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LABORATORY RECORDS
1954

OPERATIONS DIVISION

MONTHLY REPORT
FOR
MONTH ENDING JULY 31, 1949

M.E. RAMSEY
E.J. WITKOWSKI
A.F. RUPP
J.A. COX
L.B. EMLET

[redacted]

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OPERATIONS DIVISION

MONTHLY REPORT

for

Month Ending July 31, 1949

by

M. E. Ramsey
E. J. Witkowski
A. F. Rupp
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SUMMARY

1. Lost pile operating time averaged 8.1% as compared with 10.3% for June, 1949. (Page 4.)
2. Two ruptured slugs were detected and removed from the pile without difficulty. (Page 4.)
3. Processing difficulties in the production of P^{32} caused the delay of some shipments. Improvement work on this process indicates that the difficulties can be corrected by modifying the procedure and equipment. There is some indication that anion resins will not withstand beta radiation as well as cation resins. (Pages 7, 8, and 9.)
4. A satisfactory method of plating Ru^{106} on small metal discs has been developed. (Page 12.)
5. The Chemical Waste Evaporator has reduced by 99.9% the quantity of activity entering the Settling Basin from the Chemical Waste System. (Pages 15 and 16.)
6. RaLa Run #34 was completed on July 14, 1949, and resulted in the shipment of 4,284 curies, the largest ever produced. (Pages 18 and 19.)
7. During July, 1949, 427 shipments of radioactive materials were made to bring the total, since August, 1946, to 8,909. (Page 20.)
8. The Radioisotope Processing Area is expected to be completed by September 5, 1949. (Page 22.)

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A. PILE DEPARTMENT

I. Operating Data:

	JULY 1949	JUNE 1949	YEAR-TO-DATE 1949
Total Accumulated KWH	2,459,743	2,304,835	17,588,608
Average KW/operating hour	3599.35	3567.31	3805.04
Average KW/24-hour day	3306.11	3201.16	3456.88
Percent Lost Time	8.1%	10.3%	9.2%
Approx. Excess Pile Reactivity	95-105 inhours	80-90 inhours	
Slugs Charged	176	83	2232
Slugs Discharged	178	33	2182
Product Made (grams)	89.77	84.12	614.92
Product Discharged (grams)	20.03	0.22	162.79

II. Pile Operation:

The pile-down time averaged 8.1% for July, compared to 9.2% for the year-to-date.

Ruptured slugs were indicated by the probe on two occasions this month. The ruptured slugs were located by use of the scanner and discharged without difficulty. These slugs were exposed as follows:

Metal Channel No.	Date Discharged	Days in Pile	Approx. Max. Temp. in Channel
1861	7-22-49	577	220°C
2378	7-23-49	1761	150°C

A new-type safety rod somewhat larger than existing safety rods was built and installed to determine whether four of the new-type safety rods would give reactivity control equivalent or greater than the present safety and shim rods. The present safety and shim rods are used as safety controls only, and have reactivity control effects as follows:

Rod	Inhours/Rod	No. Rods	Total Inhours
Safety	105	4	420
Shim	235	2	470
		System Total	890

[redacted]

 [redacted]

II. Pile Operation: - (Continued)

The new safety rods gave only 185 inhours each or a possible total of 740 inhours, which is 150 inhours less than the present safety and shim rod system. While this lower safety control is entirely adequate for the pile with its current loading of uranium and materials for isotope production, it is not expected that the safety aspects of such a change will be evaluated on a long-term basis until the possibility of using enriched slugs is eliminated. The chief advantage of using four new-type safety rods and removing the two shim rods is that such a change would permit the building of more satisfactory experimental balconies on the north side of the pile and would free two more holes for research or radioisotope production.

The fuel assembly in Hole 11, being evaluated by Argonne National Laboratory, has operated without difficulty since its insertion last month.

The excess pile reactivity was ninety-five to one hundred and five inhours at the end of the month. The approximately fifteen-inhour increase during the month was due chiefly to discharge of four rows of calcium nitrate slugs and two less cans of sulfur in the pile.

III. Filter House:

The following table compares the pressure drops across the exhaust air filters of last month and this month with that experienced immediately after the replacement of filters:

[redacted]

 [redacted]

Date	F. G. #50 GLASS WOOL FILTERS Inches w.g.	% Increase	C.W.S. #6 PAPER Inches w.g.	% Increase	ACROSS HOUSE Inches w.g.	% Increase
Clean filters	1.1	--	1.0	--	3.3	--
6-30-49	3.3	200%	1.8	80%	6.3	91%
7-31-49	3.5	6%	1.9	6%	6.6	9%

Filter House operation was normal throughout the month.

IV. Fan Operation:

Fan operation was normal during the month.

V. Radioisotopes:

The following table is a comparison of the radioisotope and research samples charged into the pile during July, 1949, with those handled in June, 1949:

	JUNE, 1949 Research	JUNE, 1949 Radioisotopes	JULY, 1949 Research	JULY, 1949 Radioisotopes
Stringers 13, 14, & 16	90	83	44	106
Hole 22 (Pneumatic Tube)	64	2	58	13
All Other Holes	8	16	12	14
TOTAL BY GROUPS	162	101	114	133
TOTAL FOR MONTH	263		247	

At the end of July, 1949, there were 359 cans of target material in Stringers 13, 14, and 16, compared to 389 cans of target material in these stringers at the end of June, 1949.

[redacted]

[redacted]

B. CHEMICAL SEPARATIONS AND ISOTOPE DEVELOPMENT DEPARTMENTS

I. Radioisotopes:

1. Iodine (I^{131} - 8d)

Twenty-four uranium slugs were processed and approximately 20,776 mc shipped. All products were within specifications. Lower yields this month were due to a shorter than usual irradiation time in the pile.

During this month, it became impossible to sample the contents of the dissolver tank. Upon investigation, a ruptured plastic connector in the sample line was found; it will be replaced as soon as it is practical to decontaminate and enter the cell.

2. Phosphorus (P^{32} - 14.3d)

Seventeen, 2000-gram cans of irradiated sulfur were processed and about 4,632 mc shipped. Difficulties and lower yields were experienced again this month resulting from the following:

a. Losses in purification of several products which showed a precipitate at a pH of 7.

b. Losses occurred because of three poor extractions of phosphorus from the sulfur.

c. Some losses in the dissolving of the lanthanum carrier.

d. A short irradiation time for some of the cans.

The following steps have or are being taken to try to improve yields:

a. The evaporation equipment has been reworked.

b. A new reactor used in the iron precipitation step has been replaced with one using a filter stick instead of an open draw-off line. It is hoped that only very minute amounts of iron will go into the lanthanum-carrier step.

[redacted]

2. Phosphorus (P^{32} - 14.3d) - (Continued)

c. The new larger resin columns will be regenerated with larger amounts of HCl and the effluent from the regeneration tested for cations.

d. Dowex 50 resin replaced Analcite.

e. Steps will be taken in the washing of the lanthanum precipitate to prevent ammonia from getting into the product solution, thence to the column.

It has been reported by some of the users of P^{32} that the laboratory analysis was too low, resulting in the customers receiving more P^{32} than ordered. After a study made by the Chemistry Division, the factors used in calculating P^{32} concentration have been changed, increasing the concentration about 14%.

Phosphorus Development Work

Design work continued on the P^{32} extraction equipment for the new area. Several changes were made in the glass-lined reactor to permit easier fabrication. All parts for the extractor are scheduled to arrive on the plant within eight weeks. Arrangements were made to have a special fluorothene part to the extractor made at K-25.

Several trial runs for purification of Cell 5 extraction liquor were made with the experimental cation-anion equipment described in last month's report. Two runs with a starting solution containing only a small amount of P^{32} (15 mc) contaminated with 50 mg each of Fe^{+++}, Cr^{+++}, Al^{+++}, Ni^{++} were tried with good success. However, when a production run containing 1,000 mc P^{32} was tried, the P^{32} band on the anion

2. Phosphorus Development Work - (Continued)

column turned a blue-green color.

The product solution eluted in 0.1 N HCl retained the color and was also quite cloudy. It is thought that this is a result of beta radiation on the anion resin, or the effect of a chemical product of radiation, such as hydrogen peroxide. If this is true, it appears that anion exchangers are much less resistant to radiation than cation exchangers.

Approval has been obtained from Hanford to irradiate sulfur in regular six-inch slugs with press-lift caps. The temperature in the water channels will be quite low, with no danger of the sulfur melting, so this should prove quite satisfactory. An initial batch of ten slugs has been sent to Hanford. Since welding has proved so unsuccessful for X-type sulfur slugs and the irradiations can be made at Hanford, work on welding sulfur slugs will be deferred indefinitely.

The X-type welded slug containing 100 grams of sulfur, which was irradiated in a regular channel between two uranium slugs, gave a P^{32} yield increase over the regular cans by a factor of approximately 2.8. This is very close to the figure predicted for this irradiation. It will not be practical to irradiate sulfur slugs in the X-pile unless a special donut-type channel is built.

3. Carbon (C^{14} - 5100y)

No runs were made of the $Ca(NO_3)_2$ process this month.

C^{14} Development Work-(Be_3N_2 Process)

A final test run is in progress, using the Be_3N_2-H_2O_2 process. Ten slugs will be used and the C^{14} products from all ten slugs (two per dissolving) will be passed through the

3. C^{14} Development Work-(Be_3N_2 Process)

furnace and scrubbers to study the efficiency and capacity of this equipment. Several scrubbers are used to catch various portions of the C^{14} gaseous products, as follows: (a) before the CuO furnace; (b) products of the first half of the period during which acid is added; (c) same as (b) for second half; (d) oxidizable C^{14} products.

The first scrubber will be tested for cyanide. If hydrogen cyanide is present, there should be enough accumulated during a ten-slug run to make detection possible. Operating data from this run will allow us to complete our designs for the Isotope Area equipment.

Approximately 300 grams of purified BeO (containing Be^{10}) was sent to Y-12 during the month.

4. Sulfur (S^{35} - 87d)

Analysis of the BaS^{35} reported last month is as follows:

Total Activity	-	2,000 mc S^{35}
Concentration	-	19.9 mc/ml
Specific Activity	-	15 curies/gram S
Sulfide	-	87%
Sulfate	-	13%
Barium	-	5.5 mg/ml.

A sample of Hanford-irradiated NaCl was processed to produce carrier-free $H_2S^{35}O_4$ and Cl^{36}. Analyses have not been completed.

This is the first time we have used NaCl for target material at Hanford; ordinarily, KCl is used. The NaCl crystals were jet black and contained a large amount of gas trapped in the crystals, the same as KCl. These crystals effervesce copiously when dissolved in water. We have presumed that this gas is dead argon resulting from the beta

4. Sulfur (S^{35} - 87d) - (Continued)

decay of short-lived chlorine. It apparently does originate with chlorine and not potassium, since similar amounts of gas are given with both potassium and sodium chlorides.

5. Fission Products

Run SS-16 was completed and the Cs^{137} fractions collected for purification. The cesium eluted from the column very slowly, the total volume being approximately eight liters. This HCl solution will have to be boiled down to a small volume and put back on a small column for further separation of Cs from Sr and Ce. Run SS-16 was made up from three-year slugs and the uranium was eluted from the primary column (#2) with 2.70 pH citrate instead of the usual 0.25 M H_2SO_4, in an attempt to retain all possible Cs on the column. However, citrate gave very slow and inefficient uranium removal; in future runs, only 0.25 H_2SO_4 will be used for U removal, even though Cs losses may be slightly higher. Other fractions were collected from this run to be examined for Eu, Sm, and 61.

SS-17 was started during the month, employing normal (30-day) slugs. This run will include a test of the Zr-Cb process being developed by W. Baldwin of the Chemistry Division. The adsorbents in column 1 and 1A (Zr-Cb) separators have been changed to silica gel and anion resin for this purpose.

Zr-Cb, Y^{91}, and Sr^{89-90} purification apparatus are being moved into better shielded locations in the North Hot Lab. The rare earth separation equipment is now in operation on the west side of Cell A. Approximately one curie of Y^{91}, 500 mc rare earths, and one curie Ce^{144} are in process of purification.

6. Ruthenium (Ru^{106} - 1y)

Work on the preparation of plating solutions of ruthenium nitroso chloride with very radioactive Ru^{106} preparations has demonstrated that ruthenium is volatilized with fuming nitric acid. Approximately 20% of each preparation is lost to the traps during the fuming nitric acid step. The material can be recovered from the traps and returned to the plating solution make-up. We are now in a position to take care of any ordinary requests for plated Ru^{106} sources.

7. Calcium (Ca^{45} - 180d)

The source of minute amounts of calcium in purified scandium oxide target material and carrier-free Ca^{45} preparations are being investigated. All reagents will have to be specially prepared and stored in quartz or Vycor in order to eliminate the inactive calcium. Calculations show that only a very slight contamination of carrier-free Ca^{45} (produced only in microcurie quantities) with inactive Ca would be sufficient to lower the specific activity to within the range of Ca^{45} (30 mc/gram) produced by (n, γ) on normal calcium at Hanford. Users of carrier-free Ca^{45} would therefore have to be extremely careful to prevent entrance of inactive Ca into their work to preserve the specific activity of the original preparation.

8. Strontium (Sr^{89-90} - 55d, 30y)

Several curies of Sr^{90} are being reprocessed by a column procedure on Amberlite 105 resin. A completely anomolous behavior of the Sr^{90} has been noted in that all the Sr^{90} was stripped from the column in a pH 2.75 citrate wash being used to strip impurities from the Sr^{90}. Normally Sr does not move

8. Strontium (Sr^{89-90} - 55d, 30y) - (Continued)

with this low pH citrate solution. No explanation for this unusual occurrence has been found.

9. Iron (Fe^{55-59} - 4y-44d)

A sample of normal iron irradiated at Hanford was processed. The final product had the following analysis:

Concentration, Fe^{55}	-	1.10 mc/ml
Concentration, Fe^{59}	-	0.60 mc/ml
Specific Activity, Fe^{55}	-	10 mc/gram Fe
Specific Activity, Fe^{59}	-	5.4 mc/gram Fe
Acidity	-	2.3 N in HCl.

10. Miscellaneous

a. Two lots of Na^{22} from cyclotron targets (magnesium) are in process. A process reported in the literature is being used. This procedure gives low yields and will have to be improved. Approximately 0.5 mc Na^{22} has been separated so far.

b. Techniques for high temperature, high vacuum distillation of micro-quantities of various radioactive material, such as Sr^{90}, are being investigated preparatory to designing our equipment for work of this type.

c. Contacts have been made with the plastics group at K-25 to prepare experimental batches of the 50/50 red phosphorus-bakelite plastic needed for making P^{32} beta sources. We have furnished them with red phosphorus and they are proceeding with the problem.

d. A study is being made to determine the variation in alpha counting of intense beta-gamma sources on various alpha counters around the plant. A new scintillation counter developed by the Instrument Department is of major importance in this test.

10. Miscellaneous - (Continued)

e. The details of plating cobalt sources of all kinds (before irradiation) with nickel and gold have been worked out in collaboration with the Mechanical Department. A quantity of cobalt pieces of various sizes have been plated for irradiation at Hanford. The nickel and gold plates are only a few ten-thousandths inch thick and do not contribute significantly to the radiation of the finished source.

II. Tank Farm and Burial Ground:

1. General

a. Considerable progress has been made this month to increase the Metal Waste storage space by the operation of the Evaporator. About 94,800 gallons of precipitated metal supernate from W-7 and W-10 tanks were jetted to W-5 tank for evaporation. As a result of this, it was possible to further increase the available storage space by jetting 75,330 gallons of metal waste from W-9 and W-4 to W-7 and then precipitating the uranium with 5,145 gallons of caustic.

b. The present Burial Ground is being expanded, while the study of a new site for the disposal of radioactive waste continues.

2. Wastes Discharged to White Oak Creek

Approximately 50.43 curies of beta activity were discharged from the Settling Basin this month; this represents a 20.5% decrease over last month, or an average of 1.63 curies per day. Three of the four weeks this month, the activity from

2. Wastes Discharged to White Oak Creek - (Continued)

the basin was lower than 10 curies per week. This decrease is due to the operation of the Chemical Waste Evaporator.

The following table shows the discharge of activity to the White Oak Creek:

Discharged From	Gallons	Curies
Settling Basin	26,932,000	50.43
Retention Pond	380,800	.2

3. Waste Evaporator

Some minor difficulties have been met in the operation of the Chemical Waste Evaporator, as follows:

a. High specific gravity feed solution. This was made up of the alkaline supernate from the precipitated uranium tanks and the high activity waste solution from W-3, the Hot Pilot Plant storage tank. The high specific gravity feed solution prevents a large volume reduction.

b. On one occasion, the evaporator coils scaled up, causing poor heat transfer, resulting in a shut-down to remove the scale from the coils with acid.

c. Several foam-overs have occurred, but their frequency has been reduced by dropping the concentrated material from the Evaporator before a high volume reduction is realized.

d. As reported last month, it was necessary to decontaminate the equipment and to replace the gate in the valve from the condendate tank to W-5. This month, the valve began sticking again so it was decided to have the valve open at all times since it will not interfere with operations.

3. Waste Evaporator - (Continued)

Because of differences in opinion concerning the methods used in calculating decontamination factors, it has been decided that in the future, the reports will include the total input of activity to the evaporator and the total activity discharged from the evaporator to the Settling Basin. Calculations made on this basis, which cover the last week of operation only, show that 151.5 curies of beta activity were charged into the evaporator, while .175 curies were discharged to the Settling Basin.

Special analysis run on three batches indicates that for all practical purposes, a complete gamma and alpha decontamination is obtained with the evaporator, while the beta decontamination will vary with the feed solution.

Gallons Fed to Evaporator	Gallons of Concentrate to W-6	Volume Reduction
231,059	24,359	9.5:1

4. Waste Tank Inventory

Tanks	Gallons Capacity	Gallons In	Gallons Out	Discharged To	Free Space
		HOT PILOT PLANT STORAGE			
W-3	41,300	2,072	0	---	12,728
		CHEMICAL WASTE STORAGE			
W-5	170,000	263,450	275,710	Evaporator	45,600
		EVAPORATOR CONCENTRATE			
W-6	170,000	28,200	0	---	81,600
		METAL WASTE			
W-4,7,8, 9,10	713,000	18,072	94,800	Evaporator	166,070

[redacted]

5. Special Wastes

a. Two shipments of alpha contaminated trash were received from Dayton.

b. Two shipments of contaminated material from K-25 were buried.

c. A total of 567.71 kg. of uranium was received into the Metal Storage System this month. Of this, 306.11 kg. was transferred from the Hot Pilot Plant; 130.8 kg. from the Technical Division, Section I; and 132.43 kg. from Building 706-D.

d. Five drums and three pots of chemical waste and three drums and one pot of uranium-plutonium waste were received from Chicago.

e. A shipment of liquid waste containing plutonium was received from Knolls Laboratory.

[redacted]

III. RaLa (Ba^{140} - 12.5d):

The work of relocating the vessel off-gas lines and filter box was completed and the equipment found to be in good operating condition.

The dissolver off-gas condensate pit vent system was used during RaLa Run #34 and proved to eliminate the remaining sources of air contamination during runs. High air contamination occurred after the run when the product was removed from the cell. This incident resulted in a contaminated product carrier by a broken waste line. To prevent a hazard from similar occurrence in the future, it is planned to use air masks during this operation instead of respirators as we have done in the past.

RaLa Run #34 was started on July 10, 1949, with the loading of seventy-six, four-inch, Hanford slugs to the dissolver. These slugs were dissolved and extracted in two batches.

No difficulties were encountered in the operation with the exception of a tygon waste line breaking in the glassware cubicles during a waste transfer. This failure did not impair the run.

The glassware operation was exceptionally fast. Last Separation Time was reached at 1250 on July 14, 1949, four hours after glassware operations were started. The product with a content of 4,284 curies, as determined by a ten-hour-and-thirty-minute skyshine, was shipped in the nitrate form at 0310 on July 15, 1949. (Los Alamos reported 5,200 curies of lanthanum with no comment on the quality.)

The analytical summary of the run follows:

Slugs Loaded: 76, four-inch, Hanford slugs

Slugs Dissolved: 72.85 Hanford slugs (by analysis).

[redacted]

III. RaLa (Ba^{140} - 12.5d): - (Continued)

	CURIES	PERCENT
Total Curies Dissolved*	5,903	100.0
Cell A Losses	1,283	21.73
Cell B Losses	441	7.47
Losses Accounted For	1,724	29.20
Material Balance through B-6		92.43
Product Shipped (Skyshine)	4,284	72.57
Material Balance through Skyshine		101.77

* All curies corrected to L. S. T.

Following shipment of the run, the work of decontaminating the cubicles for equipment change and tygon line replacement was begun. This work is 75% completed and should be finished by August 10, 1949.

The next run is tentatively scheduled to begin on August 14, 1949.

[redacted]

C. ISOTOPE CONTROL DEPARTMENT

I. General:

There were 427 isotope shipments during the month of July compared with 447 during June, 1949.

A number of P^{32} shipments had to be delayed because of processing difficulties. By the end of the month orders for approximately 1,500 millicuries had been delayed or cancelled.

The breakdown of shipments according to separated and unseparated material is as follows:

	JUNE 1949	JULY 1949	TOTAL August, 1946, to July, 1949, Inc.
Separated Material 706-D Area	332	328	6,867
Unseparated Material 100 Area	115	99	2,042
	447	427	8,909

The breakdown of shipments according to non-project, project, and foreign shipments for June and July is as follows:

	JUNE	JULY
Non-Project	367	339
Project	54	73
Foreign	26	15
	447	427

II. Phosphorus:

Because of the continuing shortage of P^{32}, it was decided to obtain some P_2O_5 which had been kept in the pile at Hanford approximately eight months for use in such emergencies. This material is expected to arrive Monday, August 1, and together with the P^{32} produced here should provide enough material to fill all outstanding orders. The irradiation of phosphorus at Hanford generally produces a material with a specific activity about one millicurie per milligram. This is not as high as the phosphorus ordinarily shipped which has a [redacted]

II. Phosphorus: - (Continued)

specific activity of about one millicurie per twenty-five micrograms. For medical purposes, however, it appears that one millicurie per milligram is sufficiently high; in fact, some institutions now add phosphate to our P^{32} to act as buffer.

III. Iron 59:

The iron 59 produced from the enriched iron 58 irradiated at Hanford was all distributed. Since this material has approximately 5% Fe^{55} activity, there was some question as to whether it was suitable for use in humans and no more will be irradiated at Hanford until a decision is made by the Atomic Energy Commission Sub-Committee on Human Applications.

IV. Cobalt 60:

To prevent dusting from irradiated cobalt metal, it will now be gold-plated before being exposed. There is a possibility that for some medical uses, gold-plated needles may be used without sheaths.

Co^{60} in a wide range of specific activities is now on hand. The highest is one and on half curies per gram. Approximately 1,500 curies are now on hand and large sources can be prepared at any time.

Later in the year material with a specific activity of about three curies per gram is expected.

V. Shipping Regulations:

The cylindrical fiber container used to ship P^{32}, C^{14}, and other beta emitters has been replaced by a cubicle fiber container meeting Interstate Commerce Commission Specification 12-B.

VI. Beta Sources:

Favorable reports on beta sources were received from Princeton University regarding a cerium 144 source and from Ohio State University Medical School regarding a ruthenium 106 source plated on a gold disc. The latter material is being studied for application in treatment of cancer and will probably find widespread application if the work now in progress continues to be successful.

VII. Radioisotope Processing Area:

Work continued on all buildings in the Radioisotope Processing Area. In the Analytical Building work continued on the service piping, electrical wiring, aluminum ceiling, and the isotope loading barricade. Also, the exhaust ducts were completed except for the drops to the hoods; installation of the laboratory furniture and fabrication of the hot sinks and barricades were started. In the process buildings the exhaust ducts were completed except for the drops to the hoods, and work continued on the service piping, electrical wiring, interior painting, and the lead barricades; also, insulation of the service piping was started. The lumnite cement floor topping was completed in the decontamination building.

The concrete roadways and most of the grading in the area were completed. At the exhaust stack installation of the underground hot drains, semi-hot drains, hot off-gas lines, and service piping was completed; also, the equipment pad around the stack was poured except for the southeast corner, and installation of the blowers was continued. Excavation for the 706-C-D exhaust ducts was started.

L B Emlet

[redacted]

L. B. Emlet, Director
Operations Division

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VIII. SF Material Control:

Two monthly and one weekly salary employees have been transferred into the SF Accountability Group from other divisions.

Many special reports were requested during this month which delayed the work on modifying the current SF procedure.

1. Manual of SF Accountability Procedures. This report includes flow charts on the RaLa process, I^{131} process, development work on 235 recovery program, development work on Redox, and a typical semi-works process chart. Also a description of the existing record system for inventory processes and internal accountability control was included.

2. Laboratory Inventory and Requirements of Elemental Boron and Boron Complex, which includes a review of the boron on hand, and for use in experimental problems to determine the amounts available for return to the Atomic Energy Commission.

3. Beryllium and Beryllium Oxide Inventory. A study of all beryllium metal and oxide stocks at the Laboratory to determine quality and shapes on hand.

4. Special Material Requirements for Fiscal Years 1950 and 1951, includes requirements and intended usage for the following:

   a. All Rare Earths and their Components
   b. Calcium
   c. Magnesium and Magnesium Compounds
   d. Beryllium
   e. Zirconium
   f. Gallium
   g. Radium
   h. Uranium Glass

5. Review of all Outstanding Special Orders by and on the Laboratory. This includes all requests by the AEC for SF and special materials and Laboratory requests for stable isotopes, various forms of Be and requests for rare earths. [redacted]

VIII. SF Material Control:- (Continued)

Work was started on the following:

1. Recovery of small amounts of fissionable material for return to production channels has been started. Various individuals have returned amounts to the SF Accountability Office upon completion of experimental work. It is planned to prepare these samples in suitable form for recovery.
2. Additional quantities of enriched uranium were returned to Y-12 Plant for salvage. As was the case in the month of June, there has been a continuing flow of enriched uranium samples from research personnel to the Accountability Office. As rapidly as these samples could be prepared, they have been shipped for recovery.
3. Plutonium values were assigned to all slugs in the canal, as the first step in plutonium slug accounting as recommended by the Atomic Energy Commission. Pu accounting is being set up on all uranium slugs that have been through the Laboratory pile. Pu quantities in the future will be transferred throughout the Laboratory in addition to the uranium transfers as previously reported.
4. Review of fissionable material requirements for the year 1950. The AEC has requested a listing by projects for quantities of the Laboratory requirements for enriched uranium, plutonium, and U^{233}.
5. A field survey was conducted on SF Laboratory sample transfers prior to establishing sample transfer procedures. All of the existing Laboratory sample transfer systems have been reviewed with the idea of adapting them to an SF accountability transfer system. The AEC has requested that all samples of fissionable material be controlled by the Accountability Office.

VIII. SF Material Control: - (Continued)

Following is a summary of shipments and receipts of SF Materials for the month of June, 1949:

RECEIPTS

Received From	Material	Content
Argonne National Laboratory	Waste Solution (Uranium)	1.606 kg 72.5 mg Pu
" " "	1 Normal Uranium X-Slug	1.17 kg
" " "	Waste Solution (Uranium)	29.41 kg
Battelle Memorial Institute	Thorium Samples	7.00 gm
C&CCC, K-25 Area	5 Nickel Discs (depleted uranium)	2.00 gm
" " "	UO_3 (normal)	28,134.00 gm
" " "	Hanford Waste (radioactive glass and paper)	37.00 gm
General Electric Company	First Cycle Waste	0.12 mg Pu
" " "	Thorium Metal	286.80 lbs.
" " "	U/Zr enriched	3.887 gm
	Al-U235 Alloy enriched	1.585 gm
" " "	Enriched Uranium 93.5%	794.105 gm
" " "	Hot Uranium Slugs	135,133.54 gm 24.18 gm Pu
" " "	Enriched Uranium 93.7%	3,311.00 mg

SHIPMENTS

Shipped To	Material	Content
Brookhaven National Lab.	U_3O_8 - 94.8% Enriched	1.057 gm
" " "	U-238	4.9 gm
C&CCC, K-25 Area	12 Sample Bottles containing UAP Precipitate (normal)	247.00 gm
" " "	UAP Precipitate (normal)	3.2 kg
" " "	1 Hanford-size U Slug (normal)	3.59 kg
" " "	5 Nickel Discs	2.00 gm
C&CCC, Y-12 Area	U_3O_8 (normal)	3.0704 gm
" " "	UAP	41.77 kg 69.4 mg Pu
" " "	Fuel element #1, Zr clad U/Zr enriched uranium 93.18%(for analysis)	3.097 gm
" " "	Enriched U-235, 79% enriched (for recovery)	15.00 mg
" " "	Uranium Metal in nitric acid 6.5% enriched (for recovery)	.5248 gm
" " "	Uranium Metal in nitric acid 2.7% enriched (for recovery)	.4797 gm
" " "	Uranium sheet 99% enriched(for recovery)	.003 gm

[redacted]

VIII. SF Material Control: - (Continued)

SHIPMENTS

Shipped To	Material	Content
General Electric Company (HGE)	2 containers uranium solution recovered from Redox. 4 containers first cycle waste supernate, contains no uranium	648.00 gm
General Electric Company (SGE)	Natural Uranium, Redox solution 1EU normal uranium	49.00 gm
Westinghouse Electric Co.	Normal Uranium Al-Alloy Plates	16.00 gm

[redacted]