures for analysis of samples of large volume waste streams have been instituted. The improved procedures lowered the detection level for plutonium and neptunium by a factor of 100.

E. Improvement Performance

1. Process Tests and Revisions

A new Palm recovery flowsheet was utilized. The flowsheet produced a high recovery efficiency and eliminates the use of the potentially corrosive chrome solution.

F. Inventions and Discoveries

Nothing to report.

G. Events Influencing Costs

Failure of the H-4 tube bundle and 2AF pump will result in increased maintenance costs during the month.

The laboratory reduced its force by one laboratorian.

A saving of about \$13,000 was realized through the reclamation of the J-4 pulser which failed in November 1958. Decontamination and repair work cost about \$5,000 versus \$18,000 replacement cost for a new unit.

III. ORGANIZATION AND PERSONNEL

A. Safety

There were no disabling or near-serious accidents during the month. Seven medical treatment injuries were reported.

The Safety Training Program for all Purex supervision was initiated and about a third have completed the course.

B. Security

There were no security violations in March.

C. Personnel

G. L. Gurwell transferred from Finished Products Operation on March 1, 1959 as Supervisor-Product and Material Handling.

G. Y. Jordy from the General Manager's Office, AEC, Washington, D.C. toured Purex on 3-24-59.

PRM-Murray
Manager-Purex

PR McMurray:EAF:gt

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CHEMICAL PROCESSING DEPARTMENT
REDOX OPERATION
MARCH, 1959

I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Processing Operation

1. Production Rates and Operating Continuity

E-Metal processing was conducted as scheduled for the month. The production commitment was exceeded by 1.2 percent while operating at 31 percent of the total hours scheduled for building operation. To make this production, however, it was necessary to continue the metal dissolution operation on a sustained basis, including weekends, when the building is normally scheduled for stand-by.

Processing rates for irradiated enriched uranium through the Redox Plant were reduced this month by new, lower batch size limits imposed for the dissolvers as a result of criticality tests carried out at Oak Ridge in a mock-up dissolver. At the present time, Redox dissolver batch sizes are about 60 percent of those previously used for E-Metal; however, it may be possible to increase this batch size to about 80 percent of the previous limit after the results of the Oak Ridge study have been more carefully evaluated. In the meantime the smaller batch sizes and the slower dissolution rates encountered with the enriched fuel elements will result in very tight production scheduling in order to meet commitments.

The gamma ratio on both product streams remained under good control throughout the month. No tail-end treatment or reworking of any kind was necessary. Waste losses for the month averaged 0.21 and 0.53 percent for uranium and plutonium respectively. During the latter part of the month, the precycle columns were utilized for processing two batches of D-9 waste solutions which had been collected from cell sumps and cell flushings.

The first three cars of UO_3 powder, processed at the UO_3 Plant from E-Metal UNH, were sold to the customer on waiver because of the sodium content which was slightly above shipping specifications. This impurity crept into the product largely because of past performance which had disclosed no problem in this area. Process flow sheets have since been revised and recent production has been well within specifications.

Batch concentration of the plutonium product stream was started in the 233-S Concentration Building on March 2, 1959, in an effort to

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improve the purity of the plutonium product from the Redox Plant. The low processing rates required for E-Metal and a corresponding increase in residence times, plus corrosion of the 304-L stainless plutonium concentrator, have materially increased the metallic impurities (iron, chromium and nickel) in the final product. The problem is aggravated by the more rigorous specifications for alpha plutonium being produced at Z Plant. Batch processing through the concentrator has reduced the metallic impurities, but procurement of a titanium replacement concentrator is being expedited for full resolution of the purity problem.

Iodine 131 emission to the 291-S stack remained under good control throughout the month. Total emission for the month was 0.06 curies.

B. Maintenance Operation

Considering the intermittent five-day week operation the canyon equipment operated very well during the month. No major cell equipment was replaced, although the C-2 dissolver, which was taken out of service during the latter part of December because of a leaking coil, was removed and shipped to the 221-T Canyon Building for storage and possible repair at a later date. A conventional type replacement dissolver is currently being fabricated and is scheduled to be completed by May 1, 1959.

Five canyon jumper installations were made during the month. One was a new jumper installed on Project CG-686, and four were replacements for failed equipment.

On March 27, 1958, a wheel bearing failed on the trolley of the left hand auxiliary hoist on the 60 Ton canyon crane. At month end replacement was in progress.

C. Waste Handling and Decontamination Operation

1. Waste Handling

Redox Coating Waste Received (S Farm)	10,993 gallons
Redox Salt Waste Received (SX Farm)	62,839 gallons
Total Gallons Boil-Off Salt Waste	137,788 gallons
Waste Received at TX (From 221-U)	12,000 gallons

2. Equipment Decontamination and Repair

a. Regulated Steam Pit

Nineteen vehicles, eight pieces of heavy equipment, and six miscellaneous items were decontaminated during the month. A total of 190 man-hours was charged to this operation.

b. Railroad Equipment

One hundred man-hours were charged to decontamination and operational coverage for repairs to equipment. Decontamination work included locomotives No. 19, 22, 25, 30 and 32; and well cars No. 38, 39, and 42.

One of the three casks was removed from each of the two Redox cask cars which have been designated for E-Metal handling. This was done to prevent the possibility of loading more than two buckets of slugs into the Redox dissolvers and thus exceeding the new, lower batch size limits which were put into effect this month.

c. 221-U Canyon

Decontamination of the Redox A-2 dissolver pot proceeded far enough to allow a relatively close inspection of this equipment. It was found that the failure of the heating - cooling coils of the dissolver pot occurred at point of contact between the coil and support during expansion and contraction of the coil under changing thermal conditions. Three other points of contact between the coil and support were found to be severely abraded. At month end plans were being made to remove and repair the coils and then to re-install with a new support, as designed by the Facilities Engineering Operation.

Decontamination of the failed heat exchanger tube bundle from the Purex F-6 acid concentrator was sufficient to allow photographing and close inspection. This unit obviously failed because of severe general corrosion and repair was considered impractical. The work on this piece of equipment and the dissolver pot noted above, illustrates very forcefully that quite often the value of information received from the inspection of failed, "hot" equipment far exceeds the value of the recovered equipment piece.

Repairs to the Redox F-2 concentrator pot were completed this month. A savings of approximately \$47,000, over the cost of a new unit, was realized.

The Purex F-7 pump, which was decontaminated and repaired during the latter part of February, was returned to the customer at a net savings of \$1,200 over the cost of a new unit.

Approximately 150 reactor pigtails were received from the Irradiation Processing Department this month for decontamination. The work was completed without incident and the units returned to the customer.

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d. 221 and 224-T Buildings

Decontamination work in F and G cells in the 224-T Building continued this month and the work is now approximately 95 percent complete.

Preliminary work at the 221-T Building was started this month in anticipation of the relocation of the Redox Waste Handling and Decontamination Operation from 221-U to 221-T. The work included: (1) Installation of a wooden dock at Section 20 for receiving material and equipment, (2) removal of overhead piping in the pipe gallery at Sections 19 and 20, preparatory to the installation of a change and shower room, and (3) the issuance of a work order for complete overhaul of the 75 Ton Canyon Crane.

e. Miscellaneous Activity

The coating waste pump, which is used periodically to pump waste from the 107-S to the 107-U Tank, failed this month. A new spare pump is now being assembled and will be installed during the early part of April.

Daily soundings and hydrostatic pressure readings were routinely taken in the active tanks of the SX-Tank Farm, for any indication of tank bottom buckling. No evidence of movement has been detected to date.

D. Analytical Control Operation

Twenty-four hour analytical control coverage was provided for the palm production run which was conducted by Research and Engineering personnel this month. Also special analyses for evaluation purposes were made during a test run to determine the behavior of boric acid in the extraction system of the Redox Plant. Other analytical work was confined primarily to routine operation.

E. Radiation Monitoring Operation

Five radiation occurrences were recorded during the month. Two of the occurrences involved personnel contamination, one was loss of contamination control within a radiation zone, one was personal clothing contamination and one was a dose rate exceeding 6 mr/hr. outside an established radiation zone. The two cases of personnel contamination were promptly and readily reduced to non-detectable.

Unplanned dose rates exceeding 6 mr/hr. outside of a radiation zone were detected when a dose rate of 5 r/hr. was detected coming through a line in the 202-S South Pipe Gallery. This occurred following a process transfer from the H-4 oxidation tank to the centrifuge feed tank. The line was subsequently flushed and the radiation level returned to normal. No personnel exposure was involved.

Decontamination work on the 202-S Building 60 Ton Canyon Crane, using the solvent spraying technique, continued this month. Follow-up surveys indicated some improvement in certain areas, however additional cleaning efforts will be needed. The west catwalk now averages approximately 1,000 mrad/hr. at six inches.

Repeated entries were made into the 202-S Canyon this month, via the SWP stairway, to work on decontamination of the Remote Maintenance Shop ceiling blocks. Dose rates on the blocks were reduced from a maximum of 12.5 rads/hr. to an average of 500 mrad/hr. This decontamination work is directed toward entry into and use of the Remote Maintenance Shop for equipment inspection and repair.

F. Improvement Experience

1. Process Tests and Revisions

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

2. Inventions or Discoveries

There were no inventions or discoveries of a patentable nature reported in the Redox Operation during March, 1959.

G. Events Influencing Costs

Spare parts reductions during the month amounted to \$2,700, primarily from parts in which usage reports indicate no activity over a three year period.

The new, smaller dissolver batch size for E-Metal processing, which was put into effect this month, can be expected to increase chemical costs, since the smaller batches generally require more chemicals pound for pound than the larger batches.

H. Plant Development and Expansion

1. Preparatory Engineering

Redox Column Carrier Facilities

It is anticipated that detailed design will have progressed far enough to procure components of the new carrier prior to the end of FY 1959 on money budgeted for this installation.

Redox Inert Gas System

The silica gel dryer has arrived on-plant and installation should be completed by May 20, 1959, on which date the replacement high-pressure receiver is scheduled to arrive on site. As this equipment is installed the complete system will be redesigned to permit more effective use of the after-coolers, oil filters and other component parts.

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Power Fuels Charging

One of the three eight foot, nine-inch long dummy fuel elements was charged into a decontaminated dissolver pot at the 221-U Building on March 24, 1959, simulating Redox Canyon charging conditions. The dummy fuel element failed to clear the top of the charging opening by two to six inches on numerous tries. This was due to the fact that the lower edge of the charging chute acted as a fulcrum, causing the bottom of the dummy fuel element to rest on the top of the elliptical bottom of the dissolver. Manual means were subsequently used to get the bottom of the fuel element against the slug fence which would permit replacing the dissolver lid. No additional tests are planned since the charging of the long fuel elements is not feasible for the Redox Plant Operation.

2. Design and Construction Liaison

CG-764 - Test Wells, 216-BC Crib Area

The contractor has completed drilling of the well and has suspended work pending delivery of the well screen.

CG-772 - "T" Metal Dissolvers, Redox

The project proposal revision No. 1, was returned to the General Electric Company on March 4, 1959 for rescoping. Production schedule changes, uncertainties in enrichment levels for new fuels, and recent criticality test data, have necessitated a project revision which will reflect these changes.

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

Beneficial use was obtained on March 13, 1959 and the project is complete with exceptions. A letter listing the exceptions has been transmitted to the contractor by the HOO-AEC.

CAC-812 - Equipment Decontamination Building - 2706-W

Work has been initiated by the AEC-CPFF construction contractor for renovation of utilities at T Plant to the points of tie-in by the contractor. The bid opening is scheduled for April 15, 1959, with a 120-day contract commencing May 1, 1959.

MA-10 - 113-SX Waste Tank Leak Detection

Construction activity was at a standstill during the month as negotiations by the AEC were in progress with the Midland Drilling Company to perform the perforating work in four of the five lateral pipe lines. Midland has procured the equipment and demonstrated their ability to perform the work.

AR-59-CPD-52 - High Level Radiation Alarms

The design verification model was completed and tested March 19, 1959, and demonstrated March 20, 1959. All locations for the instruments have been chosen and design of the electrical power supply for each station is nearing completion. Fabrication of the alarm instruments has begun and is scheduled for completion June 1, 1959. Installation will begin as instruments are completed.

I. Reports Issued

No secret reports were issued by Redox Operation personnel during the month of March, 1959.

III. ORGANIZATION AND PERSONNEL

A. Safety

There were no disabling injuries, serious accidents or incidents, in the Redox Operation during March 1959. Ten medical treatment injuries were reported during the month.

B. Security

There were no security violations in the Redox Operation during the month of March, 1959.

C. Personnel Activities

Dr. W. L. S. Wu, Convair Corporation, visited the Redox Plant on March 26, 1959 to observe the physical layout of a primary separations plant.

Dr. D. Pflaum, from the Washington AEC Office, visited the Redox Plant on March 24, 1959 to discuss problems of declassification.

C. T. Grosz
 Manager - Redox
 Chemical Processing Department

CT Grosz:HW:mh

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CHEMICAL PROCESSING DEPARTMENT
FINISHED PRODUCTS SECTION
MONTHLY REPORT

MARCH 1959

I RESPONSIBILITY

There were no changes during the month in the responsibility assigned to the Finished Products Section.

II ACHIEVEMENTS

A. Processing Subsection

Gross production of unfabricated plutonium was on schedule for the month of March. The Recuplex (recovery) facility achieved a record output during the month when scheduled production was exceeded by 25%. Scheduled production of uranium oxide was achieved without difficulty from both normal and enriched feed material. All shipping commitments were met without difficulty. 537,594 pounds of 100% nitric acid was delivered to Purex during the month from the recovery system at the Uranium Reduction plant.

There were few operational or mechanical difficulties during March affecting the preparation of plutonium metal. Outages at Purex affected feed receipts at the start of the month, resulting in a delayed startup, forcing high operational rates later.

The Recuplex operation achieved an all-time record during March when 94 Kgs of plutonium were recovered from 59 slag and crucible runs plus metal dissolver solution and material from supernate recycle out of Hood 9A. The extraction columns operated at 82.4% efficiency at 1700 liters/day average rate.

A special shipment of 3 Kgs of high purity plutonium nitrate was prepared in the Recuplex facility for shipment to the Canadian Atomic Energy Commission at Chalk River, Ontario.

The Uranium Reduction facility continued to operate routinely. No difficulty was encountered other than the normal maintenance work. Some difficulty was encountered at month-end with the feed concentration system. Investigation has disclosed severe corrosion in some of the off-gas piping. Replacement has been made and an improvement in the operation of the concentrators is anticipated. Some inadvertent downgrading of "E" metal was made during late February as a result of a common tie-in on overheads from the concentrators. Correction has been made to prevent a recurrence of this type.

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B. Fabrication Subsection

Production of 65 model assemblies exceeded goal forecasts for March by 3%. This overage made it possible to compensate for the underage experienced in February. In addition, one 6506 part was fabricated and delivered to the customer to replace a reject which was reported earlier. All shipping requirements were satisfied.

During the first two weeks of March fabrication progress was poor. Considerable difficulty was experienced with the melting furnaces and casting quality was poor. The metal contained pits, voids, cracks, and inclusions. Machining rejects were high due to frequent failures of tools and to personnel errors. Progress of the work during the latter half of the month was excellent. The production rates that prevailed established a record that provides basis for predicting that the increased schedules of coming months will be met.

It was possible to fabricate only a small number of parts in the new machining hoods. It was necessary to modify the turret operating mechanisms on the South Bend lathes in order to provide more precise control of the tool feed during the boring operation. This modification took most of the month for installation. It was impractical to use the Gorton lathes for radius generating, even though they were available, because of the additional time and exposure which would be required due to the additional handling of plutonium in transporting it to and from the RMA Line. The small amount of additional experience gained during the month with the Gorton machines tends to confirm the opinion that these machines are well adapted to making radius cuts.

C. Maintenance Subsection

The operation of the equipment used for plutonium metal preparation was good during the past period. No major unscheduled shutdowns were required.

The equipment in product recovery functioned much better this month than in previous months, requiring only one unscheduled outage, to replace a ruptured H-3 column pulser bellows. The scheduled replacement of the D-24 and D-25 condensers was completed without difficulty.

Equipment used in the fabrication of plutonium metal functioned well during the month except the Task IV furnaces, which experienced a high rate of heating element failure. Modifications to effect a change from a helium atmosphere to a nitrogen atmosphere in the machining hoods were accomplished without incident.

D. Control Subsection

Analytical work proceeded routinely during the month with the performance of 6904 determinations on 1403 samples.

Excluding these rejects, impurity levels averaged 2030 ppm, which agrees well with chemical assay results.

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D. Control Subsection (Cont'd)

Chemical assay revealed one set of plugs to be of low purity (99.35%). For all others the average purity was 99.82%.

There were seven radiation occurrences and eighteen cases of skin contamination experienced during the month. One of the radiation occurrences had serious potential. It involved the plutonium recovery apparatus, in the analytical laboratory, which pressurized and generally contaminated the entire room. No personnel were involved. A new recovery procedure has been instigated.

Z Plant stack emissions averaged 11 microcuries plutonium per day (high of 58 microcuries per day). The cause for this increase over February is being studied.

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 216 WR Crib Replacement Project for the Uranium Reduction plant is awaiting Company approval.

Project CG-723, Conversion of Recuplex to a Manufacturing Facility, is awaiting AEC approval and release of additional construction funds.

A project proposal for reduction of radiation exposure in the Button Lines - 234-5 Building has been submitted for comment.

Project CGC-813, Recovery of Pu from Waste, is being routed for Company approval.

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G. Plant Development and Expansion (Cont'd)

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

Phase II of Project CA-826, Vacuum System Improvements, 234-5 Building, is being circulated for Company approval.

2. Projects - Construction

A total of four projects are in the construction phase for the Finished Products Section. They are: CG-734, RMC Button Line; CG-767, Miscellaneous Improvements, UO₃; CGC-800, Reduction of Exposure, RMA Line; and CGC-826, Phase I, Vacuum System Improvements, 234-5 Building.

Construction funds have been released for Projects CG-725, Liquid Waste Handling Facilities, UO₃; CGC-811, Additional Fabrication Equipment, 234-5 Building; and CG-789, Additional Fire Protection, 234-5 Building. Detailed design work is underway on all projects.

3. Projects - Completed

Project CG-745, RMC Fabrication Line, has been accepted with major exceptions by the Finished Products Section.

III ORGANIZATION & PERSONNEL

A. Organization Changes

There were no changes during the month.

B. Safety Experience

No disabling injuries or serious accidents occurred during March. Ten medical treatment injuries were experienced as compared to three in February. The frequency rate rose from 0.64 to 2.09.

All supervisors have completed the "Safety Training for Supervisors" Program.

Two serious incidents occurred in the 234-5 Building during the month. Both occurred in the development laboratory which is operated by the Plutonium Metallurgy Operation, HLO. One involved the overheating and firing of a flammable oil in a plutonium processing hood. The other involved an explosion, of yet undetermined origin, in a hood during the machining of plutonium. Neither incident caused any significant interference with the Finished Products Section's activities, but the potential was high. Investigations have been made and detailed reports are to be issued.

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C. Radiation Experience

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

D. Security Experience

There were no security violations experienced during the month.

E. Personnel Activities

Sixteen employees attended Training Meetings conducted in CPD in addition to those taking Red Cross First Aid Training and PBM-1.

Acting Manager - Finished Products

WN Mobley:JPT:jjh

CHEMICAL PROCESSING DEPARTMENT
POWER AND GENERAL MAINTENANCE OPERATION

MARCH, 1959

I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Operating Continuity

Steam, water, and emergency electrical services were made available to the production facilities in sufficient quantities to sustain continuity of operation without interruption for the entire month.

B. Inspection, Maintenance, and Replacement

A sample of a ruptured platinum fluorinator tube at 234-5 was taken to 300 Area for a gamma scan to determine the extent of contamination on this metal. This was done at the request of the AEC, and a report of this test was submitted to them.

At the request of Finished Products Operation, a new waste disposal ditch was dug from the 234-5 Building to the 221-U swamp. This new ditch, approximately 5/8 of a mile long and eight feet deep, was dug adjacent to the existing ditch, which had become ineffective and plugged. At the completion of the excavation the spoil was used to backfill the old ditch. The entire excavation was properly marked with stake and chain.

Overflow of the 216-A-6 crib just outside of the 200 East perimeter fence made it necessary to cover this area (approximately 6,400 sq. ft.) with earth fill to prevent contamination spread. The waste water from the 202-A Building failed to dissipate into the ground.

Occupancy and utilization of several small substandard buildings in the 200 Areas was discontinued during March preparatory to excessing these buildings, with removal anticipated at an early date. Buildings involved are:

272-WA	Old saw filing shop
2701-B	B-Plant badge house
2701-T	T-Plant badge house
2707-WA	Old change house rear of Power House, 200-W.
2715-WA	Old ice storage building, 200-W.
2716-W	Hutment, formerly used as headquarters by laborers.

Buildings 211-T, 221-T, and 291-T were transferred to the Waste Handling and Decontamination Operation.

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The removal of several obsolete deteriorated fences, designating radiation zones throughout the 200 Areas, has received the approval of the several parties concerned. Such fences, having high maintenance costs and unsightly appearance, will be replaced with suitable stake and chain fencing with proper signs displayed.

A program was initiated to improve the state-of-repair of area steam supply lines and appurtenances. During the month 19 defective wood pole supports were replaced with steel posts set in concrete. A study is in progress to determine the future status of lateral lines supplying isolated and little used locations throughout the areas, with the view in mind of deactivating or removing those which are not included in the area's future.

Installation of equipment in the 200 Area Power Houses designed for use in treating process steam with a filming amine was completed. The 200 East Area started receiving amine treated steam on March 27, with the 200 West Area scheduled for April. A representative of the Betz Laboratories acted as consultant during the initial start-up.

Ventilation Balancing personnel were in attendance at a meeting with Irradiation Processing Department's design engineers to assist in planning the complete rebalancing of ventilation systems in the 105 and 115 Buildings in 100-B, D, and F Areas. The work was in progress on March 12.

Fabrication of two tube bundles for Purex concentrators has progressed to approximately 35% of completion. Drilling of the tube sheets for one unit is complete and the major component parts for both units have been made up.

Repairs have been completed on the vendor fabricated spare B2 off-gas steam heater for Purex which had failed to pass our routine pre-service hydrostatic test. After removal of the heads and painstaking testing the leak was located in the weld joining one tube to the tube sheet. Careful grinding at this point disclosed a void under the crater. The first attempt to reweld resulted in gassing at this same spot, and indicated that entrapped oil or other foreign volatile matter had caused the original weld failure. The area was heated until gassing ceased, and the tube then successfully welded to the tube sheet. Hydrostatic tests are now satisfactory and the unit will be available for service after placement of stainless steel sheathing.

A Purex J5 pump was prepared for service and sent to the plant on an emergency basis on March 2, and an L5 recirculating pump was also delivered at the end of the month following completion of revisions designed to eliminate leakage through the shaft seal which had been a source of some difficulty.

A proposal by the Shops Engineer to change the design of dip tubes and nozzles in the conversion of 221 type centrifuges to Redox type centrifuges has been accepted by FEO and Redox personnel. This will result in a saving of about 150 man-hours of labor on each future conversion. The proposal was based on knowledge, and recognition,

that the dip tubes need not be remoteable, and this allows for use of standard nozzles, dip tubes and extension sleeves, and minimizes the amount of machining required.

A total of 12 replacement process pipe jumpers were fabricated - 8 for Redox and 4 for Purex.

Six tool and die makers are presently assigned to machining of chucks, tools, fixtures and gauges in furtherance of the HLO program to prove capability of the Gorton lathes to produce models that are to follow the current production models.

Work has started on fabrication of a rather complex Electron Beam Furnace for use at 231-Z by HLO personnel. This is to be a high vacuum and heat intensity furnace designed to produce high purity plutonium through vaporization of contaminants.

Modification work is in progress on a White Bus which is designed to provide mobile storage for CPD disaster equipment. This bus is to replace a four wheel trailer which is unroadworthy.

Production commitments required overtime to complete installation of the three-position bell jar casting hood, 234-5 Building. Installation and operation was further complicated by the use of used valves which had to be reworked to make them operable. Several leaks appeared during the testing of No. 3 bell jar base. Inspection revealed cracks in the base. These were welded and operation is now satisfactory.

In connection with the PRTR Program the Special Maintenance unit fabricated a high vacuum annealing furnace using excess mechanical, electrical, and instrument equipment from the 234-5 Building. Two temperature control systems were made in the Shop. The furnace is capable of heating to 760°C in thirty-seven minutes.

III. ORGANIZATION AND PERSONNEL

A. Safety and Security

No disabling injuries were experienced by the Operation.

No security violations were incurred during the month.

B. Personnel Activities

W. J. Richardson and J. H. Palmer attended the ventilation and air filtration equipment display in Seattle, Washington, on March 17.

T. G. LaSalle, Manager
Power and General Maintenance Operation

CHEMICAL PROCESSING DEPARTMENT
FINANCIAL OPERATION

MARCH, 1959

I. RESPONSIBILITY

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

II. ACHIEVEMENT

A. Product Cost

Several studies have been prepared to assist in establishing a new Book-Physical Inventory Difference procedure for stabilization of the unit costs and product billing prices carried in the Product Cost Report. In collaboration with Contract Accounting, a new routine was agreed upon which was later recommended to the local Commission by the Managers of CPD Finance and Contract Accounting.

Unit costs (based on budgeted dollars, estimated depreciation and estimated production for FY 1959, 1960 and 1961) were prepared to finalize the FY 1960-61 production budget submission.

February maintenance assignment tickets for the General Maintenance Landlord function were punched and IBM feedback information was delivered to management concerned. CPD Power Operation personnel completed a study of utility charges to the landlord function during the month. This study, coupled with other cost information including a janitor assignment study, will establish an improved basis for determining costs by building.

Two prototypes, Redox Silver Reactor - \$38,285 and Purex Continuous Solvent Contactor - \$51,190, were capitalized during March in accordance with the newly established capitalization procedure.

Considerable effort was expended in assisting Research and Engineering personnel prepare the Research and Development Proposal documents, covering the FY 1960-61 budget. The document masters were delivered to Contract Accounting on schedule.

The completed budget for FY 1961 and Revision for FY 1960 was reviewed by the CPD General Manager and accepted without alteration. The completed submission was made to Contract Accounting on the due date of April 1.

Total budgeted 2000 Program operating costs for FY 1960 were \$19,530,000, or 3% above the FY 1959 estimate, while the budget for FY 1961 totaled \$19,922,000, or 5% greater than FY 1959.

The 3000 operating program budget for FY 1960 totaled \$2,563,000, an increase of 34% over the FY 1959 estimate, and in FY 1961 the budget was \$2,875,000, an increase of 50% over the estimated costs for FY 1959. The

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increases are due principally to higher production estimates and anticipated additional quality problems associated with increased shape complexity.

Research and Development budget estimates are \$4,583,000, \$4,788,000 and \$4,644,000 for FY 1959, 1960 and 1961, respectively. The increase in FY 1960 is primarily due to prototype equipment on order but not ready for delivery until that year.

The detailed procedure for taking the annual physical inventory of steam coal was issued, and the inventory was taken at the end of the month. Reconciliation is now in progress.

B. Personnel Accounting

Several employees who were given an ROF during 1958 have recently been recalled and in two instances Personnel Accounting has been concerned with the restoration of credited service in order to restore the pension rights of these employees who had previously received a refund of their pension contributions. In agreeing to restore previously refunded contributions to the pension account by a lump sum payment or payroll deduction over a period of a year, continuity of service and credited service for these employees becomes identical.

The number and amount of Contract and Savings Bond Account checks issued during March follows:

	<u>Number of Checks</u>	<u>Amount</u>
Contract Account covering payment of FICA Taxes, Federal Withholding Tax, Union Dues, Insurance premiums and other payroll deductions.	3	\$241 102.31
U.S. Savings and Stock Bonus Account covering purchase of U.S. Savings Bonds and refund of unused balances, plus refund of Savings and Security contributions.	9	21 724.47

Statistics

1. Salary Payments

	<u>Overtime Payments</u>		<u>Gross Payroll</u>	
	<u>March</u>	<u>February</u>	<u>March</u>	<u>February</u>
Nonexempt*	\$ 9 158	\$11 373	\$558 912	\$565 835
Exempt	2 846	2 850	324 849	326 707
Total	<u>\$12 004</u>	<u>\$14 223</u>	<u>\$883 761</u>	<u>\$892 542</u>

* Payments cover a four-week period.

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	CY 1959	CY 1958
	to Date	
2. <u>Pension Plan</u>		
Number retired	2	10
Number who became eligible for participation	4	8
Number who elected to participate	4	8
3. <u>Insurance Claims Paid</u>		
Employee Life Insurance	0	8
Amount	0	\$116 244
Employee Weekly Benefit Claims Paid	35	267
Amount	\$ 4 732	\$ 23 728
Employee and Dependent Accident and Health Claims Paid	864	2 548
Amount	\$69 367	\$255 272
4. <u>Suggestion Awards</u>		
Number of Awards	77	380
Amount	\$ 773	\$ 8 510
5. <u>Preferential Rates</u>		
Number added	0	1
Number eliminated	1	4
Number currently in effect	52	53
6. <u>Participation in Benefit Plans</u>		
	Qtr. Ending	Qtr. Ending
	3-31-59	12-31-58
	Number	%
Pension	1 428	99.8
Insurance		99.4
Personal Coverage	1 453	99.8
Dependent Coverage	1 190	-
Stock Bonus Plan	448	59.5
Savings Plan	195	13.4
Savings and Security Plan	608	95.9
Good Neighbor Plan	916	63.6

C. General Accounting

Arrangements were made with Traffic for delivery of CPD travel tickets, including itinerary and hotel confirmations, to the CPD Cashier for issuance with the cash advance, thereby eliminating the need for a trip to Richland by each traveler.

Tuition refund checks totaling \$225 were issued to ten individuals within CPD who complied with scholastic requirements at the University of Washington Center for Graduate Study at Hanford for the Fall Term 1958-59.

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During March CPD Finance prepared 82 voucher checks totaling \$307,223.12. General Books issued 21 of these checks totaling \$3,732.49, which included one check for contamination of personal effects in the amount of \$16.95.

CPD's charge for the Department of Labor and Industries for Workmen's Compensation administrative and appeals costs for CY 1958 consisted of 34 payments and amounted to \$280.16, with only two of these payments applicable to CY 1958.

No new projects were authorized by the AEC during March. CA-764, Test Wells - 2416 BC Crib Area, was increased by the AEC to \$15,300 for the G.E. managed portion. CG-789, Additional Fire Protection - 234-5 Building, was increased by the AEC to \$205,000 to cover construction.

A physical completion notice was received for CA-773, Interim Waste Crib - Purex.

During March the Plant Acquisition and Construction Budget for FY 1961 and the Revision of FY 1960 was completed and forwarded to Contract Accounting. Plant Acquisition and Construction funds requested for FY 1961 totaled \$12,115,000 as follows:

New Plutonium Reclamation Facility - Z Plant	\$ 5 300 000
Isotope Recovery Facility	3 500 000
Palmolive Reprocessing Facility	1 500 000
Waste Program Projects	1 315 000
General Plant Projects	<u>500 000</u>

Total Plant Acquisition and Construction Funds - FY 1961	<u>\$12 115 000</u>
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Revision to the FY 1960 Plant Acquisition and Construction Budget requested an additional \$1,100,000 for Reduction of Radiation Exposure Task I, II, and III - 234-5 Building and also \$170,000 to permit the installation of a Weapons Assembly Hood.

A net reduction of \$1,000,000 was requested in FY 1959. This resulted from a decrease in funds required in the NPF processing program in the amount of \$3,200,000 partially offset by a request for \$2,200,000 for Separations Facilities in support of the Irradiation Processing Department's NPR Program.

D. Auditing

A formal audit report was issued covering the findings and recommendations relating to an audit of G.E. Employee Savings Plans.

Field work was completed on an audit of the G.E. Employee Pension Plan.

A review was made of the register of individuals attending the public auction sale held at the North Richland Theater, February 18, 1959. Several CPD employees were in attendance; however, in each case the employee was scheduled off. There was no indication that CPD employees bidding had prior knowledge of the condition of the materials and equipment sold.

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A review was made of HAPO employee collect toll calls to the Plant during the last six months. No exceptions were noted.

Test checks were made of purchase requisitions to determine the volume of orders placed on an emergency basis. Results have not been finalized; however, it appears that our performance in this area is satisfactory.

A folder of pertinent data relating to Consultant Agreement #176, Arthur D. Little, Inc. - Market Survey, was prepared and forwarded to the Auditing Department, Schenectady, with a request for an audit of the Consultant's accounts and records.

E. Procedures

The maintenance assignment information system was reprogramed to provide an additional IBM statistical run detailing the applied time by man within craft within foreman group. The four IBM runs have proved highly acceptable to the management within the Power and General Maintenance Operation.

Field contact work has been completed on the procedures study of the FEO Material Control Group. Report summarization is in progress, with final results of the study to be issued during April.

Review of CPD's Financial Operation work simplification study has been suspended pending clarification of procedural responsibilities relative to regrouping of financial functions and personnel under the reorganization. The original CPD study has been made available to Contract and Accounting, and is being used by them in connection with a feasibility study of a HAPO-wide integrated coding system for application to electronic data processing.

F. Measurements

Preliminary work in connection with the issuance of the quarterly measurements and productivity reports was started.

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

III. ORGANIZATION AND PERSONNEL

A. Safety and Security

A safety and security meeting for all Financial Operation personnel was held on March 26, 1959.

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

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B. Reports Issued

HW-59542	Essential Material Inventory and Consumption Report - February	GE Dyreng
HW-59617	Unit Cost Information - February	BM Dobbs
HW-59622	Redox Cost and Production Analysis - February	GH Temple
HW-59623	Purex Cost and Production Analysis - February	GH Temple
HW-59624	Finished Products Cost and Production Analysis - February	GH Temple
HW-59632	CPD Operating Report - February	MM McDonald
HW-59824	Off-Site Transfer Vouchers	KG Grimm
CLVI-660	CPD Cost and Production Analysis - February	KG Grimm
TS - RD	Product Cost Report - February	BM Dobbs

Manager - Finance

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CHEMICAL PROCESSING DEPARTMENT
FACILITIES ENGINEERING OPERATION

March, 1959

I. RESPONSIBILITY

Project Engineering was assigned responsibility for NPR Plant Acquisition and Construction budgeting liaison activities for the Chemical Processing Department.

As of the 16th of March, Maintenance and Industrial Engineering assumed responsibility for the fire and safety audit and consultation for various department operations.

II. ACHIEVEMENTS

PUREX OPERATION

A. Process Technology

Waste Storage

The prototype circulator which was installed in the 101-A tank February 11, 1959, has been performing satisfactorily and continuously since it was installed. This circulator reduced the bottom temperature from 123 to 116 C in five days.

Equipment has been obtained to perforate four of the 4-inch laterals beneath the 113-SX tank at their low points to provide drainage of the condensate, away from the caisson. The equipment was satisfactorily tested on March 24, and a contract is being negotiated to perform the perforations. A cost estimate is being made for the extraction and testing of 3-inch diameter, concrete core samples taken from near the apex of the dome on waste storage tank 241-A-103. It is currently planned to extract this sample from the floor of the pump pit where the concrete is 33 inches thick. The sample could be partially cleansed within the pump pit before transporting to 300 Area for final testing.

B. Plant Engineering

"N" Cell Concentrator Loop

Failure of the stainless steel upper and lower loop of the "N" cell ion exchange package has resulted in a requirement for better materials for this service. The upper and lower sections have been re-designed for

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fabrication of titanium, using a minimum of wall thickness coupled with a "Vanstone" flange technique for jointing.

Steam Line Treatment

The addition of Permacol 120 to the steam line at 202-A Building, in an effort to reduce the high radiation level in the associated trap pit, has been continued during the past month. A definite decrease in the radiation level has been accomplished; however, the radiation has not been reduced to a satisfactory level; consequently flushing with other compounds will be tried during the next building shut down.

Conference Room Improvements

Design was completed on improvements to the 202-A Building conference room. This included removal of partitions to increase the floor space, installation of partitions to provide two more offices, and improved lighting for the enlarged conference room.

Maintenance E-Code Analysis

Costs incurred for repair and maintenance of the Purex plant were analyzed and reported to the Purex Maintenance Manager. This analysis is part of an expanding program to pin-point maintenance costs for the Purex Operation.

C. Project Activities

CA-773 - Interim Waste Crib - Purex

The interim waste crib for Purex was completed on February 27, 1959. The following information is pertinent to the completion of this project:

Authorized Funds	\$39,100
Financial Closing Cost:	\$30,530
Directive Completion Date:	February 28, 1959
Actual Completion Date:	February 27, 1959

CGC-821 - Palm Recovery - Purex

A target project schedule for Purex Palm Recovery was set, establishing May 1, 1959, as the completion date for scope design. A process flow diagram and the hydraulic flow sketch based upon rough draft chemical flowsheet information have been completed. These drawings will serve as a basis for equipment layout studies now being conducted preliminary to preparation of engineering flow diagrams.

REDOX OPERATIONA. Research and DevelopmentMultipurpose Dissolver

A study of the coordination of E-Metal and NPR reprocessing at Redox in a multipurpose dissolver installation was completed. It was determined that, although the current CG-772 design would be suitable for E-Metal and normal metal, refinements for NPR reprocessing would be in order.

- 1) A modified annulus design incorporating provisions for nuclear-safe processing of NPR fuel elements and other selected zirconium-clad fuels enriched to a maximum of one per cent U-235. Each dissolver would also be capable of processing normal or E-Metal at rates approximating 40 per cent of the Redox solvent extraction capacity.
- 2) A modified downdraft dissolver tower design permitting zirflex processing of zirconium-clad fuels.
- 3) An off-gas bypass system around each silver reactor.
- 4) Provision of removal and dilution of ammonia gas necessary for controlling the explosive hazard associated with high concentrations of ammonia and hydrogen gas and air mixtures.

All of the above design modifications are being prepared with the objective of providing a dissolver installation permitting nuclear-safe dissolution of E-Metal which will also be compatible to the dissolution of NPR fuel elements, PRTR and certain low enrichment non-production fuels.

B. Plant EngineeringL-3 Concentrator Loop

The bottom, top, and side sub-assemblies of the lower L-3 concentrator loop were re-designed, using titanium instead of 304-L stainless steel. From a fabrication standpoint, the re-design resulted in (1) reducing the number of fittings and welds required, and (2) improved support of the reboiler tube bundle.

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FINISHED PRODUCTS OPERATION - Z PLANT

A. Research and Development

Chemical Processing and Reduction

Scoping of the new Task I, II, and III equipment has continued with emphasis primarily on Task III equipment. The Task I and II portion is essentially complete in scope concept. Functional specifications for the 6-inch continuous centrifuge have been completed, approved, and transferred to the Contract Administration Unit.

The Poroloy filters have been received for the Hood H-9A internal off-gas filter assembly. This assembly will be installed for testing in Hood H-9A during April 1959.

Z Plant Radiation Study

A frame for holding multiple thicknesses or slabs of shielding material in various arrangement is being proposed for use with the new button line. The frames have a minimum thickness of one foot with provision for nine inches of shielding arranged as parallel panels. The panels can be altered as desired both in quantity and in relative arrangements. The frame has the advantage of permitting complicated laminated shielding assemblies to be purchased incrementally, installed as warranted, and handled with a single operation of the overhead crane.

The advanced equipment-containment principle embodied in the new button line design permits use of these shielding frames without any appreciable demand for space over that of the present conventional button line. This is done by using the space currently occupied by the hoods around the equipment. By making the equipment serve also as the hood, both neutron and gamma radiation can be reduced a hundred fold at two feet from process equipment. By placing two frames on all sides and the top of equipment, it should be possible to shield adequately against any foreseeable radiation levels. A single shielding frame layer would normally suffice.

B. Project Activities

Project CG-734 - RMC Button Line

Redesign of Hood HC-13MD to accomplish the following has been completed: (1) larger hydromotor installation; (2) elimination of interferences for future shielding; and (3) revision of means of supplying air to the vibrator, clamps, and valve cylinder inside the hood.

Redesign of those portions of the following hoods affected by the change in Task III crucible design has been completed: HC-12S, HC-17SEB, and HC-18BS.

Scope work has been completed and a scope document issued for comments on methods for providing shielding to the process hoods on Project CG-734. In this document it is recommended that 1-inch high-density, lead glass sandwiched between two layers of homolite be used to cover all plexiglas hood panels. Covers are recommended to provide equivalent shielding over all glove ports. Lead glass is expected to reduce gamma dose rates by a factor of 10. Since the entire surface of process hoods will not be shielded, the net over-all gamma exposure to operators is expected to be reduced by a factor of at least 2. Prototype on methods of applying this shielding and of covering the glove ports were fabricated in 200-W Shops and were used to demonstrate the feasibility of the panel and glove port shielding.

CGC-798 - Crib and Test Wells for 234-5 Building Wastes - 216-Z Crib

On March 24, the last well was completed by the contractor. All work on this project is now completed.

UO₃ PLANT

A. Process Technology

Modified Laundry Tumbler Installation

A report summarizing the performance of the modified laundry tumbler installation for recovery of UO₃ powder associated with failed filter bags was completed. This method of UO₃ recovery was combined with the leaching method eventually adopted, and the over-all history of its development was compiled for record purposes.

GENERAL ACTIVITIES

A. Research and Development

Fission Product Recovery

Preliminary designs, cost estimates and project schedules were obtained for an interim fission product recovery program at Purex. This program would be directed to low-efficiency collection of Pm¹⁴⁷, within Purex canyon equipment, heating to about 1200 degrees to stabilize the precipitate, transferring from the cell to a suitable cask, and shipment from HAP0. The total project cost was estimated to be \$100,000, of which \$30,000 represented Purex in-cell equipment and \$70,000 was

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the cost of the shipping cask, railroad car and auxiliaries. It was estimated that the first shipment would be made within 10-12 months after determination that the desired product could be precipitated, centrifugated and filtered. The shipping container and cooling system used would be capable of handling a total beta activity of 9600 watts (about 1.4 megacuries of Ce^{144} or 1.8 megacuries of Pm^{147}).

Critical Incident Alarms

The locations for critical incident alarms in CPD facilities have been selected. Thirty gamma detection instruments with integral audible alarms are to be installed and five spare instruments are to be provided under the current appropriation request.

Considerable effort was expended in testing and investigating various types of audible alarms, and a small siren has been selected as having the most distinctive sound and for compatibility with the various requirements. Many of the instruments will have extension sirens connected to them. Actual sounding tests were made in Purex and Redox to determine coverage. For radiation sensitivity, calculations were made of shielding effects to assist in determining suitable locations.

A prototype instrument has been completed by Tech Shops and has been demonstrated to radiation monitoring personnel. Test work is continuing, and plans are being completed for quantity fabrication.

Non-Production Fuels Reprocessing

A composite scope basis for the Hanford NFF Reprocessing Program incorporating comments from all interested CPD and HLO personnel was completed. This basis defining general, receiving, storage of undissolved fuel elements, mechanical preparation, dissolving, clarification, storage of metal solutions, extraction, and UNE calcination criteria was issued to permit definitive scoping of these facilities to begin upon the availability of project funds expected this month. Composite project schedules were also prepared as a part of the scope basis defining concomitant development requirements and schedules.

Preliminary engineering based on the assumption that the above discussed scope basis is generally acceptable has begun. The purpose of this work is to establish tentatively what existing equipment must be retained for project use and what equipment may be disposed of as part of the early cleanup work. It is assumed that the equipment in some of the unused process buildings may be used to minimize new capital expenditure.

B. Plant Engineering

Filming Amine Facilities

The facilities for preparing and making the addition of a filming amine solution to the steam have been completed and placed into service in the 200 East Area. Similar facilities in 200 West Area are presently being calibrated and are scheduled for operation in the early part of April.

C. Project Activities

Project Cost Information as of March 15, 1959:

Total Authorized Funds - 21 Active Projects	\$13,225,000
Total Cost-To-Date	8,989,000
Commitments and Open Work Releases	745,000
Unencumbered Balance	3,491,000
Costs charged to above Active Projects - 2-15-59 to 3-15-59	218,451

Projects dropped from Active Status during this period were:

<u>Project Number</u>	<u>Authorized Funds</u>	<u>Total Cost</u>
CA-513-E	\$ 2,413,667	\$ 2,334,835
CG-722	223,000	168,751

D. Contract Information

The following summary represents current activity on contracts:

DDR-45 - Design Development Services with Respect to Recovery of Certain Gaseous Products - Air Products, Inc.

This contract has been completed satisfactorily at a cost of \$27,570. All reports have been received.

DDR-64 - Centrifugal Separator - Bird Machine Company.

This contract is subject to agreement in April 1959 to design and provide a modified centrifuge. Completion is expected within six months after Notice to Proceed.

CA-214 - Providing Supervisory Engineering Services for Boiler Water Conditioning - Betz Laboratories.

This contract was renewed for one year to follow up on equipment recommendations made under former contract.

III. ORGANIZATION AND PERSONNEL**DECLASSIFIED**A. Personnel

G. L. Davis, Senior Engineer, accepted a transfer to General Electric's Laboratory at Vallecitos, effective March 28, 1959.

G. O. Ager and W. H. Roos, Fire and Safety Specialists, and A. B. Clark, Clerk, transferred to Maintenance and Industrial Engineering effective March 16, 1959.

B. Safety

Safety meetings for components were conducted as previously scheduled, including the FEO All-Girl Safety Meeting on March 18. Participation of the engineering profession in national safety programs was emphasized during the month, and a special training course was presented to FEO supervisors.

C. Inventions

None.

D. Reports Issued

HWS-6335 - "Functional Specification - Jumper Cutter", D. A. Snyder, dated January 20, 1959.

HW-58610 - "Plutonium Recovery from Contaminated Materials - Project CGC-813 - Scope Revision No. 1", E. Doud, January 23, 1959.

HW-57282 - "Design of Underground Storage Tanks for Radioactive Wastes", E. Doud, August 26, 1958.

HW-59761 - "Trip Report Attendance at American Institute of Chemical Engineers 39th National Meeting", E. Doud, March 25, 1959.

HW-59745 - "Calculation of Gamma and Neutron Dose Rates from Potential Nuclear Incidents", H. A. Moulthrop, March 24, 1959.

HW-59345 - "Basis for Scope Design of a Non-Production Fuel Reprocessing Facility", W. A. Graf, et al, March 27, 1959.

HW-59464 - "The Design Calculation of Large Diameter, Concentric Tube, Thermal Diffusion Columns for the Separation of Xenon Isotopes", J. M. Gerhart, March 10, 1959.

- HW-59656 - "Final Report - Use of Modified Laundry Tumbler for Cleaning Filter Bags - UO₃ Plant", J. M. Gerhart, March 10, 1959.
- HW-59619 RD - "Assembly Facilities - Z Plant (Budget Data Sheet)", D. A. Snyder, dated March 11, 1959.
- HW-59203 - "Project Proposal, CG-719, Rev. 3 - Additional Facilities For Purex Tank Farm Wastes", issued March 25, 1959.
- HW-58437 - "Assumptions for Preparation of PA&C Budget", dated December 8, 1958, by D. R. Gustavson.
- HW-59349 RD - "Preliminary Issue - Budget for FY-1961 and Revision of Budget for FY-1960 PA&C, dated March 2, 1959.
- HW-59350 - "Budget for FY-1961 and Revision of Budget for FY-1960 PA&C", dated March 20, 1959.
- HW-59377 - "Non-Scope Revision and Reconciliation for Project CGC-813," dated February 25, 1959, by R. H. Silletto.
- HW-59552 - "Design Verification Testing of Continuous Incinerator Project CGC-813", dated February 27, 1959, by R. H. Silletto.
- HW-59619 RD - "Assembly Facility - Z Plant (Data Sheet)" by D. A. Snyder.
- HW-59799 RD - "CFD Goal for Project Authorizations during CY-1959," dated March 30, 1959, by D. R. Gustavson.

E. Trips

G. A. Conner visited the Western Metals Congress in Los Angeles, California March 16-20, 1959. A technical paper "Tungsten-Arc Cutting of Austenitic Stainless Steels" was presented by Mr. Conner at this metals meeting. A trip report is in preparation.

R. W. Harvey attended a meeting of the Indirect Labor Measurements Task Force established by Manufacturing Services, and held March 5-6 in Schenectady. Mr. Harvey spent March 4 discussing related programs with Manufacturing services personnel in the Schenectady office.

R. A. Ciccarella visited the Penworthy Instrument Company, Seattle, on March 24 to discuss processing, handling, cutting and application of lead glass to the CG-734 process hood.

H. P. Shaw visited with the H. K. Ferguson Co. and B. D. Bohna Inc. in San Francisco and with the R. M. Parsons Engrg Co. and Fluor Inc. in Los Angeles, California for Architect-Engineer design consultation, March 1, 2, and 3, 1959.

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E. Doud attended the 39th National Meeting of the American Institute of Chemical Engineers at Atlantic City, New Jersey, March 15 to 18 and visited Taylor, Stiles & Company, Riegelsville, New Jersey March 18; R. N. Bailey & Company, Inc., New York, March 19; Nash, Cadmus and Voelker, Inc., New York March 19; and Kerner Incinerator Division of Morse Boulger Destructor Company, New York, March 19.

On March 24, 1959, G. P. Kesel and J. W. Vinyard visited the Penworthy Instrument Co., Seattle, Washington, to discuss the production, cutting, and fabrication of lead shielding glass.

J. B. Fecht visited the General Electric Research Laboratory in Schenectady on March 30, 1959, to review process equipment development.

F. Visitors

Mr. Hanford Haynes, the Northwest representative for Consolidated Western Division, U. S. Steel Corporation, visited the area on March 10 to inspect a Purex off-gas heater.

Mr. R. E. Myers, Betz Laboratories, paid his regular monthly visit March 25, 1959, per consultant contract on steam treatment.

Dr. Hans Meier, General Engineering Laboratory; Dr. Frank Neumann, University of Washington; T. H. Thomas, Lockheed Aircraft; R. H. Graham, Lockheed Aircraft; Edward Warren Hoak, Holmes & Narver; Richard E. Lowe, Holmes & Narver; R. A. Williamson, Holmes & Narver; and John Garrick, Holmes & Narver visited Hanford March 17-19 to discuss the earthquake problem.

Manager

Facilities Engineering Operation

HP SHAW:FC:al

CHEMICAL PROCESSING DEPARTMENT
RESEARCH AND ENGINEERING OPERATION

MARCH, 1959

PUREX PROCESS TECHNOLOGY - R. E. HARRIS

Head End

Irradiated uranium, "cooled" from 91 to 200 days, was dissolved to form solvent extraction feed. Addition of mercuric nitrate (5×10^{-4} M) to dissolver solution "cooled" less than 105 days provided excellent radioiodine control (0.55 curies per day average).

Installation of a routing for the transfer of dissolver rinses into the 3WB system (for concentration and processing in the HA Column) has permitted the use of two five-hundred gallon rinses after dissolution instead of one three-hundred gallon rinse. Preliminary sampling data indicate a three-fold reduction in uranium and 1.5-fold reduction in plutonium concentrations in the coating waste solution as a result of this procedure change.

During the last fifteen days of the March operating period, unclarified feed was delivered to the solvent extraction batteries by elimination of the HAF centrifugation step. The test will continue next month, and, if no long-term process or equipment adversities are noted, this process change will become permanent.

A comparison of the February over-all acid recovery in the backup system with that of March, shows an increase from 52 to 61 percent. The additional recovery probably resulted from better scheduling of the dissolver operation so that a maximum of two dissolvers were in operation at one time.

Fission Product Recovery

Conditions for a second fission product recovery experimental run (now in progress) are essentially the same as those reported last month. Solids removed during a ten minute centrifuge holdup at 1500 G (compared to 1000 G last month) were $\angle$ 4.3 percent of the solution volume. Preliminary data indicate 2.1 megacuries of zirconium and 2.9 megacuries of niobium (40 and 33 percent, respectively, of the theoretical amounts in the solution) were recovered in the oxalic acid leaches which were decontaminated from Ce^{-144} by a factor of thirty.

Solvent Extraction

Normal uranium processing was conducted at 2.7 capacity factor. Operation was uneventful and typical performance data for the period are summarized below:

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<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	4.4	4.1	0.02	-	-
Final	3.1	2.5	-	1.35	7.0
Ion Exchange	>0.6	-	-	3.00	-
Overall	>8.1	6.6	0.02	4.35	7.0

Despite dilute feed and high gamma activity in the 3WB (as a result of the neptunium recovery run), over-all gamma decontamination was good at start-up. Only six batches of uranium (gamma ratios 2.2 to 3.2) required silica gel treatment to meet gamma specifications; however, several out-of-gamma-specification batches of plutonium required rework because of XAW and XCP cross contamination (see Plutonium Concentration). First Cycle decontamination remained relatively constant except near the end of the run period when the HA Column saturation was decreased, and the HAW acidity increased slightly. During this period of lower decontamination performance, the final uranium product gamma ratio routinely ranged from 2.2 to 2.8 and required silica gel treatment.

Other items of interest to decontamination included the following:

- a. When the IBX Column fission product split favored the uranium and raised the 2AF gamma activity two fold, an 18 percent increase in the IBX flow plus a 15 percent increase in the IBS pulse frequency had no significant effect.
- b. Concentration and addition of the dissolver rinse (see Head End) to the 3WB increased the gamma activity of that stream ten to thirty fold. This increased gamma activity may have partially contributed to the reduced HA Column decontamination near the end of the run period.
- c. By the end of the run period no deleterious effect from processing uncentrifuged feed had been detected. The test will continue next run period in order to establish the probability of any long-range effects.
- d. Use of IOO for 2AX instead of 200 did not significantly reduce the Final Plutonium Cycle decontamination.
- e. Complete elimination of HNO_3 from the 2DIS and maintenance of the 2DW HNO_3 at 0.8 M by nitric acid addition to the 2DF did not affect the 2D Column decontamination performance. However, when the 2DW concentration was increased to 1.14 M, by addition of more acid to the 2DF, the gamma activity in both the 2EU and 2DW increased two fold. After the 2DW acid was reduced to normal (0.8 M), the gamma count of the two streams returned to normal. It has been hypothesized that the additional gamma activity came from decontamination of either the 2DF Tank or the 2D Column as a result of the higher acid concentration.

Plutonium and uranium waste loss control was excellent during the entire run period. Use of IOO as 2AX allowed backcycle of the 2BW into the HAO Tank, thus eliminating the loss of plutonium to carbonate solvent washes. Although a temporary 25 percent increase was made in the 2DF ferrous sulfamate addition to curb an upward trend in the plutonium content of the 2DU, later a 22 percent reduction in the flowsheet ferrous iron addition to the 2DF produced no significant effect on plutonium content of the final uranium product. A ten-fold reduction in plutonium in the final uranium product has been attributed to changing the nitric acid addition from the 2DIS to the 2DF.

Neptunium Recovery

Upon completion of the February neptunium recovery run, approximately 700 grams of neptunium remained in the 3WB system. However, at month end the neptunium inventory has increased only slightly because of high HAW losses. Factors believed to contribute to the high neptunium losses in the HAW included the following:

- a. The chromic-dichromate ions which remained in the 3WB after the February neptunium recovery run initially upset the nitrite ion balance in the HA Column.
- b. Interface material, which overflowed into the IOO Tank from the turbomixer (TK-G7), killed the nitrous acid in the IOO.
- c. When the nitrous acid concentration in the IOO was increased from 0.0005 M to 0.001 M to counteract (b) above, an excess nitrite ion concentration occurred in the HA Column.
- d. The backcycle of 2BW to the HA Column from the HAO Tank introduced nitrous acid into the HA Column scrub section.
- e. A neptunium reflux in the HA Column (caused partly by (d) above) was indicated when an abrupt increase in the 2DW neptunium inventory occurred after the HAF flow was temporarily stopped due to a pump failure.

Slight reduction in HA Column uranium saturation, moderate increases in HAW acidity, and a five degree increase in the HAX temperature had no effect on neptunium recovery in the HA Column. Rework of two batches of IWW for neptunium resulted in negligible recovery because of the high HAW neptunium losses.

The neptunium loss to the 2EU was virtually eliminated by adding all the nitric acid via the 2DF instead of adding some via the 2DIS.

At month's end, a neptunium recovery run utilizing a reducing flowsheet (in order to avoid the highly corrosive action of chromic-dichromate ions on processing equipment) was started. The initial neptunium inventory in the 3WB system was estimated to be about 850 grams.

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Plutonium Concentration

Alterations made to the Plutonium Ion Exchange unit during the shutdown permitted the Plutonium Concentrator condensate and the overflow from the Resin Push Tank, in addition to the XAW and XSW, to be routed into the 3WB system. Cross contamination between the XAW and XCP via a new vent line produced several plutonium batches above specifications in gamma activity before the condition was detected and corrected.

When the top portion of the stainless steel loop in the Plutonium Ion Exchange Concentrator failed, the XCP was concentrated in the E-14 Concentrator, while repairs were completed. Upon investigation it was noted that the bottom portion of the loop, which had been replaced four months ago, was badly corroded and also required replacement.

Waste Treatment and Acid Recovery

Operation of the Waste Concentrator (E-F11) was erratic during the operating period due to higher-than-normal salt waste produced by rework of IWW, and an unbalanced steam load on the tube bundles so as to permit decontamination of a steam trap. Thus, the IWW exceeded the flowsheet value (5 flows) and averaged 59 gallons/ton of uranium after neutralization. Other waste volumes sent to self-concentrating underground storage tanks averaged 9, 111 and 353 gallons per ton of uranium produced for centrifuge cleanouts, solvent washes and cell drainage, respectively. The coating waste sent to storage was 231 gallons per ton of uranium.

Coating waste losses for plutonium and uranium accounted for 37 and 65 percent of the over-all losses, respectively.

Despite the fact that the gamma activity of the Purex recovered acid increased from a normal 500 - 1000 $\mu\text{c/gal}$ to 5000 - 10,000 $\mu\text{c/gal}$, its reuse created no handling problems. No definite reason for the increased acid activity has been apparent unless the caustic flush of the No. 2 Acid Concentrator and tower (made during the last shutdown) loosened some residual gamma activity which is now appearing in the recovered acid.

The first batch of IWW after start-up, which profitably could have been re-worked for neptunium recovery, was sent to underground storage because it contained the residual chromic ion from the February neptunium run and could have caused excessive process equipment corrosion.

Self-concentration in Tanks 241-A-101, 102, and 103 continues at boil-off rates of 3.2, 17.8, and 1.0 gallons per minute, respectively.

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REDOX TECHNOLOGY OPERATION -Dissolution

Approximately 50 tons of E-Metal, cooled an average of 260 days, were dissolved in the A and B dissolvers at an average rate of 0.8 ton per day per dissolver. The reduction in allowable charge size from 3 to 1.75 tons caused a proportional decrease in the instantaneous dissolution rate ranging from 0.7 ton per day per dissolver for solid slugs to 1.1 tons per day per dissolver for I & E slugs. Additional digestion of two second cuts revealed the heel to be negligible following the normal two-step dissolution.

Solvent Extraction

A test was made to determine the behavior of boric acid in the extraction system employing one HAF batch of the following composition:

UNH	2.0 M
ANN	0.24
NaNO ₃	0.15
Na ₂ Cr ₂ O ₇	0.10
HNO ₃	-0.3
H ₃ BO ₃	0.05

Two analyses of the HAF stream indicated the boron content to be 2 to 15 percent of that in the feed. Analyses of the aqueous product streams from the succeeding extraction cycles failed to detect boron, and spectrographic analyses of the final product streams showed the boron concentration to be less than 1 part per million parts of product. A similar test is planned to determine whether boron removal is also satisfactory with an acidic first cycle flowsheet such as might be required for neptunium recovery or power fuel processing.

The salt concentration in the 2D Column was reduced 37 percent to approximately 0.3 molar equivalent aluminum nitrate in a continuing program to reduce processing costs. An equivalent amount of salt was provided for the preceding cycles by increasing the LAW recycle to LAF from 34 to 41 percent and by recycling 14 percent of the HAW to the HAFS concentrator. Product recovery and decontamination continued to be excellent on this flowsheet; however, precipitate formation was evident in the HAFS concentrator and the HA Column.

It appears that the 15 percent increase in Fe(III) and the 100 percent increase in Cr(VI) attending the HAW recycle may have caused recurrence of the iron-chromium-aluminum precipitate previously encountered in the HAFS concentrator. During this latter period, however, the presence of 0.05 M uranium did not prevent precipitate formation. A sample of the solids is to be analyzed spectrographically to permit further evaluation of the problem. Should HAW recycle prove undesirable, it will still be feasible to recycle concentrated waste to

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the HA Column through the feed preparation system, thus retaining the savings, of \$12 per ton of uranium in chemical costs and \$10 per ton of uranium in waste storage costs, afforded by the reduction in 2DIS flow.

Product Concentration

Batch concentration of the plutonium product stream, employed as an interim measure to improve the plutonium quality, has reduced the iron contamination of the final product by a factor greater than three. Long-term plans for controlling corrosion product contamination in the plutonium stream are centered on the procurement of a "commercially pure" titanium reboiler. Corrosion testing of the immediately-available aluminum-vanadium alloy of titanium revealed it to be quite inferior to either the A-55 or A-70 grades of pure titanium. It is anticipated that the reboiler loop will be available for installation by the end of May.

FINISHED PRODUCTS TECHNOLOGY -URANIUM CONVERSION OPERATIONProcess Performance

All UO_2 shipped met product specifications. Three containers failed to meet the particle size specifications and required remilling.

Nine hundred eighty eight (988) pounds of nitric acid per ton of uranium processed (93.7% of theoretical) were recovered at an average concentration of 48%.

The average operating rate of the calciners was 7.3 tons uranium per unit for each day on the line. The overall calciner operating efficiency was 98.6%. Calcination of enriched metal in the G calciner was continued and averaged 7.6 tons uranium for each day on the line.

Process Improvement

Following the modification of TD-4 to a deentrainment vessel for the 100% UNH concentrator vapor, an accumulation rate of about 380 pounds of uranium per day was experienced. Piping changes allow the entrained material to be routed to the calciner feed tank instead of to the sump tank for recycle recovery. As a result of this modification, the amount of uranium collected in the sump during the month dropped to less than 1000 pounds from the 7000 pounds average experienced in the recent past.

When enriched metal processing was initiated, a considerable amount of normal material was mixed with the enriched metal by way of the concentrator vapor piping. Modifications have been made to prevent future occurrences. Material collected from the enriched metal concentrator vapors will continue to be added to the normal material storage tank. Although the amount of entrainment from the enriched metal concentrator is not known at present, the evaporation rate has been adjusted to minimize uranium carry-over.

A valve actuator was installed on the feed plug valve in K-cell calciner to permit operation from the panel board. Fisher-Porter magnetic flowmeters were also installed in place of the original rotameter assemblies. Feed flow and powder temperature control has been very satisfactory during the short time the flowmeters have been in service. These items have improved operator control during calciner start-up and shut-down operations.

METAL FINISHING OPERATIONRecuplex

Fifty-four (54) runs, consisting of crucibles, fragments, powders, and clean-outs, were processed through the SC hood. Slurry losses averaged

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0.03% of the recovered Pu. The continuous and batch metal dissolvers produced a record amount of dissolved Pu.

The SE hood processed 1700 liters/day at 82% operating efficiency for an average instantaneous rate of 2070 liters/day. Waste losses to the crib averaged 0.0067 g/L (0.41% of the feed Pu).

Flowsheet studies continued on the H-3 column stripping operation based on a 23% TBP extraction flowsheet. The present CCX (stripping) solution of 0.03 M hydroxylamine sulfate, 0.16 M nitric acid, 0.0025 M ferrous ammonium sulfate (FAS), and Mistron (100 ppm) has given optimum operation. The iron impurity present in the CCX has not increased the overall iron impurity in the final product. This is due to the corrosion inhibiting effect of FAS in the product concentration step.

Task I - II

Two hundred forty two (242) runs were processed with an average filtrate recycle of 2.60%.

Operation of the continuous unit during the month was good. During a one-week period, an instantaneous rate of 160% and a sustained rate of 127% of design capacity were demonstrated with no detrimental effect on the quality of tetrafluoride powder produced.

The Task I supernatant concentrator was operated under test to determine the feasibility of heat destruction of the oxalic acid in the filtrate. The plutonium oxalate entering the concentrator averaged 0.32% by volume. Intermittent foaming in the concentrator and some short circuiting of the oxalate into the product stream was evident. Addition of Dow-Corning Antifoam to the supernate feed minimized the foaming. The distribution coefficient of the concentrate blended with flowsheet amounts of salting agent varied from 6 to 85 (7 is satisfactory). The lower values indicated the presence of trace amounts of plutonium oxalate in the concentrate.

Task III

Nine reductions were made using a magnesium oxide divider in the bottom of the crucible. The reductions were made to provide smaller segments of metal and facilitate charge make-up during subsequent processing. In all cases the segments were well formed and about equal in weight. Break-out was normal.

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PROCESS CHEMISTRY OPERATIONREDOX PROCESS ASSISTANCE

The good results obtained in laboratory studies of the use of dibasic aluminum nitrate (diban) for the reduction of the acidity of Redox solvent extraction feed streams has led to an investigation of the possibility of running an acid-deficient Redox plutonium cycle. The preliminary results from runs simulating the Redox 3A column, with plutonium(VI) in the acid deficient feed (a synthetic feed, spiked with dissolver solution as a fission product source, made -0.2 M in HNO_3) and an acid (0.06 M HNO_3) scrub, were encouraging. With five extractions and two scrub stages (batch), the plutonium waste loss was Decontamination factors of 5000 for Zr-Nb, 270 for Ru were measured, along with essentially complete clean-up from Ce and an over-all DF of 1100.

A rough measurement of the corrosion rate of 304-L stainless steel in diban at room temperature gave a figure of less than 0.01 mil per month. Both aluminum and mild steel were corroded excessively under the same conditions.

NEPTUNIUM PROCESSINGPurex Flowsheet Studies

During the February neptunium campaign in the Purex plant, high waste losses were experienced in the organic 2BW stream. The high waste losses were thought to be caused by 1) failure of the hydrazine in the 2BX to reduce the neptunium from the organic-favoring Np(VI) to the aqueous-favoring Np(V) state or 2) over-reduction of the neptunium to the organic-favoring Np(IV) state. Laboratory experiments designed to check this point were made in which the conditions found in the 2B column were simulated. It was found that the reduction of organic-phase Np(VI) by contact with an aqueous phase containing 0.5 M HNO_3 and 0.04 M N_2H_4 was quite slow. The reaction, and concurrent stripping into the aqueous phase, was only about 40 per cent complete in 15 minutes and about 90 per cent complete in 60 minutes. Even after two hours, two per cent of the neptunium remained in the organic phase, giving an E_a^0 for the system of 0.023. The E_a^0 for Np(V) in 0.5 M HNO_3 is less than 0.005. These results indicate that the reduction of Np(VI) to Np(V) with hydrazine is not rapid enough to be used in a solvent extraction column.

Purification

Approximately 1000 grams of neptunium-237 was purified in the anion exchange facility during the month. The material consisted of 780 grams which had been originally processed in January, 70 grams of scrap powder from UCRL, and 140 grams of new material from the Purex plant. As the only appreciable impurity in the 780 grams held over from the January run was the neptunium daughter, protactinium-233, shortened wash cycles were employed. Unfortunately, the short wash did not remove as much of the Pa-233 as desired, resulting in a neptunium product high in gamma activity.

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Oxidation-Reduction Studies with Neptunium Nitrate

A brief study was made of neptunium oxidation state changes during the processing steps following elution from the anion resin column. It was found that in two of the three runs studied, the neptunium product eluted from the resin was mainly in the tetravalent state, while in the third it was neptunium(V). Concentration of the nitrate solution, by evaporation, from 20 g/l to 100-200 g/l gave 100 per cent neptunium(VI). An attempt to reduce neptunium(VI) in a concentrated solution (100 g/l Np, 4 M HNO_3) by addition of 0.3 gram semicarbazide per gram neptunium produced only neptunium(V) at room temperature, even after 20 hours reaction time. For complete reduction to neptunium(IV) with semicarbazide, addition of a catalyst (0.001 M Fe^{++}) was required.

Neptunium Oxalate Precipitation

Nine hundred grams of neptunium-237 as the oxide, NpO_2 , were delivered to the Plutonium Metallurgy Operation. The oxide was prepared from ion exchange product by precipitation as the oxalate (probably $\text{Np}(\text{C}_2\text{O}_4)_2 \cdot x \text{H}_2\text{O}$), followed by calcination. A limited investigation of precipitation conditions showed that good results could be obtained with the following conditions:

- 1) Adjustment of the feed solution concentration to give a final slurry acidity of 2-3 M HNO_3 .
- 2) Pre-reduction of the concentrated nitrate solution (100-150 g/l Np(VI), 3-4 M HNO_3) with semicarbazide in the presence of iron, to give a bright green solution.
- 3) Slow addition of the feed solution to enough hot one molar oxalic acid to give 0.1 M $\text{H}_2\text{C}_2\text{O}_4$ in the supernatant after the precipitation.

Under these conditions, a light gray precipitate formed initially. This changed to a bright green, crystalline material on stirring for about 45 minutes. The measured solubility after an hour's stirring was about 30 mg/liter.

ANALYTICAL ASSISTANCE

Combination Carriers for the Carrier Distillation Spectrographic Method

An investigation was initiated to find a carrier material for the carrier distillation method that is applicable to all of the metallic impurity elements of interest in plutonium. With the present carrier (4% by weight Ga_2O_3 in PuO_2), aluminum, calcium, beryllium, and lanthanum cannot be determined by this method, but must be determined separately by the cupferron extraction method.

In initial tests, several combination type carriers have been used successfully to determine aluminum and calcium in plutonium with the carrier

distillation method. The most successful combination carrier tried this far consists of a 1% Ga_2O_3 -2.95% BaF_2 -0.05% LiF mixture of carrier and PuO_2 . This mixture gave good distillation curves for aluminum and calcium and also for iron, chromium, and nickel, which are normally determined by the carrier method. The distillations were essentially complete at the end of a forty second excitation period as compared to a sixty second excitation period for the present carrier.

More extensive tests which will include all the metallic impurity elements of interest in plutonium are planned for the future.

Controlled Potential Coulometric Determination of Neptunium.

During the month, a number of neptunium samples were titrated with the controlled potential coulometer for the purpose of testing the instrument for this analysis and also as verification of other methods of assay. Coulometric analyses of neptunium nitrate solution prepared from purified neptunium oxide (NpO_2) agreed within 0.1% of gravimetric values. In other tests using impure neptunium nitrate solutions (contaminated principally with iron), coulometric results agreed within 1% of results obtained by alpha counting (TTA extraction followed by total alpha measurement) and X-ray absorption methods.

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234-5 DEVELOPMENT -PRTR Fuel Processing

Work has been initiated on the design of equipment to process plutonium from irradiated PRTR fuel. The radiation levels and shielding requirements for the system have been calculated. Manual glove box type operation will be used in the system. Shielding will be provided to allow operation of the equipment without receiving excessive radiation exposure. Mechanical manipulators will be devised to facilitate the process operations. A preliminary scope report is being prepared.

Critical Mass Fuel Preparation Facility

A study is under way to determine the equipment and technology for a critical mass fuel preparation facility. Present information indicates the need for sub-critical cubes or cylinders of hydrogenous material containing a uniform dispersion of plutonium oxide. Paraffin and polyethylene have been used at Oak Ridge and Los Alamos respectively for this type of fabrication with some success. Facilities may be required to recover the plutonium compound from the test objects for refabrication into other shapes. Immediate effort will be directed to determine the best way of producing a uniform powder mixture in paraffin.

Effect of Titanium on the Z-Plant Process

Results of an oxalate precipitation from a "hot" Redox type solution containing 100 g/l Pu, 10,000 ppm Ti and 400 ppm V indicate a separation factor of 20 and 8 may be obtained for titanium and vanadium respectively in Task I. A further separation of titanium can be expected in the hydrofluorination step due to the volatility of TiF_4 at elevated temperatures.

Analysis of a particular corrosion test solution (alloy of composition Ti 90, Al 6, V 4) indicated 25 percent of the corrosion products to be in solution (5000 ppm titanium based on a 200 g/l plutonium solution), while the remaining 75 percent were present as a hydrated oxide precipitate. The precipitate can be retained on a 15 - 20 micron pore size filter, but the filtration rate is slow, 5 ml/min/in². A 40 - 60 micron pore size filter will not retain any of the precipitate. Such a feed as was used in these tests would require filtration before Task I use in order to prevent blinding of the oxalate filter.

Task I

A sample of porous aluminum oxide filter media (Carborundum Company "Aloxite", grade 5) obtained from Chemical Development, Hanford Laboratories, was given a quick filtration test with plutonium oxalate slurry. This media delivered a clear supernate at a satisfactory filtering rate, with no apparent blinding tendency. (Only two filtration cycles were run.)

A program is presently in progress to measure some of the physical characteristics of plutonium streams in the 234-5 process. Recent measurements on $Pu(C_2O_4)_{2.6} H_2O$ resulted in values of 2.6 g/cm³ true

density and 1.2 g/cm³ bulk density. Supernate densities ranged from 1.054 to 1.098 g/cm³. These numbers have been obtained in preparation for studying particle size distribution in plutonium oxalate slurries.

Continuous Chlorination

The initial shake-down runs of the large Hastelloy demonstration chlorinator reached a chlorination rate of 90 grams per hour (as plutonium). The equipment problems encountered were of much greater significance than the rate achieved.

The second of the two powder valves between the calciner and the chlorinator was found to be leaking due to incomplete closing of the valve. Correction was accomplished by revision of the apparatus so that the drive end of the shaft operated through more than a 90° angle.

Fouling of the phosgene gas rotameter occurred when the phosgene expanded, liquified, and carried particles from the line into the rotameter. At valve temperatures of 90 - 100 C the difficulty has disappeared. A trap for the particles in the phosgene line has been installed.

Ceramic filters continue to look promising for filtering corrosive off-gases. However, breakage of a ceramic finger from its flange has occurred twice. Alternate methods for mounting ceramic filters are being tested.

Preheating of the phosgene was discontinued after a few days operation due to plugging of the preheat line. The monel tubing (½ inch OD) was badly corroded.

Chlorination Off-Gas Studies

A document, HW-59759, "The Analysis of Exhaust Products in the Chlorination of Plutonium Oxide with Phosgene", L. F. Lust (Confidential), was issued. The Summary and Conclusions follow:

Conventional analytical methods were adapted to the analysis of exhaust gases from the chlorination of plutonium oxide with phosgene gas. The techniques were developed with cerium dioxide as a stand-in for plutonium dioxide and were then applied to the analysis of off-gases from the continuous chlorination of plutonium oxide. Exhaust gases from both the cerium and plutonium processes were found to be composed primarily of carbon dioxide produced in the chlorination reaction, chlorine formed both in the chlorination reaction and by dissociation of phosgene, carbon monoxide from phosgene dissociation, and unreacted phosgene. The solids which condensed on the surfaces of the exhaust system were eliminated by keeping the surfaces at temperatures greater than 325 C.

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DECLASSIFIEDPlutonium Trichloride Reduction (Batch)

Two RS-4 crucibles flame sprayed with steel were tested with 700-gram reductions. The coating does not seem to as strong as nickel of the same thickness. One coating held the melt, but the other split part way down one side and allowed some of the melt to escape.

A 98 percent yield was obtained on a 660-gram reduction when the reductant was placed below the plutonium (III) chloride with the booster plus excess reductant on top. In this case, more of the crucible was jacketed to give better containment of the booster reaction. A like reduction was attempted with less booster (0.2 mol I_2 /mol Pu instead of 0.3) to determine if this would decrease the violence of the reaction. The reaction seemed to be about the same, but a lower yield resulted.

Two thousand five hundred nineteen grams (2519) of plutonium metal were delivered to Finished Products. Impurities were below 1000 ppm and densities ranged from 18.42 to 19.17 grams/cc.

ORGANIZATION AND PERSONNEL

Personnel

On March 16, 1959 S. J. Beard transferred from the Purex Technology Operation to the Advance Process Development Operation.

Trips

R. L. Stevenson attended the Industrial Nuclear Safety Conference for meetings on nuclear safety and review of Los Alamos incident of December, 1958. This meeting was held at the E. I. du Pont de Nemours & Co., Savannah River Laboratory, Aiken, South Carolina on March 9, 10 and 11, 1959. Contact was made with H. K. Clark.

W. G. Browne presented a talk on "The Importance of Atomic Power to the Peoples of the World" to The Electric Club of Oregon, Portland, Oregon on March 26, 1959. Contact was made with R. K. Gilbert.

A. E. Smith visited the Lawrence Radiation Laboratory, Livermore, California on March 16, 17 and 18, 1959 for discussions on plutonium metallurgy research and development and Gorton lathe capability test. Contact was made with Max Harris.

Visitors

A. J. Kaye of GE Manufacturing Services Laboratory, Schenectady, N.Y. visited A. E. Smith, R. E. Smith and E. F. Kurtz on March 30 and 31, 1959 for consultation in connection with "Hands-Off" Program.

D. G. Karracker, D. A. Orth and J. C. Eargle of E. I. du Pont de Nemours and Co., Savannah River Laboratory, Aiken, South Carolina visited E. R. Irish, W. H. Swift, J. P. Duckworth and G. C. Oberg on March 3, 1959 for discussions on Purex process and related programs. Mr. Orth also visited K. M. Harmon on March 4, 1959 for discussions on neptunium processing.

J. E. Bigelow of the Atomic Energy Commission, Operations Analysis, Washington, D.C. visited H. C. Rathvon on March 10, 1959 to tour Purex Plant and get acquainted with process.

W. H. McVey of the Atomic Energy Commission, Operations Analysis, Washington, D.C. visited H. C. Rathvon on March 10, 1959 to tour Purex Plant and get acquainted with process.

Joe Rosselot of the General Electric Company, Aircraft Nuclear Propulsion Department, Cincinnati, Ohio visited J. P. Duckworth on March 19, 1959 to discuss system of "Exempt Manpower Register".

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Visitors (Continued)

D. P. Flaum of the Division of Classification, Washington AEC - HOO Liaison visited E. R. Irish on March 24, 1959 to tour Purex Plant and become acquainted with process.

L. S. Grill of the Dow Chemical Company, Rocky Flats Plant visited K. M. Harmon and J. W. Handshuh on March 18, 1959 for discussions on analytical problems.

Inventions

None

R. E. Tomlinson

Acting Manager
Research and Engineering

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EMPLOYEE RELATIONS OPERATION
MONTHLY REPORT -- MARCH 1959

I. RESPONSIBILITY

During the month, responsibilities of the two Safety and Fire Prevention Specialists were transferred to Facilities Engineering Operation.

II. ACHIEVEMENT

FIRE PROTECTION OPERATION

There were four fire responses during the month. Two were false alarms. One was caused when controlled burning ignited a utility pole after the burning crew left at the end of the shift. Loss amounted to less than \$100. There was an explosion in a hood at 234-5 building. The amount of loss has not yet been determined.

During the month 325 fire extinguishers were inspected, three installed, five delivered to new location, 12 seals broken and not reported, 200 weighed and 36 serviced. Twenty-four gas masks were inspected and ten serviced. Eighteen hand lines were inspected. Sprinkler systems at 272-W, 272-E, 277-U, 277-S, and 234-5-Z buildings were inspected and daily checks were made on 4-B dry system in 2101 building.

Fire Protection officers taught 32 two-hour sessions of American Red Cross First Aid (Standard Course). Sixteen members of Security Patrol and 23 Chemical Processing Department people completed the course.

A lecture was given inside the 202-S building on types of fires, extinguishers, discharge time, contents, etc. After the lecture a fire extinguisher demonstration was given outside on flammable liquid fires using CO₂ and Dry Chemical extinguishers. Classes were held each Friday in Civil Defense Rescue work.

COMMUNICATION

Considerable time was spent during the month in preparation of plans and promotions for the Safety Lingo contest.

A letter was sent to the Manager - Contract Administration containing suggested revisions for the HAPO OPG's. These revisions were accumulated from the various CPD components and consolidated by the Communication office.

Public Communication and Community Relations activities included assistance in collection and preparation of material for a news release concerning the 234-5 explosion; assistance in advance preparation for the tour of HAPO by members of the Joint Committee on Atomic Energy; assistance in selection of speakers for three civic engagements; and, a discussion

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about national publicity release material and signed articles for the various trade publications with a representative from the Company's News Bureau in Schenectady.

In addition to the standard informational pieces, the various Department Communication media carried material on the Savings and Security program, the Safety Lingo contest, a number of organizational changes, and four items on engineering recognition.

UNION RELATIONS OPERATION

The Wonacott Arbitration Case has been tentatively rescheduled for the first week in May. Security clearances for the various participants have not all been approved.

The HAMTC advised the Company that they wish to proceed with arbitration on four specific cases. The only CPD case is that involving H. A. Burton, an operating engineer who protested when the Company installed floor type push button controls on the overhead shop crane. This was done to expedite the handling of material by the several crafts within the shop and has resulted in a substantial reduction in crane operating time, formerly the responsibility of the Operating Engineers. The Company has not yet acknowledged that the issue is an arbitrable one and the Union has been asked to point out which article of the Agreement has, in their opinion, been violated.

The Company is still awaiting the arbiter's decision on the J. Graham Case which was heard September 8, 1958. This case was concerned with the Company having established for a thirty day period a straight swing shift for a small group of employees -- the union contended that it had not been properly negotiated. The arbiter was Hubert Wyckoff.

The month of March was unique in that only five grievances were filed in Chemical Processing Department, and none were processed at Step II.

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UNION RELATIONS OPERATION

	<u>March</u>	<u>February</u>
Bargaining Unit Employees in CPD	813	813
Bargaining Unit Employees Utilizing Check-off	544	543
Percentage of Total Bargaining Unit Employees Utilizing Check-off	66.9	66.8

Following is the grievance statistics summary for the month of March, 1959.

	<u>Unit</u>	<u>Nonunit</u>
Grievances received year to date	20	1
Grievances pending at Step II on 2-28-59	8	0
Grievances received during the month	4	1
Satisfactorily answered at Step I	2	0
Settled at Step I through expiration of 90 day time limit	4	0
Processed at Step II	0	0
Pending at Step II on 3-31-59	5	1
Pending at arbitration		
Active	3	0
Inactive	9	0

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HEALTH AND SAFETY OPERATION

<u>Chemical Processing Department</u>	<u>March</u>	<u>February</u>	<u>Year to Date</u>
Disabling Injuries	0	0	0
Serious Accidents	0	0	1
Medical Treatment Injuries	49	34	128
Technical Overexposure Incidents	0	0	0
Radiation Occurrences	15	12	51
Fires	1	1	3
Security Violations	1	1	6

Comments on Statistics

Controlled burning of weeds, which had not been completely extinguished, ignited a steam line support pole between B Area and B Street in 200 East Area. Damage amounted to \$100.00.

Programs

During the month, the Supervisors Safety Training and First Aid Training Programs were conducted in Power and General Maintenance, Redox, Purex, Finished Products, and Employee Relations Operations. Training efforts are summarized as follows:

FIRST AID TRAINING

	<u>Hrs. of Instruction</u>	<u>No. of People</u>	<u>Classes Completed</u>
Current Month	62	114	7
To Date	96	146	7

SUPERVISORS SAFETY TRAINING

	<u>Hrs. of Instruction</u>	<u>No. of People</u>	<u>Program Completed</u>
Current Month	37	95	Financial Operation
To Date	62	183	Facilities Engineering
			Research & Engineering
			Finished Products

Plans for the Department Safety Lingo contest, starting April 3, 1959, were completed.

Six Safety Slogans were posted on the Safety Marquee Boards.

Investigations

A "peanut oil" fire in Room 179, 234-5 Building, occupied by HLO personnel for plutonium development work, was formally investigated jointly with the Laboratories.

Reports or Advices Issued

CPD Monthly Safety and Fire Prevention Narrative to HOO-AEC Safety Division
 CPD Annual 1958 Safety Highlight to all employees
 As We See It, Use and Care of Personnel Meters, to all exempt personnel

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PERSONNEL DEVELOPMENT AND PLACEMENT

A. <u>Employment</u>	<u>Exempt</u>	<u>Non-Exempt</u>	<u>Total</u>
<u>Additions</u>	0	4	4
New Hires	0	0	0
Reactivates	0	1	1
Re-Hires	0	0	0
Transfers from other components	0	3	3
<u>Removals</u>	3	10	13
Illness	0	3	3
Transfer to other components	3	6	9
Resigned	0	1	1
<u>Requisitions (Non-Exempt)</u>			
Number on hand at beginning of month		4	
Number received during month		6	
Number filled		7	
Number on hand at close of month		3	
<u>Request for Transfer (Exempt)</u>			
Number on hand at beginning of month	7		
Number received during month	0		
Number transferred	1		
Number closed out	1		
Number on hand at close of month	5		
<u>Applications for Employment (Exempt)</u>			
Applications received during month	2		
Hired	0		
Closed out	4		
Applications on hand at close of month	2		
Open Requisitions	3		
<u>Service Pins</u>			
A total of 4 pins were issued as follows:			
10 yrs. service	1 Male	0 Female	
5 yrs. service	3 Male	0 Female	

G. L. Davis, Facilities Engineering Operation, was transferred to the Vallecitos Atomic Laboratory, APED during the month.

An offer was extended to Harold York, Metallurgical Products Department, Detroit, Michigan and was accepted. Mr. York will transfer to the Research and Engineering Operation in June, 1959.

Mr. James W. Fillmore, who will graduate in June from the University of Utah with a BS degree in Mechanical Engineering, accepted an offer made last month and will join the Maintenance Operation of the Finished Products Operation in June, 1959.

Status - Personnel Development Program for Non-Exempt Employees

Number of appraisals scheduled in March	98
Number of appraisals delinquent 3-31-59	68

Correspondence

During March a total of 10 inquiries regarding housing loans for CPD personnel were answered.

Military Service Records

Records show that CPD has a total of 113 employees who are subject to military training through Selective Service or Armed Forces Reserve action.

	Exempt	Non-Exempt
Ready Reserve	8	11
Standby Reserve	17	6
Deferments Requested	0	
Deferments Granted	0	
Deferment Requests Pending	3	

B. Personnel Training and Development

Participation in Training Courses

Exempt	
Non-Exempt	
G. E. Supervisory Selection Program - No. Completed	3
G. E. Supervisory Selection Program - No. Revaluated	4
Non-Exempt Personnel Counselling	3

C. Office Services

Duplicating - Copies Produced	150,332
Xerox Masters Made	480
Mail - Total Pieces of Mail Handled	67,630
Registered Deliveries	470
Addressograph-Pieces of Material Produced	15,087

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The 1959 Salary Review was completed and given final approvals. Necessary statistics to forecast Department position resulting therefrom were prepared.

Evaluation of six exempt positions to be established in the Department's Relations Practices Operation were completed and authorization requests prepared.

An authorization request to change the title of a section component was prepared. Revaluation of a unit supervisory position was authorized.

Establishment of a new sub-section position was requested.

Formal audits of two exempt positions were completed.

Two nonexempt jobs were reviewed resulting in upgrading one secretary from Schedule I to Schedule II and the establishment of an instrument specialist position.

Evaluation of jobs selected as benchmarks for the HAPC Compensation Study has been completed. A study team is now working on analysis and validation of the composite evaluations.

Descriptions prepared using the new format have been received for about 34% of the CPD non-unit jobs.

SUGGESTION PLAN

	<u>February</u>	<u>March</u>
Suggestions Received	107	88
Acknowledgments to Suggestions	105	90
Suggestions Pending Acknowledgment	2	0
Suggestions Referred to Operations for Investigation	105	90
Suggestions Pending Referral to Operations	2	0
Suggestions Completed and Closed	87	135
Adopted Suggestions Approved by Board	16	30
Adopted Suggestions Pending Approval by Board	12	18
Total Net Tangible Savings	\$672.20	\$1941.50
Cash Awards Paid During Month	\$457.50	\$ 315.00

As of the end of March, \$772.50 have been paid in awards with a total of \$2613.70 in net tangible savings. The average award of the 70 adopted suggestions is \$11.04 (below criteria of \$27.27) and the ratio of awards to savings is 29.55% (above criteria of 16.1%).

	<u>February</u>	<u>March</u>
Total number of suggestions outstanding to Operations at end of the month	212	155

Participation in Benefit PlansFebruaryMarch

Insurance Plan	99.9	99.9
Pension Plan	99.7	99.8
Stock Bonus Plan	53.9	53.8
Good Neighbor Fund	63.7	63.6
Savings & Security Program	96.8	97.0

III. ORGANIZATION AND PERSONNELA. Meetings

Members of the Employee Relations Operation attended approximately 75 meetings during the month. In addition to Safety, Security, Round Table, and Information meetings, these included:

Meetings with counterparts in other departments

CEO Construction Operation meeting on HAPD Radiation Protection Problems.

AEC Fire Protection meeting concerning a report on Annual Fire Protection Engineers Conference in Washington, D. C.

Step II Pre-grievance and succeeding grievance sessions

Industrial Relations Council meetings

Meeting regarding the Supervisory Selection Program for Firemen.

Meeting regarding overtime for different crafts

Meetings concerning reorganization

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B. Personnel Activities

Fire Protection Operation held 96 inside classes and 52 outside drills, in which 10,015 feet of hose, and 416 feet of ladders were used. The percentage of time spent in training of 13.6, amounting to 766 hours.

Health and Safety Operation provided copies of "Unaccustomed As I Am To -- Safety Meetings" to Circuit Protective Devices Department and Defense Electronics Division.

The Manager, Union Relations presented two talks at Columbia Basin College, one on General Electric's "do right voluntarily" philosophy and the second on "Union Relations Philosophy in the Economic Picture".

The Specialist, Technical Personnel Placement participated in a recruiting trip at Kansas State University, Kansas University, Texas A&M College, and the University of Texas.

Captain Paul Perkins, of Fire Protection Operation, gave a speech to the Hanford Kiwanis Club on the American Red Cross Blood Program, "Our Need for Blood".

C. Safety and Security

There were two medical treatment injuries in Employee Relations Operation during the month. There were no security violations.

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

END

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