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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT
FOR

RL-SEP--706-Del.

AUGUST, 1965

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Compiled By
OPERATION MANAGERS

September 21, 1965

HANFORD ATOMIC PRODUCTS OPERATION
RICHLAND, WASHINGTON

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

AUGUST, 1965

I. SUMMARY

August production, as per cent of the HAPO Production Forecast (RL-GEN-23), is summarized below:

	<u>August</u>	<u>Fiscal Year</u> <u>To Date</u>
Separated plutonium nitrate	100	97
Separated uranium nitrate	97	93
Uranium oxide	96	98
Plutonium metal buttons	82	88
Fabricated parts	99	99

The production of plutonium metal buttons was below that forecasted because of feed shortage and an unusually high number of mechanical failures.

Following the scheduled outage which began in July, Purex resumed operation on August 6. The processing rate was limited to about 23 tons per day, however, because only two of the three dissolvers could be used. The third dissolver was out of service all month to allow renovation of the dissolver cell and installation of the first annular-type dissolver in Purex.

In Purex Head-End, eleven fission product recovery runs were made during August, yielding 1050 kilocuries of promethium-147 and 350 kilocuries of strontium-90.

Redox solvent extraction equipment was used exclusively for enriched uranium processing all month. On-line efficiency was 82 per cent, a significant improvement over the 31 per cent experienced last month. Most of the outage time was devoted to improving performance of the 1A, 1S, and 2D extraction columns by flushing them with 10 per cent nitric acid.

The second chromatographic purification run yielded 16 grams of americium oxide.

A study was made to determine the feasibility and cost of installing equipment in the Plutonium Reclamation building for blending plutonium nitrate solutions. The installation was determined to be feasible; the cost was estimated at \$280,000.

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Laboratory tests have confirmed an earlier experience at Rocky Flats that the reported carbon content of plutonium buttons could be decreased by a factor of two. This reduction can be accomplished by cooling the sampling drill bit with argon gas instead of carbon tetrachloride.

The FY 1966 O2 Program Budget submitted to Washington AEC was \$873,000 below that requested by the Chemical Processing Department. Recent studies indicate that the O2 Program operating costs will exceed the budget by \$1,000,000 to \$1,200,000.

J. H. Warren

General Manager
Chemical Processing Department

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

AUGUST 1965

II. ACHIEVEMENTS

A. PRODUCTION OPERATION

1. Production Statistics

<u>a. Percent of Forecast (1) Achieved</u>	<u>August</u>	<u>Fiscal Year to Date</u>
Separated plutonium nitrate	100	97
Separated uranium nitrate	97	93
Uranium oxide	96	98
Plutonium metal buttons	82	88
Fabricated parts	99	99

<u>b. Purex</u>	<u>August</u>	<u>July</u>
Uranium nitrate produced (tons)	459	262
Average production rate during operation (T/D)	22	26
Total waste loss (%)		
Plutonium	0.39	0.45
Uranium	0.33	0.45
On-line efficiency (%)	81	33

<u>c. Redox</u>		
Uranium nitrate produced (tons)	203	52
Average production rate during operation (T/D)	8	5
Total waste loss (%)		
Plutonium	0.65	1.07
Uranium	0.20	0.25
On-line efficiency (%)	82	31

<u>d. Uranium Reduction (tons)</u>		
Normal UO ₃ loaded	503	252
Enriched UO ₃ loaded	223	71
Normal UO ₃ approved for storage	469	276
Enriched UO ₃ approved for shipment	152	51
Normal UO ₃ shipped	0	0
Enriched UO ₃ shipped	152	0
Normal UNH backlog	253	297
Enriched UNH backlog	123	143

(1) RL-GEN-23 - HAPU PRODUCTION FORECAST

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f. Power

	<u>200-East</u>	<u>200-West</u>
Raw water pumped (gpm)	9 795	5 935
Filtered water pumped (gpm)	1 077	1 252
Maximum steam generated (lbs./hr.)	191 000	97 000
Average steam generated (lbs./hr.)	146 000	75 000
Total steam generated (M lbs.)	108 292	55 504
Coal consumed (tons)	3 576	2 765

The production of plutonium metal buttons was below that forecasted because of feed shortage and an unusually high number of mechanical failures.

MK Harmon

Acting Manager, Production

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2. FISSION PRODUCT DATA (Kilocuries)

AUGUST, 1965

[illegible]

All promethium-147 inventories include decay correction of two years.

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II. ACHIEVEMENTS (Continued)

B. PUREX OPERATION

1. Operating Continuity

Purex Plant operation resumed on August 6, 1965 with non-weapons grade metal feed. Non-weapons grade processing continued until August 16, 1965 when a plant cleanout and switch to regular metal was completed. Regular metal processing continued through the remainder of the month without interruption. Rates were maintained at a capacity factor of 2.8.

Operation of the fission product processing facilities at the Purex Head End, B Plant, and the Cesium Loadout Station was satisfactory. Solvent extraction column modifications were completed at the Strontium Semiworks. One strontium cask was loaded for shipment to Quehanna, Pennsylvania.

2. Processing Operation

a. Purex Processing

Uranium and plutonium products met specifications.

Three neptunium purification runs were completed yielding 2587 grams. One shipment totaling 708 grams of neptunium was made. Neptunium from the Redox Plant was purified throughout the month.

At the conclusion of the maintenance outage on August 6, 1965, the Purex Plant was started up using non-weapons grade metal as feed. After the switch to normal metal on August 16, 1965, the waste rework material in the TK-F8 (waste reflux tank) was successfully reprocessed although higher-than-normal plutonium waste losses were experienced from the HA (first cycle decontamination-scrub) column. A marked decrease in the ruthenium content of the final uranium product was noted during the latter part of the month.

Renovation of A Cell and the installation of the first multipurpose dissolver was accomplished without interrupting processing operations.

Sufficient aged feed has been forecasted to keep the Purex Plant operating through October, 1965.

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b. Purex Head End Processing

Purex Head End fission product recovery operations were resumed on August 14, 1965 after a one-month outage due to the Purex Plant shutdown. Caustic-tartrate leaching of the solids discarded from the high level waste feed solution is being performed to reduce product losses. Eleven runs were made and 1050 kilocuries (amount at two years age) and 350 kilocuries of promethium and strontium, respectively, were produced.

c. B Plant Processing

Oxalate processing (to separate the rare earths from strontium) at B Plant was terminated on August 11, 1965 after all available fission product crude feed was consumed. In this run series from July 26, 1965 to August 11, 1965, consisting of sixteen oxalate runs, 7600 gallons of Tank 003 CR crude feed solution were processed and 4000 kilocuries of promethium-147 (2600 kilocuries at two-years age) and 800 kilocuries of strontium-90 were recovered. Product recoveries are estimated to be greater than ninety percent but are not accurately known due to the solids in the feed.

d. Strontium Semiworks Processing

The HAPO-II-1 strontium cask was loaded with approximately 100 kilocuries of strontium-90 from E Cell on August 30, 1965. Potassium carbonate was again used for final pH adjustment after strontium carbonate precipitation to maintain the inert zirconium in solution.

e. Cesium Processing

Cesium casks 45-A and 46 were received on site on August 23, 1965, and loaded with cesium-137 during the period August 26, 1965 to August 30, 1965. Both casks were loaded to 100 percent cesium breakthrough while recycling the latter portion of the waste to the feed tank, Tank 103-C. In spite of the attempt to obtain maximum loading, both casks loaded abnormally light - Cask 45-A, 32 kilocuries, and Cask 46, 36 kilocuries. The DeCalso resin level was measured and found to be normal in Cask 45-A but 6 inches below normal in Cask 46. A sample of Tank 103-C feed has been obtained to evaluate the feed loading characteristics.

f. Waste Management

The In-Tank Waste Solidification Unit, operating at 16,000 pounds of air per hour, reclaimed 185,000 gallons of non-boiling waste storage space. Average evaporation rates were 6.5 gallons per minute. The unit was shut down from August 2, 1965 to August 13, 1965 to permit necessary preparatory work for later installation of two prototype electrical immersion heaters in the Tank 101-BY east and west sluice pits.

Approximately 200,000 gallons of waste solution in Tank 101-AX were pumped to Tank 103-AX for boiloff as part of program to regain non-boiling waste storage space in Tanks 111-B and 112-B.

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3. Equipment Experience.

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The reconditioning of the A Cell floor (dissolver position only) in the Purex Plant canyon was completed this month. Work consisted of installing at the proper elevation a one-inch stainless steel plate equipped with required equipment support pads. Cement grout was pumped between the existing floor and new installed stainless steel plate to provide adequate support surface. All of the work was accomplished remotely. The first new multipurpose dissolver and associated vessels were installed in A Cell, including a new silver reactor and a repaired steam heater.

A major overhaul was completed on the east sample gallery hood exhaust fan in the Purex Plant. Bearings, belts, blower, shaft, and steel support base were replaced. The work was accomplished to improve the performance and reliability of the unit.

The discharge damper to the Number Three Purex ventilation air supply fan failed due to corrosion and extended service. A new replacement damper was installed and the unit returned to service.

The Number Two Purex process air compressor failed when a low pressure cylinder liner became damaged. The cylinder liner, piston, rings, and valves were replaced and the machine returned to service.

A lucite panel was replaced in the N Cell (Purex plutonium ion exchange unit) hood to prevent contamination leakage into the hood room and improve visibility for work inside the hood.

The vapor line connecting the condenser and steam heater in the Purex vessel vent system was installed with neoprene gaskets to complete replacement of the vessel vent system.

The thermohm jumper was replaced on the E-K4 (final uranium) concentrator.

Acid pump 13-2 (UO₂ recovered acid transfer pump) failed when the mechanical seal became damaged. The pump seal and bearings were replaced and the pump returned to service.

Construction forces worked from August 2, 1965 to August 13, 1965 to prepare Tank 101-BY (In-Tank Waste Solidification Unit) to receive two electrical immersion heaters. Modification of the west sluice pit was completed and approximately five days work remain to complete the east sluice pit. One of the 240 kilowatt heaters was tested in preparation for installation. A leak in the air addition line was found and repaired. An electrical continuity check revealed potential electrical problems. The installation of this unit in Tank 101-BY has been delayed to permit further evaluation of its integrity.

Approximately 66,000 gallons of coating waste were pumped from Tank 102-C to Tank 103-T before a gradual reduction in rates was encountered. Subsequent checks indicated that the pump suction was plugged, probably from the increasing sludge level in Tank 102-C. A spare pump with a three-foot shorter suction leg has been readied for installation and the necessary routing changes are being made.

Two bulge detectors were installed in Tank 105-A. No movement of the tank bottom has been detected at these points. Lateral radiation readings also remain unchanged. The north sluice pit is now completed and work continued on connecting piping for the sluice pump.

Modifications to and testing of the solvent extraction columns in the Strontium Semiworks to permit promethium flowsheet testing were completed. Several attempts to disengage the P-7 (HA column spare feed) pump remote electrical connector in which the drive bolt had previously sheared off were unsuccessful.

The pump used to transfer low level waste temporarily placed in Tank 101-AX failed because of a damaged electrical conductor in the pump pit wall connector. Repairs were made and the pump returned to service.

4. Radiation Experience

Burial of the old Purex Tank Fl6 (concentrated high level waste denitration tank) in the 200-West burial ground was completed with good contamination control.

The 151-AX and 152-AX waste diverter station cover blocks, which were found contaminated to 2500 mrad per hour on August 18, 1965, were cleaned to 5000 counts per minute (approximately 1 mrad/hr.). Daily flushing of the diverter blocks and cells was initiated to prevent a recurrence.

Sections of the abandoned B-C Crib area south of the 200 East Area are being backfilled and the topsoil chemically treated to prevent growth of vegetation since there has been a localized spread of contamination. The tumbleweeds growing in the area had radiation readings as high as 100 mrad per hour.

Low level airborne contamination entered the B Plant Operating Gallery via an open weight factor sensing line when the centrifuge was started. The area was immediately cleaned and released.

5. Analytical Experience

The procedure for the determination of microgram amounts of thorium in plutonium, neptunium and uranyl nitrate solutions has been revised and updated. The improved procedure eliminates a hydrochloric acid evaporating step, which was very corrosive to stainless steel hoods and the laboratory ventilation system.

Equipment for canning radioactive dry waste prior to disposal has been set up for routine use. Use of "tin cans", replacing ice cream cartons, provides better contamination control and eases handling of highly-contaminated waste arising from analysis of fission product and waste management program samples.

A pyrohydrolysis-spectrophotometric measurement procedure for the determination of fluoride ion has been established and is ready for use in the thorium campaign.

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Two new analytical methods, required for the Strontium Semiworks cerium-promethium flowsheet tests, were placed in service during the month.

1. The Volumetric Determination of Silver with Thiocyanate.
2. The Volumetric Determination of Persulfate.

Manager-Purex

WM Harty:MLM:gt

CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

AUGUST, 1965

II. ACHIEVEMENTS (Continued)

C. REDOX OPERATION

1. Operating Continuity

Processing activity in the Redox plant this month was confined exclusively to enriched uranium processing. Efficiencies were much improved. The process functioned 82 percent of the time available, at operating and mechanical efficiencies of 86 and 95 percent, respectively.

The Uranium Oxide plant performed satisfactorily throughout the month and the expected production for both depleted and enriched uranium oxide was achieved.

2. Processing Operations

a. Redox Processing

The solvent extraction equipment was committed to enriched uranium processing during the entire month. Unstable performance of the extraction columns was encountered at various times early in the month, resulting in above normal waste losses and out-of-specification products which necessitated rework. Corrective steps were taken and column operation was satisfactory during the latter half of the month.

Operational down-time was sustained primarily for flushing the 1-A, 1-S, and 2-D extraction columns with 10 percent nitric acid to improve their performance. Problems in establishing the backcycle salt flow to the 1-A column, following an acid flush on 8-21-65, extended the downtime for the flush by approximately 16 hours.

The operational characteristics of the 1-N column, installed in the Redox plant in March, 1965, were re-evaluated during the early part of the month. As a result a new letdown valve jumper was installed which has improved operation by providing closer control of the aqueous-to-organic flow ratio in the column.

Performance of the 1-N column was further improved by the addition of a reductant (ferrous ammonium sulfate in nitric acid) to the demineralized water used in the 1-N column to strip neptunium, plutonium and uranium from the 1-S column product stream. Initial results indicate that the column is capable of performing satisfactorily at higher rates with the modified stripping solution and with a decrease in neptunium losses to the 1-N column waste stream.

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b. Uranium Oxide Processing

All calciners except M, operated satisfactorily during the month and the expected production was achieved. The M-calciner was out of service essentially all month for replacement of both jack shafts which were found slightly bent at the coupling flanges. All oxide produced during the month met specifications.

3. Mechanical Experience

a. Redox Plant

The pump in the D-14 backcycle waste concentrator was replaced on 8-1-65, when it began drawing excessive amperage. The change-out was accomplished without incident and with a minimum of downtime.

Three agitator failures occurred during the month (E-13, L-16 and F-4). The agitator in the E-13 ozonator failed on 8-7-65. Failure was attributed to motor seizure since the failed pump was one of the new direct-drive units and there are no gears or bearings in the drive. The agitator in the L-16 plutonium recycle tank failed on 8-10-65 because of a broken shaft and the agitator in the 3-D column feed tank (F-4) failed on 8-12-65 due to a seized shaft.

On 8-29-65, a leak was discovered in the chest-type heat exchanger on the D-14 backcycle concentrator. Installation of a new unit was completed on 8-30-65. Since the failed heat exchanger had been in operation for only six months it is planned to decontaminate the unit for a close-up inspection to determine the cause of the early failure.

b. Uranium Oxide Plant

The inboard free-end agitator bearing on M-calciner was replaced on 7-27-65. However, the bearing began running hotter than normal and the calciner was taken out of service on 8-4-65. Subsequent investigation revealed that the jack shafts (2) at both the free and drive ends of the calciner main shaft were bent slightly at the coupling flanges. At month-end, new jack shafts had been installed and the calciner main shaft was being realigned.

4. Waste Handling and Decontamination

The M-130 cask, containing the third of seven shipments of assembled blanket fuel elements from Shippingport, Pennsylvania, was unloaded and the fuel elements stored under water in the 221-U canyon building on 8-20-65. Eleven blanket assemblies have been successfully disassembled to date.

Equipment valued at approximately \$70,000 was received from customers for decontamination, repair, inspection or burial during the month. Equipment valued at approximately \$60,000 was returned to customers,

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representing a savings of approximately \$8,000 based on the cost of new equipment.

5. Radiation Experience

There were no significant changes in the radiation readings under the 107, 108 and 109-SX underground waste storage tanks during the month and no measurable loss of liquid was detected.

Test wells are being drilled to depths of up to 70 feet around the 115-SX tank which leaked approximately 16 inches of dissolved sodium nitrate salt solution to ground during March 1965. Two wells have been drilled to date, which show the deepest penetration of radiation activity to be 9 feet below the tank bottom. Maximum beta-gamma activity encountered in soil samples brought to the surface from this depth to date is 6,000 c/m.

6. Analytical Experience

The Redox Analytical Laboratory provided non-routine analytical support to its various customers which included, but was not limited to: 1) plutonium polymer determinations on the Redox plant's process streams to evaluate waste losses; 2) iron determinations on process streams to assist in the evaluation of equipment corrosion, if any, after PRTR and NPR fuel processing; 3) analytical support for control of the second americium-241 purification run conducted by Separations Chemistry Laboratory; 4) dissolution and analysis of iron flux monitors for manganese-54 in continued support of the AEC's Reactor Materials Test Program.

R N McCullough

Manager - Redox

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

AUGUST, 1965

II. ACHIEVEMENTS (Continued)

D. WEAPONS MANUFACTURING OPERATION

1. Operating Continuity

The fabrication of model 88-C weapon components was without significant interruption during the month. The production of unfabricated plutonium by the button line was curtailed somewhat by the lack of sufficient quantities of specification feed material. Recovery operations were retarded by outages of the slag and crucible dissolvers and by the need to rebuild the incinerator furnace. The waste-treatment facilities and the americium-recovery equipment performed satisfactorily.

2. Processing Operations

a. Plutonium Fabrication

Information on plutonium-fabrication activities is presented in document RL-SEP-723 (Atomic Weapon Data).

b. Plutonium Reduction

Button line production consisted of normal weapons-grade plutonium at the beginning and end of the month, with some nondefense material at mid-month. A portion of the early production was slightly high in uranium content as a result of the processing of the PRTR material in July. The affected buttons (8) were successfully blended by the fabrication operation.

The processing of the nondefense material was without incident. Production during the latter part of the month was interrupted by the high Pu-240 content of the feed and lack of specification feed material for blending purposes.

c. Nondefense Plutonium Processing

The following nondefense materials were prepared and packaged for later shipment:

45 kilograms of Pu oxide for German Euratom
80 kilograms of Pu ingots for French Euratom

The following nondefense materials were shipped:

30 kilograms of Pu oxide to German Euratom
8 kilograms of Pu oxide (PRTR) to Battelle-Northwest

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10 kilograms of Pu ingots to Battelle-Northwest
400 grams of Pu metal to Sweden
175 grams of Pu metal to Battelle-Northwest
800 grams of Pu nitrate to GE-Vallecitos
30 grams of U-233 oxide to Westinghouse
50 grams of U-233 oxide to Los Alamos

d. Plutonium Reclamation

Ninety-seven (97) kilograms of plutonium, as nitrate, were delivered to the button line from the recovery facilities during the month.

The incinerator furnace continued out of service, but the leach hood and the off-gas scrubber in the incinerator facility were operated to perform essential leaching such as the rinsing of nitric-soaked rags.

Three hundred and five (305) cans containing approximately 15 kilograms of plutonium were processed through the slag and crucible dissolvers during the month.

One hundred and eighty-one (181) grams of plutonium were returned to the main process stream from 80,315 liters of aqueous waste, which were processed through the waste-treatment facility. Also, 8.7 grams of americium were recovered and stored for future processing.

The removal of plutonium from the Recuplex RB hood floor was completed during the month. The vessels in this hood are being emptied at month-end.

3. Mechanical Performance

Fabrication and Final Inspection equipment performed well.

Button line equipment experienced inadequate vacuum on the fluorinator and the failure of a gasket on one of the reduction furnaces.

Both of the slag and crucible dissolvers suffered frozen top ball valves. On the Mark I (06) vessel, it was found necessary to replace the valve seat and the Limitorque valve-operating mechanism. This dissolver should be returned to service during the first week in September. Repairs to the Mark II (04) vessel will follow immediately.

Eight of the recovery pumps failed during the month. Four were overhauled and returned to service. Four were not repairable and were buried.

Five failures of the Teflon-lined dissolver pots in the miscellaneous treatment facility were experienced. One of the failed sections has been replaced by an experimental, all metal, Coronnel section.

Repair of the incinerator furnace by J. A. Jones forces was started.

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The emission spectrograph was out of service approximately half of the month for miscellaneous difficulties. The manufacturer's representative has recommended replacement of two lenses and the mirror. These parts are being fabricated by the Battelle-Northwest optical shop. The No. 1 mass spectrograph was under repair during the entire month, and should be back in service by early September.

4. Radiation Experience

Radiation and contamination control statistics indicated good control during the month.

There were no cases of potential plutonium deposition.

Failure of a pressure-vessel gasket on one of the reduction furnaces in the button line resulted in a pressurization of the process hoods and subsequent moderate contamination of the Task II and III work areas. Decontamination of the work areas was readily accomplished, with no serious interruption in production. One employee experienced positive nasal smears, but these were promptly and successfully reduced to nondetectable. No complications are anticipated.

5. Analytical Experience

Number of samples received	2,122
Number of determinations	12,085

With mass spectrometer and emission spectrometer operation at only about 50% of normal, it has been necessary to work overtime in order to secure the data to permit shipments to be made on schedule. At month-end, there was a large backlog of process-control determinations to be performed. Overtime will be used as necessary to reduce the backlog to a reasonable level.

SG Smolen

Manager
Weapons Manufacturing

SG Smolen:ap

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

AUGUST, 1965

II. ACHIEVEMENTS (Continued)

E. FINANCE AND SERVICES OPERATION

1. Production Cost Accounting

Studies were initiated during August to determine the CPD shortage of funds in the O2 Program. The FY 1966 budget submitted by the Commission to Washington AEC was \$873,000 below the CPD request. It currently appears with this further budget reduction, the CPD O2 Program operating costs will exceed the AEC submission by \$1,000,000 to \$1,200,000. Economies in the O3 Program were found to have resulted in lower cost expectancies than budgeted in this area with the corresponding increased overhead and indirect expense absorption in the O2 Program. It was determined that J. A. Jones costs are running 60% higher than budgeted, with approximately 75% of the total budget committed or expended by the end of August.

Manpower ceilings for FY 1966 were recommended to management and were adopted after some alteration. The level of the ceiling was 41 man-years below the budgeted average manpower level of 1,547 man-years.

Multiple IME rates were finally programmed and were generally effective for August costs. The use of these rates enables the department to relieve all internal costs, as contrasted to the FY 1965 practice of relieving costs only to the section level.

2. General and Tax Accounting

As of August 31, 1965 there were twelve active projects. Following is a summary of current status of projects.

	<u>In Thousands</u>
Total Authorized Funds	\$3 106
Total Cost to Date	2 021
Commitments and Open Work Release	421
Unencumbered Balance	664
Costs Charged during August, 1965	103

There were no work authorities or directives received from the AEC during August, and no construction completion and cost closing statements issued.

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Two appropriation requests were approved during the month and are detailed as follows:

<u>AR No.</u>	<u>Description</u>	<u>Amount</u>
66008	Replacement of Incinerator Furnace	\$17 000
66009	Cutoff Machine and Accessories	<u>2 800</u>
	Total	<u>\$19 800</u>

In addition, two appropriation requests totaling \$30,300 are being held pending release of additional FY 1966 equipment funds.

3. Business Programs

The AEC requested cost estimates using K and N reactors for producing Pu-240 of varying isotopic assays. The request was assigned to CPD for action and consolidation, with a due date of September 1, 1965. Document RL-GEN-26 was issued on September 1st in response to the request, providing cost estimates for 21 cases covering various production modes and isotopic assays.

The CPD Data Book was updated to cover FY 1965 activities, and issued.

At the request of RL00-AEC, a study was prepared estimating the feed material costs chargeable to the FPCE plant for the various isotopes of interest (Document RL-SEP-652).

4. Business Information Systems

Work is progressing quite satisfactorily on new and revised forms. Four critical purchasing forms have been revised and are awaiting Isochem legal review. A color (gold and black) for Isochem payroll checks was approved. A suggested letterhead for Isochem Inc. was prepared by the Graphics Operation and submitted for approval.

Forms Control activity for August includes:

New forms	5
Forms revised	3
Temporary forms reviewed	75
Forms printed in 700 Area	12
Forms duplicated in 200 Area	35

Items delaying forms effort are (1) a state sales tax number, (2) letterhead approval, (3) Appendix "A" and (4) bank account designations.

A listing and card deck of all CPD employees with newly assigned Isochem Inc. payroll numbers has been completed and is being maintained by Personnel Accounting, CPD. The file structure and content to be used for the Isochem payroll system has been described, and Computer Science Corporation is establishing our master file. Items restrictive to the payroll system are (1) Appendix "A", (2) bank account designations, and (3) whose signature is to appear on payroll checks.

5. Audit and Contract Reimbursement

A formal audit report was issued covering our examination of year-end closing and financial reporting activities. The activities audited were satisfactory.

Formal audit report was issued covering examination of payroll activities and with the exception of the discrepancies in birth dates, the activities audited were satisfactory.

6. Purchasing

Purchase orders and contracts placed (including alterations):

	<u>No.</u>	<u>Value</u>
Formal orders	246	\$259 956
Verbal orders	137	8 152
Essential Materials orders	<u>3</u>	<u>628 376</u>
Total	<u>386</u>	<u>\$896 484</u>

Significant purchase orders and contracts placed during August:

<u>No.</u>	<u>Competitive</u>	<u>Vendor</u>	<u>Material</u>	<u>Price</u>	<u>Date</u>
S6L-060-30988		Chevron Chemical	Nonahydrate	\$219 800	8-02-65
S6L-670-30989		Chevron Chemical	Nitric Acid	313 200	8-02-65
S6L-920-30990		Van Waters & Rogers	Tributyl Phosphate	95 376	8-16-65
S6N-666-35207		Wyatt Industries	Bubble Cap Trays	65 289	8-16-65

R. A. Cornell
Manager - Finance

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CHEMICAL PROCESSING DEPARTMENT
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AUGUST, 1965

II. ACHIEVEMENTS (continued)

F. FACILITIES ENGINEERING OPERATION

1. Purex

105-A Waste Tank (Stress Evaluation Instrumentation)

The balance of components required for a system to monitor the 105-A Tank for "bottom plate buckling" have been received and assembly is in progress. The system should be complete and ready for installation by September 15. Installation of two of the proposed nine combination bottom detector and sludge temperature read-out assemblies is now complete. Operating personnel report the bottom was easily discernible with the apparatus. The units were installed in Wells No. 4 and No. 5 and sludge temperatures were found to be 104°C and 116°C, respectively. Installation of the remaining units will await elevation of the initial two installations.

105-A Waste Tank Model

Testing of the 105-A waste tank model was completed and a report issued. The report is RL-SEP-630 - "105-A Waste Storage Tank Model Test" - by D. D. Wodrich, dated August 20, 1965.

"A" Cell Pad Replacements

Installation of foot pads for the replacement vessel in the A-3 Dissolver location was successfully completed this month.

4.0 Capacity Factor Expansion - Purex

Three additional plant modifications are being considered for inclusion in the 4.0 Capacity Factor Expansion Program which are not presently included in the engineering study or the design criteria. These modifications are: (1) more extensive modification of the process vent system, including an off-gas system for the sugar denitration equipment; (2) a system for improved process water quality; and (3) railroad tunnel and car puller extension.

Project CAC-152-Rev. #1 - High-level Cell Addition - Purex

A project proposal revision has been initiated to limit the scope of work to the shielded analytical cell and associated building addition. This reduction is required to keep the project cost within the available FY-1965 General Plant Funds (\$460,000).

203-A UNH Waste Recovery Tank - Purex

Project proposal preparation, requesting authorization of total project funds is in progress. The estimated cost of the work is \$55,000. The project would provide a 10,000-gallon storage vessel with concentrating capability in the 203-A Area.

2. Redox

Neutron Monitor - L-22 Tank - 233-S Building

The subject monitor has had a long history of irregular operation. The specific complaint was that the neutron count would not "die out" as the tank was emptied and all logical explanations had been exhausted.

A charge-sensitive preamplifier, a double-delay line amplifier, and additional standard system components necessary to provide an ultra-fast neutron counting system were assembled. Due to the modified preamplifier, a single cable could be run to the BF_3 neutron detection tube with all the electronics being kept some distance away. The ultra-fast system was felt desirable in the event a high gamma background was causing erroneous counting.

A temporary system was set up in the change room of 233-S Building and the detector carried into the SWP Area and inserted in the L-22 Tank. The liquid level was varied in the L-22 Tank and the neutron count rate varied correspondingly without delay. Gamma background seemed low. Continued use of the temporary system has provided freedom from the original complaint, but has been shown to be somewhat noise sensitive. This can be expected with the type of equipment used. Evaluation is continuing.

MA-76 - Cooling Water Swamp Modifications

A Contingency Maintenance Request, for a fourth pond in a series at the Redox cooling water swamp, requesting \$48,000, was approved on August 17.

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3. Weapons ManufacturingBF₃ Tube Evaluation

The only major evaluation of BF₃ proportional counting tubes undertaken in the Chemical Processing Department was accomplished in 1959. As a result of off-site developments, a new review is desirable. Tubes from several manufacturers have been purchased and preliminary tests conducted. Early test results indicate the Hanford tube is no longer superior, and suggest that one vendor in particular may manufacture a tube with highly desirable characteristics. Work will continue on a more intensive basis now that evaluation equipment has been assembled.

Neutron Monitor - Final Inspection

Final circuit configuration is complete. The breadboard assembly is currently being used to provide output signals for spectrum analysis of the new BF₃ tubes.

A preliminary system comprised of only four BF₃ tubes, as contrasted to sixteen currently used, is suggested. This system would have only two assemblies (high-voltage supply and a combined scaler-timer). No amplifier is required. The system would occupy only a corner of a table, thus making available a large area now occupied by instrument racks.

Incinerator

Detail design of new combustion chambers has been completed and is being reviewed for nuclear safety. The new combustion chambers and cyclone assemblies are to be fabricated of Incoloy-800.

Plutonium Blending in 236-Z Building

At Commission request, a feasibility and cost study has been made for installing plutonium nitrate solution blending equipment in the Plutonium Reclamation Facility (236-Z Building). The installation is feasible utilizing four of the seven available full-height process cell equipment location sites. The estimated project cost is \$280,000 compared to \$320,000 for such a facility located in a portion of the 234-5 Building now occupied by the obsolete Recuplex Facility, which is scheduled for removal in early 1966. The operating costs at the two locations are estimated to be essentially equal.

CAC-102 - New Standards Laboratory - "Z" Plant
CAC-104 - Recoverable Plutonium Partitioning Facilities - "Z" Plant

The above project proposals, transmitted to RLOO-AEC on June 20, 1963 and March 3, 1964, respectively, were returned unapproved on August 5 and August 6, after the Commission had studied the over-all weapons program.

Plutonium Buy-back Facility - 234-5 Building

A project proposal was initiated requesting provision of facilities to receive, prepare for storage, and repackage NFS plutonium. This project will be expanded to provide necessary lag storage for SEFOR plutonium awaiting shipment.

4. General

SEFOR Plutonium Shipments

Facilities in the Purex PR Room were reviewed for load-out of high Pu²⁴⁰ solution in 54-inch-high plastic containers. A new load-out decontamination hood would have to be installed to replace the present hood due to space limitations in the PR Room. Study indicates that adding a future buy-back hood in the 234-5 Building would be the logical and least expensive method for handling, storing, and shipping the material.

Tritium Study

In connection with reactor case studies, a study was made of facilities required and their cost to permit a separation capability at Hanford. A secret document (RL-SEP-676) now being issued, indicates that a facility could be built for an estimated \$2,800,000.

5. Waste Management

General

Operation testing on the prototype waste packaging and re-work equipment has produced generally favorable results. Project CGC-132 - "Prototype and Mock-up Waste Management Packaging" - was closed-out on September 1. Current plans call for installing the equipment in Cell 15 by January 1966.

Progress in developing handling schemes to support the equipment encapsulation system has been good. Routines are being streamlined so that a minimum of time is required for a complete equipment change-out. With further development and testing, a con-

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tainment effectiveness closely approaching that of a plastic bag procedure can be expected. Effort on shake-down of this system has been somewhat limited because of high demands on the single transfer mechanism for operational tests on the packaging equipment, i.e. moving waste containers from station to station.

Manager - Facilities Engineering

HP Shaw/JF Lee/alr

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CHEMICAL PROCESSING DEPARTMENT
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II. ACHIEVEMENTS (Continued)

G. RESEARCH AND ENGINEERING OPERATION

1. Separations Process Engineering

Purex

a. Titanium Tube Bundle

Inspection of a titanium tube bundle removed from the Back-cycle Waste Concentrator (E-H4) during July had revealed a white refractory material that had apparently fouled the heat transfer surfaces. This material was found to be insoluble in standard reagents.

Further laboratory investigation has characterized this material as follows:

- (1) The solids are thin, siliceous flakes ranging in color from clear transparent to pale yellow.
- (2) The uranium and plutonium concentrations were 0.024 and 8×10^{-6} grams per gram of solid, respectively.
- (3) The solid was dissolved within a few minutes by a 9 M HF - 1 M HNO₃ solution at 25° C. Several hours were required for dissolution with a 2 M HF - 2 M HNO₃ solution at 25° C.

b. Waste Rework

The rework of product-containing waste materials stored in the Waste Rework Tank F8 was completed. During the rework period, the levels of fission-product ZrNb and Ru in the solvent-extraction streams decreased about six fold and two fold, respectively. This performance was in marked contrast to that observed during the original attempt to process some of this material in April when a very large increase in the fission-product levels of plant streams resulted. The improvement in fission-product behavior resulted from a prolonged treatment to effect acid hydrolysis of the organic degradation products dissolved in the waste. Typically, wastes of this type require 20 days or more of boiling, under reflux, in the presence of HNO₃ to reasonably

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insure maintaining satisfactory decontamination performance while processing.

Plutonium losses from the HA Column (first extraction column) were about 15 fold above normal. This loss was unexpected and has not been explained.

c. Waste Denitration

The off-gases from the sugar denitration operation were diverted from the condenser vent system to the high level waste concentrator tower on a continuous basis during the month.

Material balances show that 75 percent of the nitric acid associated with the sugar denitration off-gas is recovered in the Acid Absorber T-F5 and that the remaining 25 percent is discharged to a crib with the acid absorber condensate. No appreciable change has been noted in the fission product levels of process streams as a result of diverting the sugar denitration off-gases.

d. Steam Condensate Quality

The first phase of a sampling program to determine the feasibility of using steam condensate from the second and third uranium concentrators (E-J8 and E-K4) as process water has been completed. The sampling program involved 12 composite samples of Purex Plant steam condensate over a 4-week period. A summary of the analytical results are shown below:

<u>Impurity</u>	<u>Concentration, ppm</u>	
	<u>Typical</u>	<u>Maximum</u>
Fe	< 0.1	2.0
Ni	< 0.01	0.035
Cr	< 0.01	0.015
Cu	< 0.04	0.18
Al	< 0.03	0.05
Zr	< 0.004	< 0.004
Mn	< 0.005	0.021
Co	< 0.01	< 0.01
Ca	0.20	0.50
Mg	0.04	0.16
Pb	< 0.02	0.50
Zn	< 0.01	< 0.01
Cl	< 0.01	0.93
SO ₄	1.0	15.2
PO ₄	.03	0.06
SiO ₂	0.01	0.11

In general, the impurity concentrations tabulated as "typical", above, are an order of magnitude lower than for current Purex Plant demineralized water.

Redoxa. 1-N Column Performance

The 1-N Column, installed in the Redox Plant in March, 1965, uses demineralized water to strip neptunium, plutonium and uranium from the HS Column product stream (HSP). Performance of this column, particularly for neptunium stripping, was poor during the month. This performance resulted in part from high HS Column operating rates and from LNX flow control problems which caused operation of the 1-N Column at less than the design ratio (0.5) of aqueous to organic flow. However, with respect to losses, the performance remained marginal after correcting the flow control problem. A process test was begun on August 26, in which the LNX was made 0.001 M in ferrous ion and 0.01 M in nitric acid. Subsequently the neptunium losses to the LNW stream have decreased by a factor of 5 to 10. No adverse effect on other process streams has been noted.

2. Fission Products Process EngineeringProcess Technology Programa. Tank Farms

The condition of Tank 105-A remained unchanged throughout the month. Two bottom movement detection instruments have been installed in the tank over the bulged area. These instruments will be used to obtain information about the stability of the tank bottom during normal hydrostatic head load fluctuations. No bottom movement has been detected.

Test holes are being drilled to depths of up to 70 feet around Tank 115-SX. This tank failed earlier this year and leaked approximately 50,000 gallons of dilute waste into the ground. Two holes have been drilled thus far and show the deepest penetration of contamination to be 9 feet below the tank bottom.

b. Fission Product Recovery

A second strontium precipitation and cask loadout was made by the technique described in February (RL-SEP-332 G) which separates the decay daughter zirconium-90 from strontium during cask loading. The formation of a very fine precipitate was again observed, and less than a normal amount of strontium was loaded. During the first loadout with this flowsheet a normal cask load was achieved in spite of the fine precipitate. Additional processing experience with this flowsheet is required before the effects of the fine precipitate on cask loading behavior can be fully evaluated.

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3. Plutonium Process Engineeringa. U²³³ Purification

The U²³³ purification facilities (Hoods 42 and 43), which were previously used to develop the process, were turned over to Weapons Manufacturing Operation for purification of the UNH solution remaining from last Fall's run. The first batch (about 75 grams) of U²³³ was purified and produced an oxide having a total metal impurity content of 1,800 parts per million uranium. Of this total, approximately 1,500 parts per million were thorium. The nitrate solution from Purex was first concentrated, and then converted to a chloride solution. Daughters were removed by loading on the anion exchange resin Dowex 21K at 9 M HCl, followed by elution with 0.5 M HCl. The U²³³ was then precipitated, using hydrogen peroxide and ammonium peroxide as required to maintain a pH of 1.0 - 1.5. The filtered precipitate was calcined to oxide at 500 C.

b. Carbon in Plutonium Buttons

Tests have been completed recently using argon gas as a drill bit coolant in place of carbon tetrachloride when sampling plutonium metal buttons. These tests were conducted to determine the bias the carbon tetrachloride non-volatile residues introduced in the reported carbon content of the plutonium buttons. These tests showed conclusively that a factor of two reduction in reported carbon content occurred when the argon drill bit coolant was substituted for CCl₄. This confirmed Rocky Flats' experience earlier.

c. Uranium in Plutonium Reclamation Facility Plutonium Product

Studies have been made in the Plutonium Reclamation Facility to determine the path of uranium which enters the plant in the oxalate solution received from the button line. These studies have demonstrated that the uranium concentration gradually builds up in the Reclamation Facility, with concentrations as high as 8,000 parts uranium per million parts plutonium already reached in the product. Although significant separation of uranium and plutonium takes place during the oxalate precipitation step, such uranium concentrations in the Reclamation Facility plutonium product produce plutonium of marginal acceptability. Consequently, studies are being made to determine methods of reducing the uranium content in button line feed batches to acceptable levels. Alternatives being studied include:

- (1) Optimizing blending of Reclamation Facility plutonium with low uranium content plutonium nitrate solutions from the Purex and/or Redox Plants.
- (2) Occasional (say bi-monthly) purging of uranium from the Reclamation Facility system by routing either concentrated supernatants or plutonium nitrate product solution to Purex or Redox for partitioning.

- (3) Installation of a partitioning unit in the Plutonium Reclamation Facility which would be operated intermittently as required.

4. Separations Chemistry Laboratory

a. Americium Purification

The second chromatographic purification run was completed early in the month with a yield of 16 grams of americium oxide. The material was contaminated with 1,800 microcuries of europium-154 per gram of americium-241. The europium-154 was leached from equipment previously used to isolate promethium-147 from a rare earth fraction; the fission product emits gamma rays of several energies up to 1.6 Mev and necessitates 1/2 inch of lead shielding to protect operating personnel. Contamination to the extent of 3-1/2% aluminum was encountered also, probably as pickup subsequent to column purification. The remaining americium in the equipment has been accumulated for subsequent reprocessing.

A process for separating the europium and americium has been under development and shows considerable promise. It consists of oxidation of americium with persulfate and separation of the europium by extraction with D2EHPA. Subsequent reduction of the americium is accomplished with hydrazine followed by extraction with D2EHPA. Nitric acid stripping yields the americium ready for oxalate precipitation. Efforts are currently aimed at securing satisfactorily high separation factors.

b. Redox Process Improvement

Investigation of neptunium losses in the Redox process has resulted in a recommendation to employ a reducing agent such as ferrous ammonium sulfate or ferrous sulfamate in the aqueous strip to the 1N Column. Addition of either material will reduce the neptunium to a less extractable state and thus reduce losses. However, the ferrous ammonium sulfate would be preferred since it will reduce Np(VI) to the inextractable Np(V), whereas the sulfamate might reduce the Np(VI) to a slightly extractable Np(IV).

Investigation into the presence of plutonium polymer in some Redox process streams and which was resulting in some additional waste losses led to a recommendation to employ a slightly acidified strip in both the 2E and 1N Columns as a method of preventing polymer formation. Evaluation of the effect of 0.01 M HNO_3 is to be completed before trying higher acidities.

c. Citric Acid Kill

Laboratory investigation to find a more reliable method of destroying citric acid with hydrogen peroxide continued during the month. At 100 C and in the absence of nitric acid, 12-15% peroxide solution will destroy citric acid at a satisfactory rate and without the risk of pressurization associated with loss of control in the presence of nitric acid. Further laboratory evaluation is underway to demonstrate that the process is applicable to the strontium recovery flowsheet under plant conditions.

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d. Analytical Improvement

Colorimetric Aluminum

A colorimetric method for aluminum has been prepared and delivered to the laboratories for routine use. The method employs 8-hydroxy-quinoline in xylene. All normal interferences are removed by pre-extraction with trioctylphosphine oxide (TOPO) and appropriate complexing agents. Elements removed by TOPO include uranium and americium so the procedure may have other applications.

5. Plutonium Chemistry Laboratory

a. Dissolution of Separated Slag

A scouting study was made of the dissolution of separated, bulk, slag chunks. Qualitative results indicate that the chunk slag is readily decomposed in 0 to 4 M HNO_3 . In more concentrated acid solution, the reaction slows and finally stops at 10 M HNO_3 . The reaction appears to be a displacement of the hydrogen ion by dispersed calcium with hydrogen liberated.

A run with a 300 g piece of slag was made using water for the initial treatment. The reaction was complete after ~3 hours at 50 to 90 C. The supernatant was 0.002 g/l Pu and 0.03 M OH^- . A 350 g heel of finely-divided solids remained. This heel (finely-divided calcium fluoride) was readily soluble in 2.5 M $\text{Al}(\text{NO}_3)_3$.

R. E. Tomlinson

Manager
Research and Engineering

CHEMICAL PROCESSING DEPARTMENT
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III. PERSONNEL ACTIVITIES

A. FORCE SUMMARY

<u>Operation</u>	<u>Monthly Salaried</u>		<u>Weekly Salaried</u>		<u>Total</u>	
	<u>7-31-65</u>	<u>8-31-65</u>	<u>7-31-65</u>	<u>8-31-65</u>	<u>7-31-65</u>	<u>8-31-65</u>
General Manager's Group	10	10	1	2	11	12
Finance & Services	38	38	46	46	84	84
Employee Relations	12	11	6	6	18	17
Research & Engineering	62	58	28	30	90	88
Facilities Engineering	91	93	208	209	299	302
Production	5	5	3	3	8	8
Redox	63	63	236	240	299	303
Purex	75	74	291	292	366	366
Weapons Manufacturing	<u>55</u>	<u>54</u>	<u>234</u>	<u>234</u>	<u>289</u>	<u>288</u>
Total	<u>411</u>	<u>406</u>	<u>1053</u>	<u>1062</u>	<u>1464</u>	<u>1468</u>

B. PERSONNEL CHANGES

R. E. Isaacson, Manager - Technological and Environmental Safety, R&EO, transferred to Wire and Cable Department, Bridgeport, Connecticut, effective August 16, 1965.

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C. TRIPS

<u>Visitor</u>	<u>To</u>	<u>Nature of Discussion</u>
<u>To AEC and Other AEC Contractors</u>		
R. E. Felt	Mounds Laboratory Miamisburg, Ohio	DTA work and polonium technology. (8/19/65)
	Argonne National Lab Lemont, Illinois	Fused salt extraction and materials. (8/20/65)
J. H. Warren	AEC - DMA Albuquerque, New Mexico	Weapons program. (8/25/65)
R. E. Tomlinson	AEC - Headquarters Germantown, Maryland	Attend R&D discussions. (8/25/65)
A. E. Smith	Dow Chemical Corporation Denver, Colorado	Attent Interagency Mechanical Operations Group Steering Committee Meeting. (8/26/65)
<u>To General Industry</u>		
W. D. Gaw	Fansteel Metallurgical Corp.	Fabrication of "N" Cell concentrator. (8/4-6/65)
J. C. Willi	Torrence, Calif.	
M. E. Borgeson	Phillips Pacific Chemical Company,	To observe and inspect gas re-forming furnace. (8/11/65)
D. W. Corbell	Finley, Washington	
R. E. Felt	Factory Mutual Research Corp. Norwood, Massachusetts	Discuss Pu metal fires. (8/17,18/65)
<u>To Technical Conventions & General Meetings</u>		
J. W. Barnes	Los Angeles, Calif.	To attend 8th Annual National Heat Transfer Conference. (8/8-11/65)

D. VISITORS

<u>Visitor</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From AEC and Other AEC Contractors</u>		
Harry Waugh	Los Alamos Scientific Lab. Los Alamos, New Mexico	Process review. (8/12,13/65)

D. VISITORS (Continued)

<u>Visitors</u>	<u>From</u>	<u>Nature of Discussion</u>
<u>From AEC and Other AEC Contractors (continued)</u>		
W. G. Browne	AEC - New York	Chemical separations.
H. W. Crocker	AEC - Chicago	(8/16-20/65)
W. L. Burden	Lawrence Radiation Lab	LRL fabrication program.
J. C. Behne	Livermore, Calif.	(8/17/65)
Keith Best	Dow Chemical Company	Fabrication and quality
L. L. Zodtner	Rocky Flats Plant	control discussions.
	Denver, Colorado	(8/18-19/65)
J. R. Humphrey	Livermore Research Lab	Plutonium scrap processing.
O. L. Meadors	Livermore, Calif.	(8/3/65)
<u>From General Industry</u>		
M. Selman	Allied Chemical Company	Purex operations.
J. Jaffee	Morristown, New Jersey	(8/3-4/65)
A. H. Sutton		
H. F. Richardson		
M. J. Jump	Nuclear Fuels Services	Chemical separations.
	West Valley, New York	(8/26-27/65)

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IV. SAFETY AND SECURITY

<u>Operation:</u>	<u>General</u>	<u>Purex</u>	<u>WMO</u>	<u>FEO</u>	<u>Redox</u>	<u>R&E</u>	<u>Finance</u>	<u>Prod.</u>	<u>Empl. Rel.</u>	<u>Total</u>	<u>YTD</u>
Dis. Injuries					1					0	0
Ser. Accidents					7					1	3
Med. Treat. Inj.	9		5	11						32	320
Rad. Occurrences	2		3		9					14	81
Contam. Wds.										0	16
New Deposition Cases										0	1
Fires			1*							1	3
Security Violations							1			1	10

**Official Offsite Trip

* Neoprene tubing on the discharge end of a carbon apparatus furnace tube ignited during a carbon determination. Fire spread to a small piece of plastic on the hood floor. The fire was extinguished immediately by the operator with dry chemical extinguishing agent.

**G.O. Ager of Employee Relations attended an AEC training course in Norfolk, Virginia on Fire Prevention and Fire Fighting in Radiation Zones.

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CHEMICAL PROCESSING DEPARTMENT
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V. REPORTS

A. PREPARED AND ISSUED

- RL-SEP-232 137, Secret, "Button Purity Data - Letter No. 37", by L. E. Bruns, dated August 2, 1965.
- RL-SEP-466 REV1, Unclassified, "Supplemental Critical Mass and Chemical Hazards Control Specifications - Handling and Storage of Shippingport Reactor Blanket Fuel at T-Plant", by G. L. Hanson and H. C. Rathvon, dated August 16, 1965.
- RL-SEP-595, Unclassified, "Potential for Conversion of Redox Plant to Power Fuels Processing", by D. A. Hoover, W. G. Smith, R. E. Smith, D. F. Taylor, R. A. Watrous and R. A. Yoder, dated July 15, 1965.
- RL-SEP-630, Unclassified, "105-A Waste Storage Tank Model Test", by D. D. Wodrich, dated August 20, 1965.
- RL-SEP-648, Secret AWD, "Fabrication Process Test Evaluation Test No. 64-39 - 88-C Generating Tools", by D. A. Armstrong, dated July 31, 1965.
- RL-SEP-650, Secret, "Process Bases and Specifications - Thorium U-233 Separations at the Purex Plant", by Separations Process Engineering, Research and Engineering, CPD, dated July 26, 1965.
- RL-SEP-658, Secret AWD, "Weapons Process Engineering Technology Report - July 1965", compiled by members of Weapons Process Engineering, Research and Engineering, CPD, dated July 30, 1965.
- RL-SEP-670, Secret AWD, "A-Line Product Characteristics June-July 1965", by A. E. Smith, dated August 3, 1965.
- RL-SEP-671, Confidential, "Unscheduled Shutdown - Incinerator", by M. K. Harmon, dated August 4, 1965.
- RL-SEP-672, Secret AWD, "JOWOG 22 Plutonium Meeting", by A. E. Smith, dated August 4, 1965.
- RL-SEP-673, Confidential, "Chlorination Reactivity of Plutonium Oxide Prepared in a Screw Calciner", by H. F. Fullam and T. S. Soine, dated August 13, 1965.

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A. PREPARED AND ISSUED (Continued)

RL-SEP-676, Secret, "Tritium Extraction Facility Study-1965", by G. P. Kesel and D. D. Wodrich, dated August 20, 1965.

RL-SEP-678, Secret AWD, "200 Part Data", by A. E. Smith, dated August 6, 1965.

RL-SEP-680, Secret AWD, "G.E. Purchase Order No. S6P-666-35161", by L. L. McGregor, dated August 6, 1965.

RL-SEP-683, Unclassified, "Addendum to Critical Mass Control Specification RL-SEP-433 Rev. -- Recuplex R and B Floor Clean-Out", by R. J. Sloat, dated August 10, 1965.

RL-SEP-685, Secret AWD, "Cost Comparison for Alternate Feed Preparation Methods", by S. T. Field, dated August 13, 1965.

RL-SEP-689, Unclassified, "Critical Mass Control Specification - Removal of Solutions from Recuplex Tanks", by R. J. Sloat, dated August 23, 1965.

RL-SEP-669 PT3, Secret AWD, "Development of a Power-Roll-Forming Process Part III, Determination of Power-Roll-Forming Parameters", by G. C. Oberg and W. L. Lawton, dated August 3, 1965.

RL-SEP-708, Secret, "Analyses of Neptunium Batch - Purex No. 33", by M. K. Harmon, dated August 30, 1965.

RL-SA-29, Unclassified, "Determination of Radio-Strontium by Solvent Extraction", by W. C. Johnson, Jr. dated August 4, 1965.

RL-SA-40, Unclassified, "Status of Fission Products Recovery at Hanford", by S. J. Beard and P. W. Smith, dated August 16, 1965.

RL-SA-41, Unclassified, "Operating Experience on In-Tank Solidification of Radiochemical Wastes", by J. J. Shefcik, dated August 17, 1965.

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B. PREPARED FOR SIGNATURE AND ISSUANCE

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RL-SEP-706

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CHEMICAL PROCESSING DEPARTMENT
MONTHLY REPORT

AUGUST, 1965

VI. PATENT SUMMARY

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

TITLE

None

J. H. Warner

General Manager
Chemical Processing Department

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END

**DATE
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