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1954

OPERATIONS DIVISION

MONTHLY REPORT FOR MONTH ENDING NOVEMBER 30, 1949

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OPERATIONS DIVISION

MONTHLY REPORT

for

Month Ending November 30, 1949

by

M. E. Ramsey
E. J. Witkowski
A. F. Rupp
J. A. Cox
L. B. Emlet

DATE ISSUED

JAN 9 1950

O A K R I D G E N A T I O N A L L A B O R A T O R Y

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CARBIDE AND CARBON CHEMICALS DIVISION
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Post Office Box P
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SUMMARY

1. The pile-down time averaged 8.6% as compared to 12.0% for October, 1949. (Page 4.)

2. One ruptured slug was detected and discharged without difficulty. (Page 4.)

3. The excess pile reactivity remained constant at 130 to 140 inhours. (Page 5.)

4. The construction of the new south balcony is slightly behind schedule. (Page 5.)

5. The temporary P^{32} equipment is working satisfactorily and provides the normal as well as carrier-free P^{32}. (Pages 7 and 8.)

6. Hanford slugs were used to produce fission products. All back orders for fission products, except Cs^{137} and Sr^{90}, have been filled. (Pages 9, 10, 11, and 12.)

7. Work is starting on the equipment and process for the isolation of rare gases and the packing of H^3. (Pages 12 and 13.)

8. Less than 600 mc/day of beta activity were discharged from the Settling Basin during this period. (Page 15.)

9. RaLa Run #37 was completed and 4,240 curies shipped on November 25, 1949. (Pages 18 and 19.)

10. There were 542 radioisotope shipments during the month compared to 496 for October, 1949. (Page 20.)

11. Personnel of the Operations Division visited the Hanford Plant to discuss radioisotope irradiations, shipping and handling costs. (Page 21.)

12. Work by the J. A. Jones Construction Company continues around the stack and blower of the Radioisotope Area. Equipment is being installed in the other buildings by ORNL personnel. (Page 22.)

13. A sample of the enriched uranium isolated from the current Hot Pilot Plant runs was sent to Y-12 for U^{236} assay. Results are not available. (Page 23.)

[redacted]

This document [redacted] as defined in the Atomic Energy Act of 1946.

[redacted]

A. PILE DEPARTMENT

I. Operating Data:

	NOVEMBER 1949	OCTOBER 1949	YEAR-TO-DATE 1949
Total Accumulated KWH	2,316,908	2,112,164	26,640,397
Average KW/operating hour	3520.15	3225.18	3668.03
Average KW/24-hour day	3217.93	2838.93	3323.40
Percent Lost Time	8.6%	12.0%	9.4%
Approx. Excess Pile Reactivity	130-140 inhours	130-140 inhours	
Slugs Charged	274	400	3,205
Slugs Discharged	260	400	3,124
Product Made (grams)	84.56	77.09	945.28
Product Discharged (grams)	19.59	22.51	235.51

II. Pile Operation:

The pile-down time averaged 8.6% compared to 9.4% for the year-to-date.

The fuel assembly in Hole 11, being evaluated by Argonne National Laboratory, was removed on November 7, 1949, a week earlier than scheduled because of a rise in the radiation level in the external circulation system. This increase in radiation was not due to a rupture of the fuel covering as was suspected, but is believed to be caused by a transfer of solid corrosion products from the system. The condition of the irradiated fuel plates is being studied at ANL. The removal of the fuel elements was somewhat complicated due to the repeated failure of the cutters used to shear the stainless steel tubing. These cutters broke, indicating that they were extremely hard and brittle.

A ruptured slug was located in Metal Channel 1365 by visual inspection on November 7, 1949, and was discharged without difficulty. It had been in the pile 1,825 days at a metal temperature of approximately 210°C. The slug was in the early stage of rupture and very little oxidized material had escaped.

[redacted]

II. Pile Operation: - Continued

The excess pile reactivity remained constant at 130 to 140 inhours during the month.

Construction work on the south side experimental levels is behind schedule. The delay has been caused by inability to obtain steel panels for completion of the rooms and failure to obtain the new air-conditioning unit. However, the reinstallation of experimental equipment was started at the holes on the third level approximately one week earlier than had been expected. The equipment for the more important experiments on the south face either has been or is being installed. All reinstallation of experimental equipment is expected to be completed in the coming month.

The construction of the combination change house, locker room, and storage building at the northwest corner of the Pile Building is progressing satisfactorily. All walls have been built, the roof installed, and ventilating duct and plumbing work is being installed.

III. Filter House:

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

	F. G. #50 GLASS WOOL FILTERS		C. W. S. #6 PAPER		ACROSS HOUSE	
Date	Inches w.g.	% Increase	Inches w.g.	% Increase	Inches w.g.	% Increase
Clean filters	1.1	--	1.0	--	3.3	--
10-31-49	4.0	282	2.1	110	7.4	124
11-30-49	4.0	0	2.2	5	7.7	4

Filter House operation was normal throughout the month.

[redacted]

IV. Fan Operation:

The control transformer on No. 2 Fan failed on November 23, 1949, during an electrical storm. The controls were switched over to the spare or testing transformer with the fan being out of service only about one half hour.

Except for the failure of this transformer, Fan House 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 October, 1949, with those handled in November, 1949:

	OCTOBER, 1949		NOVEMBER, 1949	
	Research	Radioisotopes	Research	Radioisotopes
Stringers 13, 14 & 16	11	99	13	83
Hole 22 (Pneumatic Tube)	1	6	0	0
All Other Holes	45	25	30	22
TOTAL BY GROUPS	57	130	43	105
TOTAL FOR MONTH	187		148	

At the end of November, 1949, there were 353 cans of target material in Stringers 13, 14, and 16, compared to 385 cans of target material in these stringers at the end of October, 1949.

[redacted]

[redacted]

B. CHEMICAL SEPARATIONS AND ISOTOPE DEVELOPMENT DEPARTMENTS

I. Radioisotopes:

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

Sixteen X-slugs and two Hanford slugs were process and 26,176.7 millicuries shipped.

The two Hanford slugs yielded 43.8 curies. This amount will be sufficient to fill all orders for a period of three weeks. The shutdown time will be used for repairing the glassware equipment and for the production of C^{14}.

During part of the dissolving and the sparging operation, a high air count was experienced in 706-C Building. At the same time, a dissolving was underway on a batch of Hanford slugs in the process at 706-D, and the wind was from the general direction of 706-D. It is not known which process caused the air contamination. On December 13, 1949, five very "hot" ORNL slugs will be dissolved in the I^{131} equipment and high air contamination will be further investigated.

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

The emergency P^{32} production equipment for both extraction and purification is working satisfactorily and is now being operated routinely by Chemical Separations personnel.

It has been observed that much of the organic material which co-precipitates with $La(OH)_3$ and the $P^{32}O_4^{=}$ can be removed by prolonged washing of the precipitate with hot water. This washing step has been included in the procedure, and as a result the amount of organic solids which must be removed with fuming nitric acid is greatly reduced.

[redacted]

[redacted]

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

The distillate which is removed during the fuming nitric acid step in the preliminary evaporation contains a small amount of P^{32} which is fairly pure, especially with respect to metallic contaminants. This material is being re-worked to produce carrier-free P^{32} for special orders; approximately 200 mc of carrier-free P^{32} was made during the month. It was noted that some of the organic matter (extracted from the sulfur) is distilled off during the initial evaporation.

The design for sulfur extraction equipment to be installed in the new area is 100% complete and fabrication has started in the shops. Installation of equipment in Building 906 will be started within about two weeks.

Nine irradiated sulfur slugs were received from Hanford; one slug was retained by them to make radiation decay measurements. The slugs were opened uneventfully and will be processed in the emergency P^{32} equipment. Yield data will be reported later.

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

In addition to preparing the report on the Be_3N_2-C^{14} process, various parts of the equipment to be used in Building 905 of the new Isotope Area are being assembled. This equipment includes apparatus for the study of organic C^{14} fractions, as well as the routine processing equipment for production of C^{14} as $BaCO_3$.

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

None produced; adequate supply in stock.

[redacted]

5. Fission Products

Run SS-19, made from Hanford slugs, was finished during the month. Concentration of product solutions was very good and gross activities of one curie per ml were obtained in several fractions.

During this run, cation exchange resins were subjected to what is probably the most intense beta-gamma radiation yet encountered by these materials. In the final column, after deposition of the gross activity on the top portion, the concentration was probably in the order of 600-700 curies per ml of resin. No difficulties were encountered with column operation and no apparent damage to the cation exchange resin was evident. It is apparently possible to operate cation exchange processes at very high radiation levels, provided an adequate flow rate (to minimize gassing effects) is maintained through the column. The two-foot thick concrete walls of the cell are inadequate shielding for a run of this level and no further runs are planned at this level. All glassware in the cell, even the light bulbs, was heavily darkened. Tygon lines showed a good deal of darkening and radiation damage.

Old Hanford slugs with long irradiation and cooling times will be used next to separate the longer-lived fission products. One change will be made for the next run -- the substitution of Dowex 50 resin for IR-1 Amberlite resin throughout the process. Previously Dowex 50 had been tested by us only in the finishing column. This work is preparatory to the process design for our new equipment in the Isotope Area where tri-butyl phosphate uranium extraction from a nitric acid solution will

5. Fission Products - (Continued)

be used. It will be convenient to use nitric solutions throughout (to which Dowex is resistant and Amberlite is not). Poor elution characteristics of Dowex 50 has limited our use of it in the past.

All the fission products obtained from this run were stored in the underground cell of Building 706-G, there being no other storage place where these highly radioactive samples could be put until the new area is placed in operation.

a. Columbium (Cb^{95} - 35d)

Work continued on the process for separation of pure Cb^{95} from Zr-Cb solutions. Since there are a number of trace impurities in Zr-Cb solutions (Ru, Te, Sn, Pu), it has been found that a combination of three methods, ion exchange, MnO_2 co-precipitation, and TTA solvent extraction, is necessary to produce Cb^{95} of high purity.

A portion of the Zr-Cb fraction from SS-19 (3,480 mc Cb and 7,700 mc Zr) was passed through an ion exchange column to reduce the Pu contamination. The oxalic acid was destroyed with potassium permanganate and the solution was then extracted with 0.03 M TTA-benzene. Most of the activity went into the benzene layer; that remaining in the aqueous layer was approximately 550 mc, mostly containing ~1% Zr. An unknown (8 mg half-thickness) activity was also found in the aqueous layer. After eight precipitations with MnO_2, during which the 8-mg unknown activity concentrated in the supernates, the preparation was dissolved in 0.01 N HCl and H_2O_2. This solution was heated to boiling to remove

5. a. Columbium (Cb^{95} - 35d) - (Continued)

H_2O_2 and passed through a Dowex 50 column. The Cb did not adsorb on the resin (probably not colloidal). The balance of the Mn^{+3} was removed by complexing the Cb with 0.5% oxalic acid and again passing through the Dowex 50 column. Approximately 300 mc of pure Cb^{95} was produced to fill all outstanding orders.

There no other orders for fission products this month except Cs^{137} and Sr^{90}; these isotopes are discussed separately in another part of this report.

b. Strontium (Sr^{90} - 25y)

Purification apparatus for Sr^{90} from RaLa waste and other sources is being set up in Building 907. Development work has been completed on the new process which is briefly as follows. Crude Sr^{90} (containing inactive Ni, Fe, Cr, Cu, Ag, Ca, Mg Si, and traces of many other cations) is evaporated and converted from a chloride to a sulfate solution. The solution is then electrolyzed with a mercury cathode to remove the metallic components and then the Sr is absorbed on an ion exchange column. Rare earths, Na, K, Mg are removed with citrate and weak HCl solutions, and then pure Sr^{90} is eluted with 2 N HCl.

All operations are done by remote control and the equipment has a three-way ventilation system to prevent any Sr^{90} from getting into the atmosphere.

Remote control equipment is also being fabricated to make up Sr^{90} sources of the crimped aluminum disc type. Apparently this type of source will be useful for a number of applications. [redacted]

5. c. Cesium (Cs^{137} - 33y)

The demand for Cs^{137} has increased markedly and development work is in progress on the recovery of this material from the waste tanks (W-3 Redox waste). The method used involves the fractional crystallization of ammonium alum from a saturated solution. Since the cesium alum is the most insoluble of all the alums, the first crystals contain virtually all the cesium in the solution. The W-3 waste contains about 10 mc of Cs^{137} per liter; it is also high in sodium and aluminum salts and other fission activities. However, the alum precipitation process is highly selective and almost radiochemically pure Cs is obtained after several crystallizations. The aluminum (from the alum) is precipitated with ammonium hydroxide and the Cs is put on a Dowex 50 column, from which the NH_4^+, K^+, Na^+ are selectively eluted and then Cs is taken off in HCl.

This process will be one of the first set up in the 6" lead cubicles in Building 908. An emergency batch of 200 mc is in process at the present time in temporary equipment in Building 706-D to satisfy some urgent orders for this isotope.

6. Tritium (H^3 - 12.1y)

The literature survey on tritium is well under way and the Argonne tritium packaging apparatus was inspected in preparation for installation of this equipment in Building 907 for dispensing this isotope, which is prepared at another site. Drawings, notes, and equipment numbers were obtained on the Argonne equipment.

6. Tritium (H^3 - 12.1y) - (Continued

A somewhat modified design, including some features which make it more versatile than the Argonne equipment, is being prepared for our installation. The installation of this equipment, as well as all other equipment required for the many isotope processes, is somewhat contingent upon the availability of craft manpower during the next six months.

7. Rare Gases (Xe^{133}-5.3d; Kr^{85}-9.4y; A^{37}-34.1d)

Library work on the separation and purification of the rare gases is completed. A^{37} has been isolated in oxygen carrier from irradiated calcium. This preparation has not been assayed because no satisfactory standards are available at the present time. This problem is being worked on by the Chemistry Division.

K^{85} has been isolated by the Chemistry Division from old W-slugs, using essentially the same process we have intended to use for routine separations of both Xe and Kr from dissolver off-gas; namely, adsorption on charcoal at the temperature of liquid nitrogen. Kr and Xe will never need to be separated, for one would select old slugs for Kr and very young ones for Xe.

As stated earlier, installation of the high vacuum gas processing and packing equipment in Building 907 depends upon the availability of craft manpower.

8. Ruthenium (Ru^{106}- 1y; Ru^{103} - 42d)

Work continues on the plating of special sources with Ru^{106}. It has been observed that there is an upper limit to the quantity of Ru metal which can be plated per square centimeter of surface on a source, using our present techniques. The present specific

[redacted]

8. Ruthenium (Ru^{106} - 1y; Ru^{103} - 42d) - (Continued)

activity of our Ru^{106} stock (~5 mc/mg) is insufficient for very concentrated sources. It is planned to produce high specific activity Ru^{106} from the palladium sulfide precipitate to be made on F. P. run #SS-20. The reason for the limit on plate thickness has not been determined, but changes in the plating bath and consequent changes in the Ru surface are considered to be probably causes. It was observed that it is impossible to plate gold directly over Ru^{106} without contaminating the gold bath. It seems probable that one must put a flash coat of dead Ru over the Ru^{106} before gold-plating to produce Ru^{106} sources from which activity can not be removed by rubbing.

One 8.9 mc Ru^{106} source and one 15 mc Ru^{106} source were made for special orders. Work on the large 125 mc Ru^{106} source cannot be completed until high specific activity material is available.

A portion of the tailings from #SS-19 was saved to produce Ru^{103} for a special order.

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

None produced this month.

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

None produced.

11. Cyclotron Targets

Targets for the isolation of Na^{22}, Be^{7}, I^{125}, and Co^{57} have been received and are being processed. Shipments of this material should be made during the next period.

A target for the production of trace amounts of Fe^{59} is expected from the University of California by the first of January, 1950.

[redacted]

12. Miscellaneous

a. Cobalt Sources

Two sources of one curie each and one of 250 mc of Co^{60} were prepared in special holders furnished by customers.

b. Irradiation Sample Preparation

Three cans of Sb, three of Ta, one of enriched Fe^{58}, and one of U^{238} were prepared for Hanford irradiation.

II. Tank Farm and Burial Ground:

1. General

a. The J. A. Jones Construction Company accidentally broke the stainless steel waste line running from Building 706-HB to tank W-5. The line has been repaired.

b. Approximately 9,600 gallons of precipitated metal supernate were jetted from W-7 to the Chemical Waste System this month.

2. Wastes Discharged to White Oak Creek

About 20.62 curies of beta activity were discharged from the Settling Basin this month. This is the lowest rate of activity discharged from the Basin for several years.

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

Discharged From	Gallons	Curies
Settling Basin	24,862,000	20.62
Retention Pond	329,900	.14

3. Chemical Waste Evaporator

Two changes were made this month in the operation of the evaporator to reduce the frequency of foam-overs, thereby increasing the decontamination factors. One change involved the addition of antifoam. In the past, about 300 grams of antifoam were added after starting up and after each foam-over. Under the present method, 50 grams are added after each start-up and every four hours thereafter. Another change was an attempt made to stop each run before it foamed on the basis of the performance of the previous run. This procedure, of course, eliminated many foam-overs. The volume reduction, however, which is considered less important, was sacrificed to some extent.

The evaporator was shut down for about six hours this month to repair a leaking union on the condensate side of one of the steam coils in the evaporator.

Gallons Fed to Evaporator	Gallons of Concentrate to W-6	Volume Reduction	Beta Curies To Evaporator	Beta Curies to Settling Basin
285,143	12.070	22.6:1	1.851.32	7.82

4. Waste Tank Inventory

Tanks	Gallons Capacity	Gallons In	Gallons Out	Discharged To	Free Space
		HOT PILOT PLANT STORAGE			
W-3	41,300	4,736	0	- - -	5,328
		CHEMICAL WASTE STORAGE			
W-5	170,000	287,543	285,143	Evaporator	42,000
		EVAPORATOR CONCENTRATE STORAGE			
W-6	170,000	12,000	0	- - -	64,800
W-8	170,000	2,400	0	- - -	98,400
		METAL WASTE STORAGE			
W4,7,9,10	543,000	11,328	9,600	Evaporator	29,976

[redacted]

[redacted]

5. Special Wastes

a. Five shipments from Dayton were buried.

b. A total of 258,738.21 grams of uranium were transferred to the Metal Waste System this month. Of this, Building 706-D contributed 133,338.40 grams and the Technical Division, Section I, 125,400.81 grams.

c. Two shipments of trash from K-25 were buried.

d. The first shipment of dead cattle was received from the UT-AEC Agricultural Program this month. These will be routine burials for some time.

e. Four drums of uranium-plutonium waste were received from Chicago, with two drums of contaminated trash from the Crane Company in Chicago.

[redacted]

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

Following the replacement of one glass reactor, RaLa Run #37 was started on November 20, 1949, as scheduled, with the loading of seventy-four Hanford four-inch slugs. The slugs were dissolved and extracted in two batches. No difficulty was encountered in the operation. Slightly higher waste losses were recorded in Cell A due, in part, to leaving behind more undissolved metal in the dissolver. The Cell B losses were slightly lower because of a faster filtration disc which allowed the use of lower vacuum during filtration.

L.S.T. was reached on November 24, 1949, at 1325. The product was shipped at 0915 on November 25, 1949, as a nitrate with a content of 4,240 curies as determined by a ten-hour skyshine measurement of 39½ R.

The analytical summary of the run follows:

Slugs Loaded: 74 - 4" Hanford slugs
Slugs Dissolved: 71.9 - 4" Hanford slugs (by analysis)

	Curies	Percent
Total Curies Dissolved	5,930	100.0%
Cell A Losses	1,418	23.9%
Cell B Losses	413	7.0%
Losses Accounted For	1,831	30.9%
Material Balance through B-6		95.7%
Product Shipped (Skyshine)	4,240	71.5%
Material Balance through Skyshine		102.3%
Losses Unaccounted For		2.3%

No report has been received from Los Alamos as to quality of this run.

In attempting to develop a better RaLa separation process and to test the effect of extremely high radiation on resin columns, the Technical Division personnel installed a resin colum in a temporary lead cubicle which now adjoins the existing concrete cells. The wastes from Run #37 were collected, processed through

[redacted]

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

the metathesis step, and approximately 700 curies turned over to them for their experimental work. Preliminary results indicate that their experiment was highly successful. The possibility of processing a complete run of 5,000 curies through this column is now being investigated.

The next run is tentatively scheduled to start on January 1, 1950.

[redacted]

C. ISOTOPE CONTROL DEPARTMENT

I. General:

There were 542 isotope shipments during the month compared with 496 during October, 1949. This represents a new record. Two hundred and twenty-one new orders were received during the month; this demonstrates an increase in the domestic and project orders for which the totals were 163 and 51 respectively, compared with 116 and 25 for the month of November, 1948. Foreign orders,on the hand, decreased from 32 a year ago to 7 for this month.

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

	OCTOBER 1949	NOVEMBER 1949	TOTAL August,1946, to November, 1949, Inc.
Separated Material 706-D Area	398	441	8,408
Unseparated Material 100 Area	108	101	2,514
	496	542	10,922

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

	OCTOBER	NOVEMBER
Non-Project	389	404
Project	91	118
Foreign	16	20
	496	542

II. Hanford Irradiations:

Arrangements are being made through the Atomic Energy Commission to obtain an increased allotment of approximately 100 inhours for Hanford irradiations. This will permit the irradiation of about 150 slugs of beryllium nitride, 30 to 50 slugs of cobalt, and miscellaneous materials such as sulfur to produce P^{32}.

III. Phosphorus 32:

Sufficient P^{32} has been produced this month to meet all demands and 6,290.37 millicuries were sold. The first irradiated sulfur slugs were received from Hanford on November 28, 1949. If the yield from these irradiations proves satisfactory, regular irradiations will be made to augment the supply of P^{32} from the ORNL pile.

IV. Transportation and Irradiation Charges for Hanford Exposures:

It was learned during a visit to Hanford that pile charges in addition to direct labor charges are being made on Hanford exposures. The pile charges represent about 50% of the total charge to ORNL, which has been averaging about $3,000 per month recently. Also the pile charges have been allocated on the basis of direct labor and not on the basis of number of samples irradiated or the number of process channels occupied.

It was also learned that there is a discrepancy between the way ORNL and Hanford has handled transportation charges. It has been the understanding at ORNL that Hanford would pay express charged on shipments to ORNL, while the return shipment would be paid for by ORNL. Hanford is now operating under a procedure whereby all shipments would be paid for by ORNL except for programs of primary interest to Hanford, such as RaLa and Redox. Shipments under these programs will be paid for both ways bu Hanford.

V. Beta Ray Sources:

Four strontium beta ray sources are on order at the present time, three from the U. S. Testing Company and one from duPont. One ruthenium source was made during the month for Western Reserve University. An order for 250 millicuries of Strontium 90 has been received from the General Electric Company and it appears that General Electric intends to prepare their own beta ray sources. [redacted]

[redacted]

VI. Cobalt 60:

A report has been received from the Bureau of Standards on twelve curies of Cobalt 60 sent September 30, 1949. The specific activity closely checks measurements made here.

VII. Radioisotope Processing Area:

In the Isotope Processing Area construction work continued on the cell exhaust precipitators and filters. The exhaust blowers at the stack were started up and run for a few hours during the latter part of the month; further testing of the equipment is planned for next month.

ORNL personnel completed installation of the lucite panels in the laboratory hoods, volume control valves for the hot and cold water knee-valves, and approximately 75% of the remote control isotope packaging equipment. Also, painting of some of the concrete walls and floors, and installation of the equipment in the Decontamination Building were started.

L. B. Emlet, Director
Operations Division

wp

[redacted]

VIII. SF Material Control:

1. One shipment was received from Hanford containing 200 gallons of supernate for the tributyl-phosphate process. This brings the total amount of material received for this process to 600 gallons. In addition, we also received slugs for the RaLa process.

2. Revised forms of SF Material Transfer X-150 and SF Inventory X-333 were distributed to all individuals having custody of source or fissionable materials. It was requested that they begin using these new forms December 1, 1949.

3. Analytical work was completed on the enriched material being used in the preparation of fuel assemblies for the Materials Testing Reactor Program. Results were within three grams of the analytical data furnished by Y-12 when the material was delivered. Because of the quantity and high enrichment of this material, the SF Accountability Office is establishing special accounts for the purpose of giving closer scrutiny of the transactions involving this material than is normally given to routine work.

4. A sample was taken from the first product of the U^{235} process and was delivered to Y-12 for an isotopic assay of U^{235} and U^{236}. It is expected that the results of this assay will be somewhat lower in U^{236} than the results from other runs, in view of the fact that the material used in run number one had a shorter irradiation period than did the material used in subsequent runs.

5. In paragraph I, under SF Material Control in our October report, reference was made to an apparent discrepancy or an "unaccounted for" loss of material above 75% enrichment. As explained in

[redacted]

VIII. SF Material Control: - (Continued)

5. this report, the amount of material in question fell within the limit of error applicable for the handling which this material received, and the case had been formally closed in a letter from Mr. C. N. Rucker to Dr. A. H. Holland, dated October 19, 1949; however, Y-12 personnel has since destructively leached the fuel tubes preciously associated with this material and, as a result, recovered an additional 72.76 grams. Consequently, this has reduced the discrepancy from a -76.33 grams to a +.43 gram.

6. Following is a summary of shipments and receipts of SF materials for the month of November, 1949:

SHIPMENTS

Shipped To	Material	Content
Argonne National Lab.	Zr. Clad Zr. Uranium Alloy Plates	13.854 gm.
" " "	X-Size Slugs (depleted)	248.10 gm. 0.555 gm. Pu
" " "	Irradiated X-Slugs (depleted)	41,976.00 gm. .670 gm. Pu
" " "	Uranium and Plutonium Waste (depleted)	8.25 gm. .000002gm.Pu
K-25, C&CCC	Unjacketed Slugs (normal)	33,814.00 gm.
Y-12, C&CCC	93.5% Enriched Uranium	299.5 mg.
" "	X-Size Slugs (normal)	2,332.00 gm.
" "	X-Size Slugs (normal)	2,332.00 gm.
" "	X-Size Slugs (normal)	2,332.00 gm.
Naval Research Lab.	U_3O_8 (normal)	.80 gm.

[redacted]

VIII. SF Material Control: - (Continued)

RECEIPTS

From	Material	Content
Argonne National Lab.	Aqueous Solution (depleted)	23,160.00 gm. 138.776 mg. Pu
Battelle Memorial Inst.	Thorium Crystal Bars	0.36 kg.
" " "	Uranium-Zirconium Test Cylinders	13.34 gm.
K-25, C&CCC	Hanford Contaminated Liquid Waste (depleted)	3,960.00 gm.
" "	UX_1 Solution (normal)	612.00 gm.
" "	Enriched Uranium	.015 gm.
" "	Hanford Waste Scrap (Radioactive Glass and Paper)	35.00 gm.
Crane Company	Waste Precipitate and Contaminated Materials	334.53 gm.
Y-12, C&CCC	Uranyl Sulfate (normal)	19,856.8 gm.
" "	Uranyl Nitrate (normal)	78,644.4 gm.
" "	Nickel-Plated Uranium Slugs (normal)	2,332.00 gm.
" "	Nickel-Plated Uranium Slugs (normal)	2,332.00 gm.
Hanford Engineer Works	Irradiated Slugs (depleted)	135,133.54 gm. 24.18 gm. Pu
" " "	Metal Waste Supernate (depleted)	22,200.00 gm. 30.00 mg. Pu
" " "	Gamma Extruded Rod (normal)	17,599.29 gm.
Simons Saw and Steel Co.	Uranium Rods (normal)	19,912.60 gm.
Westinghouse Electric Co.	Thorium and Thorium Oxide	256,810.00 gm.