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ORNL-608
Progress Report

AEC RESEARCH AND DEVELOPMENT REPORT

LABORATORY RECORDS
1954

OPERATIONS DIVISION

MONTHLY REPORT

FOR MONTH ENDING JANUARY 31, 1950

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OPERATIONS DIVISION

MONTHLY REPORT

for

Month Ending January 31, 1950

by

L. B. Emlet

DATE ISSUED

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ORNL 308

SUMMARY

1. Lost pile operating time averaged 9.1% as compared to 9.0% for December, 1949. (Page 5.)
2. A gain of thirty inhours was realized by discharging twenty-four rows of $Ca(NO_3)_2$ slugs for C^{14} production. (Page 6.)
3. One ruptured slug was located and discharged without difficulty. (Page 5.)
4. The Pile Department of the Operations Division assumed responsibility for the operation of the Water Demineralization Plant, Building 807, on January 1, 1950. (Page 7.)
5. Completion of Program "H" work in the Pile Building is proceeding slowly. Practically all of the research projects that were interrupted by this work have resumed operation. (Page 5.)
6. Radioisotope production continued with only minor difficulties.
   a. The phosphorus purification equipment was modified to eliminate personnel radiation hazards and to provide a more efficient process. (Pages 8 and 9.)
   b. Some difficulty is being experienced in preparing a large quantity of S^{35} as elemental sulfur. (Page 10.)
7. The activity discharge into White Oak Creek totaled 12.88 curies, an increase of 60% over last month. The portion contributed by the Evaporator discharge was only 0.88 curie compared to 2.1 curies for December, 1949. Pages 15, 16, and 17.)
8. Two RaLa runs were completed this month. Run #38 assayed by "skyshine" at 4,670 curies was shipped to Los Alamos on January 6, 1950.

   Run #39 was prepared for the testing of the Technical Division resin column on RaLa isolation. Two successful runs through the column were

[redacted]

SUMMARY - (Continued)

8. Continued

completed. Detailed results will be included in the Technical Division's report on this problem. (Pages 19, 20, and 21.)

9. The next RaLa run is scheduled for shipment to Los Alamos on March 5, 1950. (Page 21.)

10. There were 633 radioisotope shipments during the month compared to 430 for December, 1949. (Page 22.)

11. The fans in the Radioisotope Area were placed in operation this month. Mechanical difficulties delayed the operation of the off-gas blowers. (Page 25.)

12. An audit was completed on the S-F records of three analytical labs. (Page 27.)

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[redacted]

[redacted]

A. PILE DEPARTMENT

I. Operating Data:

	JANUARY 1950	DECEMBER 1949	YEAR 1949
Total Accumulated KWH	2,439,940	2,432,071	29,072,468
Average KW/operating hour	3616.24	3612.96	3663.36
Average KW/24-hour day	3279.49	3268.91	3318.77
Percent Lost Time	9.1	9.0	9.4
Approx. Excess Pile Reactivity	120-130 inhours	90-100 inhours	
Slugs Charged	245	172	3377
Slugs Discharged	198	215	3339
Product Made (grams)	89.05	88.76	1061.04
Product Discharged (grams)	13.09	13.07	248.58

II. Pile Operation:

The pile-down time was 9.1% for the month, compared to 9.4% for the Year 1949.

The permanentization work in the Pile Building and on the new Change House and Storage Room is progressing slowly. The south experimental levels are essentially completed with practically all research work on these balconies having been resumed. The painting in the Pile Building is about ninety-five percent completed. The central air-conditioning unit has arrived and installation is to be completed during the coming month. The combination Change House and Storage Room is about three-fourths completed. The door framing for the Change House came in the last of this month, and the partition walls are being erected.

A ruptured slug was located in Metal Channel 1662 by visual inspection on January 9, 1950, and discharged without difficulty. It had been in the pile 1,922 days at a metal temperature of approximately 225°C. The probe may have given slight evidence of the rupture since it became somewhat more erratic than usual during the week prior to detection of the rupture. This rupture was the sixty-sixth since the pile has been in operation. [redacted]

II. Pile Operation: - (Continued)

The excess pile reactivity was 120 to 130 inhours at the end of the month. The increase of approximately thirty inhours during the month was due principally to discharge to twenty-four rows of calcium nitrate slugs for C^{14} separation.

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:

	GLASS WOOL FILTERS		CWS #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	--
12-31-49	3.0	173%	2.5	150%	6.8	106%
1-31-50	3.2	7%	2.6	4%	7.0	3%

Filter House operation has been normal throughout the month.

IV. Fan House:

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 January, 1950, with those handled in December, 1949:

	DECEMBER, 1949		JANUARY, 1950	
	Research	Radioisotopes	Research	Radioisotopes
Stringers 13, 14, and 16	61	79	58	154
Hole 22 (Pneumatic Tube)	2	1	29	6
All Other Holes	23	20	8	18
TOTAL BY GROUPS	86	100	95	178
TOTAL FOR MONTH	186		273	

At the end of January, 1950, there were 366 cans of target material in Stringers 13, 14, and 16, compared to 372 cans of target material in these stringers at the end of December, 1949. [redacted]

[redacted]

VI. Water Demineralization Building:

The responsibility for operation of the Water Demineralization Building was transferred to the Pile Department on January 1, 1950. This building had been operated previously by personnel of the Hot Pilot Plant (Technical Division).

The operation of the building was normal during the month with 606,600 gallons of water being demineralized.

The cost of operating this building has been proportionately allocated to the users of this water irrespective of whether they used demineralized water or used deaerated demineralized water. During the coming month, an evaluation will be made of the difference in cost of the two types of water and future cost allocations will reflect the higher cost of deaerated demineralized water. This higher cost is due principally to cost of steam and an appreciable amount of extra labor required to operate the deaerator.

[redacted]

[redacted]

B. CHEMICAL SEPARATIONS AND ISOTOPE DEVELOPMENT DEPARTMENTS

I. Radioisotopes:

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

Six ORNL and four Hanford slugs were processed and 25,111 millicuries shipped.

No troubles were encountered in the equipment operation this month. Slight air counts were noted a few times during certain dissolving and transferring operations. This difficulty should be overcome when the cell tie-in to the new stack is completed.

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

Sixteen, 2,000-gram cans of irradiated sulfur were processed and 9,666 millicuries shipped.

Phosphorus Development Work

Installation of equipment in Building 906 was started. Practically all purchased materials, except the flexible cables for controlling valves, have now been received.

The new sulfur irradiation can design was completed and two sample units are being fabricated for testing.

A problem involving the dripping of molten sulfur at the end of each melt was anticipated. It has been decided to use forced-air cooling of the can and heater at the end of the melting cycle in order to freeze residual sulfur in place.

An additional zinc bromide viewing window will be installed in the front wall of the barricade to allow visual observation of the sulfur melting, charging, and cooling operations.

[redacted]

[redacted]

2. Phosphorus Development Work - (Continued)

The temporary P^{32} purification apparatus in Building 204 was revised to allow the incorporation of recent improvements in the routine procedure. The alkaline hydroxide precipitation at high pH was replaced by the newly-developed ion-exchange Stang reactor process to allow a faster, simpler, and more efficient removal of miscellaneous cations before the $La(OH)_3$ precipitation step. Another ion-exchange Stang is used on the dissolved $La(OH)_3$ - $LaPO_4$ solution to remove virtually all the La^{+++} before the solution is passed through the final column. The new equipment has performed very well, allowing operation with low exposure to personnel. Complete details on the yields to be expected are not available, but it is believed that the overall yield will be improved from the normal yield of approximately 60% to 85%.

Twenty-four more slugs were loaded with sulfur for irradiation at Hanford. An improved Hanford sulfur slug was designed to give 40% greater sulfur loading. The new design also includes an end hole closed by a threaded plug and a Pb-Al gasket for easy filling. Two cans are being fabricated for physical testing here and at Hanford.

3. Carbon (C^{14} - 5100y) ($Ca(NO_3)_2$ Process)

Eight hundred and seventy-eight $Ca(NO_3)_2$ slugs were processed. Some difficulty has been encountered in analysis of the product; results will be reported as soon as available.

[redacted]

3. Carbon Development Work - (Be_3N_2 Process)

Design work on the Be_3N_2-C^{14} plant for Building 905 continued and is approximately 75% completed.

4. Sulfur (S^{35} - 87.1d)

A large order for high specific activity sulfur (>1 curie/gram) in elemental form was worked on during the month. This preparation has been found to be much more difficult than anticipated, principally because of the tendency of elemental sulfur to occur in colloidal form when produced by oxidation of sulfides in aqueous solution. Consequently, this method of preparation has been abandoned and new equipment has been set up for vapor phase thermal or electrical discharge dissociation of hydrogen sulfide.

5. Fission Products

Most of the time this month was spent in re-fractionating products from Run #SS-20.

Some of the fractions obtained from this run were as follows: 2,780 millicuries rare earths; 384 millicuries pure Ce^{144}; 1,000 millicuries Sr^{90} plus Ce^{144} impurity; 300 millicuries of Ru^{106} plus Tc^{99}; 600 millicuries Cs^{137}. The fraction of greatest interest is the rare earth fraction which contains Eu^{155} and Sm^{151}, as well as Pm^{147}. This material is now being re-fractionated to remove the Cs^{137}, which always builds up in the Pm^{147} band, and the Ce^{144} traces, which always bleed thru because of the large amount present.

SS-21 will be started in February, using the second half of the Hanford slug metal solution used for SS-20. However, all Dowex resin will be replaced with Amberlite IR-1 or IR-120

[redacted]

5. Fission Products - (Continued)

resin to speed up operations. An attempt will be made to wash Cs^{137} off the main column with 0.25 N HCl before the U is removed with 0.25 M H_2SO_4.

The platinum sulfide precipitate, made in the anion fraction which passes through the column, was found to contain an undesirable amount of elemental sulfur caused by nitric acid oxidation of hydrogen sulfide. It is planned in subsequent runs to boil this solution down and convert to HCl solution to avoid this. Ruthenium and technetium sulfides do not precipitate well unless there is a high concentration of acid to promote the presence of Ru^{+4} or Ru^{+3} rather than RuO_4^-.

During the month a start was made in abandoning the various old locations in 706-D used for purification of fission product fractions. New equipment will be built in the new Isotope Area, principally in Buildings 908 and 910, for this work.

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

Fifty millicuries of Cb^{95} in 0.2 M citric acid solution was made for a special order.

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

Approximately 1,200 millicuries of Sr^{90} were produced during the month. The new Sr purification apparatus installed in Building 907 is now working satisfactorily. However, a more permanent type of equipment will be installed as soon as time permits.

c. Yttrium (Y^{91} - 57d)

The crude Y^{91} fraction from SS-19 was boiled to near dryness and fumed to destroy organic matter. Several

[redacted]

5. Fission Products - (Continued)

c. Yttrium (Y^{91} - 57d)

portions in HCl solution containing a total of 17,400 millicuries were stored for future use. A 400-millicurie portion was taken for TTA Pu purification for current orders.

d. Cerium (Ce^{144} - 275d)

Four curies of Ce^{144} were purified for stock.

6. Tritium (H^3 - 12.1y)

Concrete pads for the gas hoods have been poured in Building 907 but the shops have not completed construction of the hoods yet.

A supply of H^3 has been received from other sites.

All special glassware and equipment has been received except relays and valves for the automatic Toepler pumps.

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

Approximately 135 millicuries of Ru^{106} of high specific activity (>20 mc/g. Ru) were separated from SS-20 fractions. Work is in progress on separating a small amount of Tc^{99} which accompanied the Ru^{106} fraction.

8. Cyclotron Targets

a. Beryllium (Be^7 - 53d)

Development work has been completed on the chelation process for extraction of Be^7 from cyclotron-irradiated lithium targets. Several improvements have been made in the process suggested by Bolomey and Broido (ORNL-196), namely, dissolution of the target in ethyl alcohol instead of hydrochloric acid, and minor changes in chelating

8. Cyclotron Targets - (Continued)

a. Beryllium (Be^7 - 53d)

conditions, using acetyl acetone. Bolomey and Wish recommended the use of TTA instead of acetyl acetone in another report (ORNL-136), because of the volatility of the acetyl acetone chelate. However, this difficulty has been overcome by back extraction of the Be^7 into weak acid and thereby avoiding the evaporation of benzene-beryllium acetyl acetone solutions.

Approximately 50 millicuries of Be^7 were produced for shipment during the month.

b. Sodium (Na^{22} - 3y)

The all ion-exchange process for separating Na^{22} from cyclotron-irradiated magnesium targets suggested by G. E. Boyd was tried on a much larger scale than was used in the original work. Thus far, operating conditions have not been determined which will duplicate the results shown in the original lab-scale experiments. This process involves absorption of all Mg and Na^{22} on the top of an ion-exchange column, followed by selective elution of the Na^{22} with 0.2 M perchloric acid.

Approximately 100 millicuries of Na^{22} are in process at the present time. Several different methods are being explored in working up this material.

c. Iron (Fe^{59} - 45d)

One cyclotron-irradiated cobalt target was received and is in process for extraction of Fe^{59}. The method being used is extraction of Fe from $CoCl_2$-$FeCl_3$ solution in 7 N HCl.

9. Miscellaneous

a. Purification of 105 Canal Water

Design of a system for reducing the radioactivity in the 105 canal water so that recirculation of water may be employed was started this month. Most of the basic data required for the design have been determined. Water will be pumped through a sand filter and a Dowex 50 resin bed in series. Capacity of the system will be 30 g.p.m. requiring a 7.5-square-foot area of quartz sand, two feet deep on one foot of graded quartz gravel, and a 7.5-square-foot bed of resin, three feet deep on one foot of graded quartz gravel and sand. About one half of the activity is collected on the sand filter and most of the remainder is collected on the ion exchange column until breakthrough occurs in ten to fifteen hours. For efficient operation, daily regeneration will be required and probably two units should be installed so that one can operate while the other is regenerating.

b. Plating Highly Radioactive Co^{60} Sources

A fairly large number of Co^{60} sources, 1 cm diameter by 4 cm long, each containing approximately 30 curies of activity, are on hand and must be plated with Ni, Ag, or Au in order to prevent the sloughing-off of Co^{60} oxide during handling. Remote control equipment is being set up in the 6" Pb Cubicle #1 in Building 908 for this work. It was necessary to increase the cubicle wall thickness to 8" Pb with lead brick in order to contain radiations from this intense source. The scattering and skyshine

9. Miscellaneous - (Continued)

b. Plating Highly Radioactive Co^{60} Sources were eliminated by use of ½" thick steel cubicle cover. Actual plating work will start early in February.

c. Two special 0.2-curie Co^{60} sources were packaged in special holders furnished by the customer.

d. A ferrous sulfate (Fe^{59}) solution was made up according to a user's specifications.

II. Tank Farm and Burial Ground:

1. General

a. About 2,400 gallons of precipitated metal supernate from the Uranium Storage Tank (W-10) were transferred to the Chemical Waste System (W-5).

b. Ten glass-lined tanks, which have been stored at the Burial Ground for the last three or four years, were transferred to the Austin Company at Argonne National Laboratory.

2. Activity Discharged to White Oak Creek

As indicated below, 12.88 curies of beta activity were discharged from the Settling Basin during this month. Only 0.88 curie of this total, however, was contributed by the Evaporator.

An unexplained increase in the discharge from the Settling Basin occurred during the last week of the month. It is suspected that this was caused by emptying hot wastes from the 706-A Building directly into the process drains, which discharge into the Settling Basin. During this period the hot drain line from 706-A Building was out of service for repairs. [redacted]

[redacted]

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

	DECEMBER, 1949		JANUARY, 1950	
Discharged From	Gallons	Curies	Gallons	Curies
Settling Basin	19,562,000	7.97*	22,050,000	12.88*
Retention Pond	494,500	1.05	604,727	1.85
TOTAL TO WHITE OAK CREEK		9.02*		14.73*
*Contributed by Evaporator		2.1		.88

The constant samplers at the inlet and outlet of the Settling Basin, installed by the MIT Practice School students and described in Report KT-52, were tested for a period of twenty-six days. During this period, the analyses of samples taken by the new sampler at the outlet of the basin were compared with those taken by the old spot-sampling method. Also, a comparison was made between the activity of the waste entering the basin to determine the effectiveness of the basin in removing activity from the waste discharged to the Creek.

The analyses of samples taken by the new sampler indicated that the average activity of the waste discharged to the Creek was approximately 19.7 beta c/min/ml, while the samples taken by the old four-hour, spot-sampling method showed 23.7 beta c/min/ml. The reason for the higher activity shown by the spot-sampling method may be that in scooping the sample out of the diversion box, some algae or scum was frequently scraped from the sides of the box into the sample bottle. Samples containing this foreign material, which is high in activity, would not be representative of the wastes discharged.

[redacted]

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

During the same twenty-six-day period, the average activity of the waste entering the basin was 149.5 beta c/min/ml, while the discharge was 19.7 beta c/min/ml. This decontamination factor of 7.6 indicates that the Settling Basin is still effective in removing activity from the wastes, and that recent speculation to the contrary was wrong.

3. Chemical Waste Evaporator

It was necessary to run the evaporator at a reduced rate this month due to the large amount of I^{131} present in the feed solutions from the two RaLa runs made this month. Good decontamination factors were made, the average for the month being 1,541.1.

The following work was done on the equipment:

a. A constant feed pump was installed to deliver antifoam solution to the Evaporator at a steady rate. Antifoam has been added batch-wise in the past. The constant addition of antifoam does not seem to have any effect towards reducing the number of foam-overs as compared to the addition of antifoam agent batch-wise.

b. The bellows on the Taylor Aneroid Loquid Level Indicator failed and had to be replaced. Manual operation was necessary until replacement was made.

Gallons Fed to Evaporator	Gallons of Concentrate to W-6	Volume Reduction	Beta Curies To Evaporator	Beta Curies to Settling Basin
DEC.-247,014	31,151	8.9/1	578.1	2.1 C
JAN.-157,136	6,067	25.9/1	1,346.18	.88 C

[redacted]

4. Waste Tank Inventory

Tanks	Gallons Capacity	Gallons In	Gallons Out	Discharged To	Free Space
		HOT PILOT PLANT STORAGE			
W-3	41,300	296	0	---	5,328
		CHEMICAL WASTE STORAGE			
W-5	170,000	175,206	157,136	Evaporator	27,531
		EVAPORATOR CONCENTRATE STORAGE			
W-6,8	340,000	9,588	3,000	---	102,641
		METAL WASTE STORAGE			
W-4,7, 9,10	543,000	17,316	2,400	Evaporator	77,844

5. Special Wastes

a. Two shipments from Dayton were buried.

b. A shipment of trash from K-25 was buried.

c. Six drums and eight pots of uranium-plutonium waste were received from Chicago.

d. A total of 283,905 grams of uranium was received in the Metal Waste System this month. Of this, the Operations Division transferred 267,563 grams.

[redacted]

[redacted]

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

RaLa Run #38 was started on January 1, 1950, with the loading of seventy-four, four-inch, Hanford slugs. The slugs were dissolved and extracted in two batches. No difficulty was encountered in the operation with the exception of one high air count which lasted for only a short period of time. An unusually high waste loss was recorded on the metathesis waste decantation, but the material balance results seem to indicate that the laboratory analysis of the waste might be in error.

L.S.T. was reached on January 5, 1950, at 1915. The product was shipped at 0900 on January 6, 1950, as a nitrate with a content of 4,670 curies as determined by a nine-hour and fifteen-minute skyshine measurement of 43.5 R/hour. This was the largest run ever produced.

The analytical summary of the run follows:

Slugs Loaded: 74-4" Hanford slugs.
Slugs Dissolved: 74.8 Hanford slugs (by analysis)

	CURIES	PERCENT
Total Curies Dissolved	6,013	100.0%
Cell A Losses	1,721	28.6%
Cell B Losses	580	9.7%
Losses Accounted For	2,301	38.3%
Material Balance through B-6		106.0%
Product Shipped (Skyshine)	4,670	77.7%
Material Balance through Skyshine		116.0%
Losses Unaccounted For		-16.0%

Los Alamos reported the quality of this run satisfactory.

Following the shipment of the product of Run #38, arrangements were made to obtain Hanford slugs to process Run #39 for testing of the Technical Division's experimental resin column operating at full-run capacity.

[redacted]

[redacted]

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

With seventy-four, four-inch, Hanford slugs and the recovered wastes from Run #38, the experimental run was started on January 15, 1950. The first dissolving proceeded very slowly so that it became necessary to discontinue it before the normal specific gravity was reached. The second dissolving was discontinued after seven hours when it became apparent that no reaction was taking place. It was then discovered that over forty slugs were jammed in the slug chute.

Several mechanical methods were tried in an attempt to move the slugs but all failed. The slugs were slowly dislodged by pouring coating removal solution through the chute and then dissolving out some uranium with 70% HNO_3. This mishap resulted in a forty-eight-hour delay.

As a result of the excess nitric acid used in unplugging the slug chute, it became necessary to make three instead of the normal two dissolvings and extractions. The three batches were metathesized without incident and a total of approximately 3,800 curies of product was given to the Technical Division for their experimental work on January 21, 1950.

Following the passage through the resin column, the material was returned for re-extraction and recovery with more accumulated wastes of Run #39 for another passage through the column to repeat the test with slight process modifications. Approximately 3,400 curies of metathesized product was again sent to the column on January 26, 1950.

[redacted]

[redacted]

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

Following the completion of the Technical Division's work, the remaining product was discarded along with other accumulated wastes to the Tank Farm.

Complete results of the experimental runs will be released in a Technical Division report. Preliminary results indicate that the experiments were successful.

Run #40 has been tentatively set by Los Alamos to start on March 5, 1950.

[redacted]

[redacted]

C. ISOTOPE CONTROL DEPARTMENT

I. General:

During January there were 633 isotope shipments, compared with 430 during December, 1949, and 542 in November, 1949. Also this compares with 390 in January, 1949.

The following table indicates the breakdown between separated material and unseparated material:

	DECEMBER 1949	JANUARY 1950	August, 1946, to January, 1950, Inc.
Separated Material 706-D Area	361	490	9,259
Unseparated Material 100 Area	69	143	2,726
	430	633	11,985

The following table indicates the breakdown between non-project, project, and foreign orders for November, 1949, December, 1949, January, 1950, and January, 1949:

	NOVEMBER 1949	DECEMBER 1949	JANUARY 1950	JANUARY 1949
Non-Project	404	325	505	296
Project	118	88	104	66
Foreign	20	17	24	28

II. Hanford Irradiations:

One channel of sixty-eight slugs of beryllium nitride was charged to the Hanford pile during January and General Electric has indicated that more will be charged as soon as space becomes available.

Information has been received from the Hanford Office, AEC, that pile costs will not be made on future pile irradiations at Hanford.

[redacted]

[redacted]

III. Activation Analyses:

1. Carbide and Carbon Chemicals Division, Union Carbide and Carbon Corporation, South Charleston, West Virginia.

Considerable trouble was encountered with the Cl^{38}, S^{35} and P^{32} which were obtained in large amounts on irradiating the vinylite. The chlorine was eliminated prior to irradiation by ashing, but this procedure was dropped and the samples are now being irradiated in their original form and the metallic activities separated afterward with the help of added carrier.

2. California Research Corporation

The bentonite submitted has been activated, the short-lived activities allowed to decay, and the longer-lived activities are ready to be studied. Whether there remains enough long-lived activity to permit radiographs to be made, has not yet been determined.

3. Dow Chemical Company

Nothing has been done on the magnesium alloys. Samples will be irradiated soon, however, and the investigation begun.

IV: Cyclotron-Produced Radioisotopes:

During the month processing of a fifty-hour bombardment of lithium yielded approximately fifty-seven millicuries of Beryllium 7 and another one-hundred-hour bombardment is on hand. In addition, estimates have been made that approximately eight-five millicuries of Sodium 22 are on hand.

[redacted]

[redacted]

IV. Cyclotron-Produced Radioisotopes: - (Continued)

Following is a table showing bombardments received and requested to date:

	M.I.T.	CALIFORNIA	PITTSBURGH	ST. LOUIS
Bombardment Received:				
Be^7			4 Bombardments (160 hours)	
Na^{22}			5 Bombardments (201.75 hours)	4 Bombardments (400 hours)
Co^{57}				2 Bombardments (50 hours)
Fe^{59}		1 Bombardment (46.6 hours)		
I^{125}				1 Bombardment (10 hours)
Bombardments Requested but not Received:				
Na^{22}	1 Bombardment (100 hours)			
Mn^{52}			1 Bombardment (10 hours)	
Fe^{59}		1 Bombardment (50 hours)		
Mn^{54}				1 Bombardment (50 hours)
Zn^{65}	1 Bombardment (100 hours)	1 Bombardment (40 hours)		
As^{73}			1 Bombardment (10 hours)	
Total Number of Cyclotron Hours Outstanding:	750	703.4	388.25	290

Shipments of Cyclotron-Processed Isotopes: Be^7-(6 shipments - 9.173 mc)
Na^{22}-(4 shipments - 1.75 mc)

[redacted]

[redacted]

IV. Cyclotron-Produced Radioisotopes: - (Continued)

Washington University and California have requested a schedule on a long-term basis for the rest of the 1950 fiscal year which would use up all the bombardment time originally allocated. It appears, if this is done, that long-lived radioisotopes would have to be stock-piled. A decision on this will be obtained from the Atomic Energy Commission before a schedule is authorized.

V. Outstanding Orders:

The following are radioisotopes for which we have four orders or more outstanding:

Sodium 22 (cyclotron)	- 8 orders
Fe^{59}	- 7 orders
Sr^{89-90}	- 6 orders
Sr^{90}	- 8 orders
Tc^{99}	- 4 orders
$Ru^{103-106}$	- 4 orders
Tl^{204}	- 4 orders

VI. Radioisotope Processing Area:

In the Isotope Processing Area, the exhaust fans and the exhaust stack were turned over to the Operations Division and put into operation. One hot off-gas blower and temporary connections were installed from the Isotopes Area hot off-gas system thru the blower and to the stack. However, the blower impeller proved defective and was returned to the manufacturer; the impeller of the standby blower is being installed in order to get the system into operation as soon as possible.

[redacted]

[redacted]

VI. Radioisotope Processing Area: - (Continued)

In the Analytical Building, the AEC made a motion picture of the operation of the remote control isotope packing equipment. During the last week of the month, packing of the isotopes for shipment in the new equipment was started, and most of the equipment and materials were moved from 706-D to the new shipping rooms. Fabrication and installation of the skyshine shields in the west section of the isotope storage barricade was started. Also, work continued on other minor items throughout the area.

Logan B. Emlet, Director
Operations Division

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[redacted]

VII. S-F Material Control:

1. During the month, four of the seven batches from the U^{235} recovery process were decontaminated and forwarded to Y-12 for further processing. The remaining three batches plus the tailings from the process are expected to be decontaminated and transferred to Y-12 during February.

2. Two Hanford express cars, carrying Hanford slugs for the RaLa process, were received during the month. The first shipment was received January 1, 1950, and the second on January 15, 1950. The latter shipment was for a special experimental RaLa run.

3. The first shipment of highly irradiated uranium fuel rods was received from Chalk River, Canada, on January 25, 1950. The shipment consisted of fifty, eight-inch slugs which have a uranium weight of about 400 pounds and a calculated plutonium content of 175 grams. The material was transferred to the Pile Department for storage in the canal.

   It is expected that there will be an additional three or four shipments of this material. The entire lot will amount to 260, eight-inch pieces having a uranium weight of approximately 2,080 pounds.

4. The analysis records of three analytical laboratories were audited during the month. The audit consisted of inspecting and comparing all requests for analysis against the analytical results obtained, verifying each result sheet in connection with disposition and spot checking repositories when disposition reflected material was stored in the analytical laboratory's safe. All records were in good order and no irregularities appeared to exist. [redacted]

[redacted]

VII. S-F Material Control: - (Continued)

5. Clean-up and rearrangement of the storage vault continued. Work pertaining to container labeling, cross-indexing with SF Transfers, shelve labeling and numbering of bins was started. This work is progressing very well and will be completed during February. When complete, we will have a system of locating material in storage comparable to a factory storeroom.

6. On December 13, 1949, the Atomic Energy Commission requested that we prepare revisions and/or supplements to our SF Accounting Procedure Manuals. Much of the requested data was for additional technical information; namely, sampling technique, description of samplers, process description, points at which material measured, ratio of sample to stream or batch, SF content of sample, description of analytical procedure, type of equipment used, experience and educational prerequisites of persons working in analytical laboratories.

   In view of the broad scope of the request and the unstableness of processes in a research laboratory, it was decided that we would cover processes which are subjected to the least number of changes. Two processes were placed in this category; namely, the RaLa and U^{235} separation process.

   Considerable time and effort were expended during the month in compiling the data for supplementing and revising our SF Accounting Procedure Manual; nevertheless, the Manual will be ready for distribution early in February, 1950.

[redacted]

[redacted]

VII. S-F Material Control: - (Continued)

7. A request has been received from the Atomic Energy Commission for the preparation of fifty, U^{235}-aluminum alloy slugs similar to those irradiated at Hanford on SR-52. An additional batch of approximately 100 grams of enriched U^{235} will be obtained from Y-12 to perform this work.

8. Following is a summary of receipts and shipments of S-F materials for the month of January, 1950:

RECEIPTS

FROM	MATERIAL	CONTENT
Argonne National Lab.	IIBP Solution (depleted)	13.10 gm. Pu
" " "	Waste Solution (depleted)	122.00 gm. 334.00 mg. Pu
" " "	Waste Solution (depleted)	980.00 gm. 567.7 mg. Pu
Brookhaven National Lab.	Thorium Fluoride Pellets	30.21 gm.
C&CCC, K-25 Area	Hanford Contaminated Liquid Waste (depleted)	30.00 gm.
C&CCC, Y-12 Area	Uranium Zirconium Alloy Scrap	1.34 gm.
" " "	Uranium Metal (enriched)	20.00 micrograms
" " "	Nickel Plated Uranium Slugs(normal)	11,660.00 gms.
" " "	Uranyl Nitrate Hexahydrate(enriched)	65.66 gms.
Hanford Engineer Works	Uranium Rods (normal)	179,394.85 gms.
" " "	Irradiated Slugs (depleted)	135,133.54 gms. 26.04 gms. Pu
" " "	Metal Waste Supernate (depleted)	22,200.00 gms. 38.00 mg. Pu
" " "	Irradiated Slugs (depleted)	135,133.54 gm. 23.26 gm. Pu
National Research Council	Depleted Uranium	181,436.00 gm. 175.00 gm. Pu
General Electric Company	Thorium Bars	406.00 gm.
" " "	" "	560.00 gm.
Simonds Saw & Steel Co.	Uranium Rods (normal)	309,212.30 gm.

[redacted]

[redacted]

VII. S-F Material Control: - (Continued)

8.

SHIPMENTS

TO	MATERIAL	CONTENT
Argonne National Lab.	Hot X Slugs (depleted)	26,146.00 gm. 0.59 gm. Pu
Brookhaven National Lab.	Hot X Slugs (depleted)	2,332.00 gm. 0.26 gm. Pu
C&CCC, Y-12 Area	Uranium Solution (enriched)	382.07 gm.
" " "	U_3O_8 (enriched)	.2364 gm.
" " "	Enriched Uranium	309.12 gm.
" " "	U_3O_8 (enriched)	.3615 gm.
" " "	UO_2F_2	2,453.42 gm.
" " "	Enriched Uranium	289.65 gm.

[redacted]