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LABORATORY RECORDS
1954

OPERATIONS DIVISION

MONTHLY REPORT
FOR
MONTH ENDING MARCH 31, 1949

BY

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

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[redacted]
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OAK RIDGE NATIONAL LABORATORY

OPERATED BY
CARBIDE AND CARBON CHEMICALS CORPORATION
FOR THE
ATOMIC ENERGY COMMISSION
POST OFFICE BOX P
OAK RIDGE, TENNESSEE

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OPERATIONS DIVISION

MONTHLY REPORT

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DATE ISSUED
APR 19 1949

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operated by
Carbide and Carbon Chemicals Corporation
for the
Atomic Energy Commission
Post Office Box P
Oak Ridge, Tennessee

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SUMMARY

1. Lost pile operating time averaged 7.3% for the month. (Page 4).
2. The excess pile reactivity increased from approximately 75 inhours to 140 inhours due to the discharge of miscellaneous items. (Page 4).
3. Pile operations continued normally with no unusual difficulties. (Page 5).
4. Radioisotope production continued at an increased rate. Fission products resulting from development work are being made available for distribution in greater quantities than was previously possible. (Pages 6 thru 11).
5. Some difficulty was experienced during the purification of ten-curie quantities of Sr^{90} on an ion exchange column. The beta activity decomposed the water so rapidly that proper operation of the resin column was almost impossible. (Page 10).
6. The construction of the Tank Farm chemical waste evaporator has been started. Completion is expected by May 1, 1949. (Page 13).
7. RaLa Run #31, using seventy-six, four-inch Hanford slugs was completed and shipped to Los Alamos on March 25, 1949. About 3,200 curies (Los Alamos reported 3,400 curies) were isolated as the nitrate with a chemical yield of 52%. (Pages 15 and 16).
8. A total of 514 shipments of radioisotopes were made during March, the largest number per month to date. Since August, 1946, the start of the Distribution Program, 7,063 shipments have been made. (Page 17).
9. Construction work continued at an increased rate on the Radioisotope Production Area. Partial occupancy is expected by June, 1949. (Page 20).

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A. PILE DEPARTMENT

I. Operating Data:

	MARCH 1949	FEBRUARY 1949	Year-to-Date 1949
Total Accumulated KWH	2,686,447	2,428,468	7,814,904
Average KW/operating hour	3893.40	3964.33	3938.41
Average KW/24-hour day	3610.82	3613.79	3618.01
Percent Lost Time	7.3%	8.8%	8.1%
Approx. Excess Pile Reactivity	130-140 inhours	60-70 inhours	
Slugs Charged	236	1488	1800
Slugs Discharged	236	1465	1759
Product Made (grams)	98.04	88.63	285.21
Product Discharged (grams)	5.89	126.51	132.61

II. Pile Operation:

The pile-down time averaged 7.3% for the month as compared to 8.8% for February and 8.1% for the year-to-date.

No ruptured or swelled slugs were detected during the month.

A recent test has indicated that the gaseous fission product decay instrument has good possibilities as scanning apparatus for individual slug channels. It has been modified slightly and will be evaluated as a scanning device at the time of the next slug rupture.

The boron shot tube in Hole 11 was reworked on March 28, 1949, to serve as an experimental hole without impairing its functioning as a boron shot tube. This hole will be used by Argonne National Laboratory in evaluating a fuel assembly for a future pile.

The excess pile reactivity was 130-140 inhours at the end of the month. The seventy-inhour gain from last month was due to the removal of a pound of gold for Hg^{198} separation, two cans of piston rings, calcium nitrate cans, and other miscellaneous materials.

[redacted]

Pile operation was unusually uneventful during the month.

III. Filter House:

The pressure losses encountered in the Filter House at date of initial use and until the end of the month are as follows:

	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
11-15-48	1.1	-	1.0	-	3.3	-
11-30-48	1.5	36	1.1	10	3.8	15
12-15-48	2.4	60	1.2	9	4.7	24
12-31-48	3.4	41	1.3	8	5.8	23
1-15-49	4.2	19	1.3	6	6.8	17
1-31-49	4.8	12	1.3	0	7.2	6
2-15-49	5.2	8	1.3	0	7.4	3
2-28-49	5.4	4	1.4	7	7.7	4
3-15-49	5.4	0	1.4	0	7.8	0
3-31-49	5.4	0	1.4	0	7.8	0
OVERALL INCREASE	4.3	390	0.4	40	4.5	1

Since the pressure loss across the filters has been increasing so slowly, the date of the filter change is indefinite. It is currently planned to use the present set of filters until the pressure loss is great enough to reduce air flow and thus lower the pile operating power.

The gummed tape instrument indicates that the filters are removing all of the radioactive particulate matter from the pile exhaust air. This instrument is to be placed between the glass wool filters and the C.W.S. #6 paper filters to determine whether any radioactive particles are passing the glass wool filters. If the radioactive particulate matter is being removed by the glass wool filters, it would be very desirable from economic considerations to dispense with the C.W.S. #6 paper filters.

IV. Fan Operation:

The fans operated normally throughout the entire month.

[redacted]

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V. Radioisotopes:

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

	FEBRUARY, 1949		MARCH, 1949	
	Research	Radioisotopes	Research	Radioisotopes
Stringers 13, 14, and 16	58	120	12	81
Hole 22 (Pneumatic Tube)	55	3	57	5
All Other Holes	27	18	6	8
TOTAL BY GROUPS	140	141	75	94
TOTAL FOR MONTH	281		169	

At the end of March, 1949, there were 336 cans of target material in Stringers 13, 14, and 16, compared to 372 cans of target material in these stringers at the end of February, 1949.

B. CHEMICAL SEPARATIONS AND ISOTOPE DEVELOPMENT DEPARTMENTS

I. Radioisotopes:

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

Fifteen uranium slugs were processed and approximately 10,090 mc were shipped. All the products were within specifications.

It was reported in last month's report that half-inch lead had been installed to shield personnel operating the iodine glassware from scattered radiation. The results are satisfactory under the present operating conditions. Radiation has been reduced by a factor of five.

[redacted]

[redacted]

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

Ten, 2000-gram cans of irradiated sulfur were processed and approximately 6,021 millicuries were shipped. All products were within specifications.

Plans have been made and a work order issued to further shield the extraction and purification equipment at points of highest radiation. This additional shielding should bring the radiation level in the operating area to well below tolerance.

Phosphorus Development Work

Two Clinton type sulfur slugs are being prepared so that irradiations may be made between uranium slugs in the channels. Welding these slugs has proved to be difficult and some special technique will have to be worked out before leak-free sulfur slugs can be made.

Design work continued on P^{32} separation equipment for the new area.

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

Eight hundred and fifty irradiated calcium nitrate slugs were processed to yield approximately 1,225 millicuries with an average isotopic ratio of 6.15%.

C^{14} Development Work - Be_3N_2 Process

The pilot plant equipment is being rearranged to study the use of carbonate-free sodium hydroxide instead of barium hydroxide for scrubbing CO_2. Various methods of producing carbonate-free sodium hydroxide are being studied, including water vapor attack and solution of sodium metal, solution of pure sodium peroxide, and quantitative precipitation of carbonates from saturated NaOH with barium hydroxide.

There are several advantages to absorbing CO_2 in sodium hydroxide, including the possibility of offering C^{14} for sale in solution form.

[redacted]

Large batches of $BaCO_3$ of great uniformity may be precipitated from $NaOH-Na_2C^{14}O_3$ solutions, thus giving a better product than is obtained by direct precipitation in $Ba(OH)_2$ solution. Sodium hydroxide scrubbers are easier to handle in process work than $Ba(OH)_2$ scrubbers, where one must deal with a precipitate which is constantly formed.

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

Analysis of the 10.5 curies of S^{35} as BaS^{35} reported last month is as follows:

Concentration S^{35}	- 10.5 mc/ml
Total sulfur	- 1.74 mg/ml
Sulfide sulfur	- 80%
Non-sulfide sulfur	- 20%
Specific Activity	- 6.03 mc S^{35}/mg S.

5. Fission Products

Dissolver solution from four and a half, sixty-day slugs were processed during the month to separate fission products. Approximately 65% of this material was run all the way through the process, but only Zr-Cb was separated from the remaining 35%. The resin in the finishing column (#3) was reduced from 96" height to 40" to cut down running time by about one-third. The efficiency of F. P. separation was not noticeably impaired by this change. The F.P.-HCl concentrate charged to column #3 from the boiler was contaminated with iron, chromium, and nickel as a result of a cracked electrical immersion heater. Final product spectrographic analysis showed that these impurities were removed during the subsequent processing. These data are important in that it is suggested that it may be possible to use a stainless steel dissolver instead of a tantalum-lined dissolver and still get acceptable results.

Practically all requests for the regularly-produced fission products were filled during the month and a good start was made on stock piling the longer-lived materials.

[redacted]

a. Zr-Cb (Zr^{95}-65d, Cb^{95}-35d)

Three curies of Zr-Cb which was within specifications was produced during the month. Two curies of sub-standard material was combined with two curies remaining from last month for further refining.

Approximately forty millicuries of Cb^{95} are in process, but is still contaminated with 2% Zr^{95}, which must be removed before it is acceptable for shipment.

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

About 695 millicuries of purified Y^{91} were produced, which was more than enough to fill orders on hand.

c. Rare Earths (Nd^{147}-11d, 61^{147}-3.7y, Pr^{143}-14d)

Crude fractions were set aside for later separation of 61^{147}. There were no orders for Nd or Pr.

d. Cerium ($Ce^{141-144}$-28d, 280d)

Two curies of cerium were produced, but contained some iron contamination. This material is being further refined to meet specifications.

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

No further casium was purified, there being an adequate supply on hand.

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

Thirty-one concentrates were made this month. The concentrate storage tank is full and no more runs are planned for the immediate future.

The Chemical Separations Department will process the product from the concentrates starting during the next month.

[redacted]

6. Ruthenium Development Work

The Ru^{106} purification process is now being run routinely. About 300 mc of purified product was produced during the month. The capacity of the apparatus is about fifty liters of slurry per twelve hours, producing 100 mc of Ru product. An overall yield in the concentration and purification steps of 70% is obtained. The equipment has a maximum capacity of 2 C Ru^{106} per month.

Inactive ruthenium metal has been plated on copper discs ranging from 2 m.m. diameter to 3 inches in diameter. Tracer amounts of radioruthenium have also been plated and found to give a good quality plated surface. A 5 mc source plated on a 3" disc gave a radiation intensity of 10 R/hr. at one inch.

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

A ten-gram sample of highly-purified scandium oxide is being prepared for irradiation in a receptacle slug (fast neutron zone) at Hanford in an effort to increase the production of Ca^{45}.

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

One run was made to yield approximately 575 millicuries, which analyzed 95% Sr^{89} and 5% Sr^{90}.

Strontium Development Work

The reprocessing of a ten-curie batch of Sr^{90} on an ion exchange column has revealed an interesting problem. The intense beta activity decomposed the water into hydrogen and oxygen so rapidly that it was almost impossible to operate the column. The production of gas from water not only uses up the water (flow rates through these small columns are very low) but the gas bubbles disrupt the resin column. While this problem has been known to exist, it was not realized how serious it may be in high activity work.

[redacted]

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

The analysis on the enriched Fe^{54} which was irradiated at Hanford is given below.

Concentration Fe^{55}	- 2.5 mc/ml
Concentration Fe^{59}	- None detected
Iron concentration	- 5.35 mg/ml
Total activity	- 250 mc
Specific activity	- 467 mc/gram iron.

The irradiated material as received was not radiochemically pure. A hard gamma emitter was removed by extracting the iron with isopropyl ether. The radiochemical purity of the resulting Fe^{55} exceeded our expectations.

A routine sample of Hanford-irradiated normal iron was processed. Analysis of the final product is given below.

Concentration Fe^{59}	- 0.33 mc/ml
Concentration Fe^{55}	- 0.43 mc/ml
Total activity	- 72.8 mc Fe^{59}, 94.8 mc Fe^{55}
Iron concentration	- 50 mg/ml
Specific activity, Fe^{59}	- 6.6 mc/gram iron
Specific activity, Fe^{55}	- 8.6 mc/gram iron
Solution acidity	- 3.67 N. in HCl.

10. Potassium (K^{40} - 4 x 10^8y)

The latest batch of Hanford-irradiated KCl is being processed to recover the enriched K^{40}.

11. Chlorine (Cl^{36} - 10^6y)

No Hanford material is in process. An ORNL-irradiated sample (3 yrs.) was processed to yield product with the following analysis:

Concentration	- 0.6 microcuries/ml
Total Cl^{36}	- 51 microcuries
Total chlorine	- 2.6 grams
Specific activity	- 19.3 microcuries Cl^{36}/g Cl.

12. Miscellaneous

a. Titanium (Ti^{51} - 72d)

A sample of titanium dioxide irradiated at Hanford is being processed to remove contaminants.

[redacted]

[redacted]

b. Tungsten (W^{185} - 77d)

A sample of tungstic acid irradiated at Hanford is being processed to remove radiocontaminants.

c. Ten slugs containing various-sized cobalt pellets were prepared and shipped to Hanford for irradiation.

II. Tank Farm and Burial Ground:

1. Wastes Discharged to White Oak Creek

a. Approximately 120 curies of beta activity were discharged to the White Oak Creek from the Settling Basin and West Pond this month. This was an average of 3.89 curies per day.

b. To facilitate the tie-in of the new diversion box, it was necessary to bypass the Settling Basin and to discharge waste to White Oak Creek through the West Pond for a period of nine days. The new diversion box was put into operation on March 16, 1949. During the time the water was routed through the West Pond and until a flow indicator is installed in the new diversion box, an assumed figure of 380,000 gallons per day has been used. This is based on an average figure prior to the installation of the new box.

c. Due to the lack of free space in the chemical waste system and the fact that a RaLa run was to be made, about 32,400 gallons of chemical waste containing 91.8 curies of activity were jetted from W-6 to the East Pond for storage.

At the end of the month 46,856 gallons of free space remained in the chemical waste system.

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

Discharged From	Gallons	Curies
Settling Basin	9,080	107.86
Retention Pond	464	.18
West Pond	2,980	12.73.

[redacted]

2. Waste Tank Inventory

Tanks	Gallons Capacity	Gallons In	Gallons Out	Discharged To	Free Space
			CHEMICAL WASTE		
W-3,5,6	381,000	47,000	90,000	East Pond and White Oak Creek	46,856
			METAL WASTE		
W-4,7,8	713,000	9,864	11,200	Ruthenium Process	113,632

3. Special Wastes

Other than the routine disposal of plant wastes discharged into the chemical waste system, the following wastes were handled:

a. Three shipments of alpha-contaminated waste from Dayton were buried.

b. Eleven pots of chemical waste; eleven, 55-gallon drums of uranium; and one, five-gallon drum of chemical waste were received from Chicago.

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

d. The ruthenium recovery process consumed 11,200 gallons of precipitated metal supernate from W-7 tank. This consumed an average of .005% uranium. No more supernate will be taken from W-7 tank for some time, due to a lack of storage space for the concentrate.

e. A total of 1,121.57 kg. of uranium was added to the metal storage system this month. Of this, the Hot Pilot Plant transferred 745.8 kg.; RaLa 132.79 kg.; Chemistry 21.06 kg.; the I^{131} process 31.59 kg.

4. Maintenance and Construction

a. The new diversion box ahead of the Settling Basin is about 90% complete. It is in use, but the landscaping and the installation of flow rate instruments have not been completed.

b. The J. A. Jones Company has begun construction of the Tank Farm evaporator. To date, the shielding has been poured, the feed tank and

condensate tank have been set, and footing forms for the operating gallery built. The evaporator has three feet of concrete shielding and the feed and condensate tanks have two feet. Excavations have been made for the tie-ins to W-1, W-2, and W-12.

[redacted]

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

Following Run #30, the glassware cubicles were stripped of all equipment, decontaminated, and the replacement equipment was installed. Several leaks in the stainless steel lines to Cell B were repaired at the same time.

Because Los Alamos reported that Run #30 contained foreign material which appeared to be oil, all the instruments connected with the final product evaporation were cleaned, the lines to the cells steamed and the instrument oil replaced with water.

Phoenix carrier II was completed and shipped to Hanford for use in Run #31 which started on March 19, 1949.

Seventy-six Hanford slugs were received in two carriers and were charged into the 706-D dissolver on March 19, 1949. Some difficulty was met while loading the slugs when a jam occurred in the slug chute. The condition was eventually cleared and the run started with a delay of four hours.

The slugs were dissolved and extracted in two batches. The only difficulty encountered was a high waste loss in the first extraction. The analytical results indicated that this loss was recovered by resettling but the validity of these results is questionable in view of the low material balance which shows that approximately 1,100 curies could not be accounted for. Fortunately, the increased number of slugs used in this run made it possible to successfully complete the run in spite of the high loss.

The balance of the run proceeded with incident. LST was reached at 0645 on March 24, 1949, and the product shipped at 0500 on March 25, 1949.

The analytical summary is tabulated below:

Slugs Loaded: 76 four-inch, Hanford-irradiated slugs.
Slugs Dissolved: 75.3.

[redacted]

[redacted]

	CURIES	PERCENT
Total Curies Dissolved*	6,252	100.0
Cell A Losses	1,494	23.9
Cell B Losses	430	6.9
Losses Accounted For	1,924	30.8
Material Balance through B-6		81.4
Product Shipped (Skyshine)	3,244	51.9
Material Balance through Skyshine		82.7
Losses Unaccounted for through Skyshine		17.3

* All curies corrected to L.S.T.

The product was shipped as a nitrate at the request of Los Alamos rather than as a chloride as in the past.

Los Alamos reported 3,400 curies of product and indicated that the material was successfully processed without the previously experienced difficulties.

The investigation to determine the source of high air contamination during previous runs proved that the bulk of the activity was discharged through the drains on the A-16 fan housing. This condition was corrected before the start of this run by installing valves on the drains and operating with these valves closed.

During this run it became apparent that leaks around the A-16 fan equipment also contributed to the contamination of the air. It was found that this source could be eliminated by operating the standby fan instead of the one regularly used.

With the two changes mentioned, it was proven that air contamination can be reduced. There is one other source to be investigated during the next run; that is, the sampling equipment used at present.

The project to replace the existing cell underground ventilation duct has been started and its completion is expected by April 8, 1949. This work will not hold up the next shipment which is scheduled to leave Oak Ridge about April 22, 1949.

[redacted]

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C. ISOTOPE CONTROL DEPARTMENT

I. General:

There were 514 isotope shipments during the month of March compared with 404 of February, 1949. The increase was partly due to the fact that there were more working days in March than February, but this represents a new record for number of shipment in any month.

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

	FEBRUARY 1949	MARCH 1949	TOTAL August, 1946, to March, 1949, Inc.
Separated Material 706-D Area	318	399	5,468
Unseparated Material 100 Area	86	115	1,595
	404	514	7,063

The breakdown according to non-project, project, and foreign shipments for February and March is as follows:

	February	March
Non-Project	311	392
Project	54	85
Foreign	39	37
	404	514

Since April, 1948, I^{131}, P^{32}, and Na^{24} have been offered, free of production costs, for qualified research work on cancer. In February, 1949, the Atomic Energy Commission announced that all radioisotopes would be available without charge to qualified persons in this country doing cancer research. During March, 1949, the number of free-issue shipments increased only slightly. Fifty-seven millicuries (8 shipments) of C^{14} or about 40% of the total distributed were shipped free of charge.

[redacted]

[redacted]

II. Special Requests:

Two requests for preparation of cobalt 60 in the form of needles have been received. Specifications for each of these sets of needles are different, however, and it may be difficult to stockpile a standard type of needle at the present. Consideration is being given to this, however, since it is felt that if a standard needle was available oftentimes the requestor would accept this rather than have a special type fabricated.

Two requests are pending for sources of ruthenium 106 plated on special applicators. One of these, for Ohio State University, is for a small gold needle which would be inserted into tumors. The second, from the University of Illinois, is for a cylinder two centimeters in length by four milliliters in diameter on which approximately 125 millicuries of ruthenium 106 would be plated. This source is intended for irradiation of the wall of the stomach in an attempt to control the secretion of gastric juices as a means of treating peptic ulcers.

III. Radioactive Cobalt:

The first large sample of cobalt was charged to the Hanford pile March 21, 1949. It is hoped that this will arrive by the end of April to fill several large orders for cobalt 60 which are pending. Nine more slugs were to have been charged March 29th for three to six months' irradiation.

There may be some difficulty in having all of the cobalt charged to the Hanford piles that we desire since Hanford is limited to a total of 50 inhours for special irradiations at present. This figure is already exceeded and our cobalt will considerably increase the inhours used. An attempt will be made to increase the priority of the cobalt irradiation as soon as justification is received from the Naval Radiological Defense Laboratory in San Francisco. This Laboratory intends to request several thousand curies of cobalt 60 and it is believed if enough justification was presented with this request that a special priority could be arranged with Hanford.

[redacted]

The cobalt being irradiated for the National Naval Medical Center to produce 500 curies of cobalt 60 in the X-10 pile has apparently caused a local flux depression in the pile which has lowered the production rate to about one half of the estimated value. If necessary, this request can probably be filled with cobalt irradiated at Hanford, but this will involve a "hot" canning operation.

IV. Carbon 14 Labeled Compounds:

During the month there were received the following compounds from the Radiation Laboratory, Berkeley, California:

Sodium valerate-1-C^{14}--------4.75 mc.
Calcium glycolate-1-C^{14}------7.00 mc.
Alanine-1-C^{14}----------7.00 mc.
Benzonic Acid-Carboxyl-C^{14}---9.00 mc.
Sodium propionate-2-C^{14}------5.00 mc.
Sodium heptanoate-1-C^{14}------4.75 mc.
Sodium butyrate-1-C^{14}--------3.75 mc.
Sodium caproate-1-C^{14}--------4.75 mc.
Glycine-1-C^{14}----------10.00 mc.
Sodium propionate-3-C^{14}------4.50 mc.
Calcium glycolate-2-C^{14}------4.25 mc.
Alanine-2-C^{14}----------2.75 mc.

We also received from the Los Alamos Scientific Laboratory the following C^{14} labeled compounds:

Nicotinic acid----------8.0 mc.
Nicotinamide----------8.0 mc.
Urea----------8.0 mc.
Anthranilic acid----------4.0 mc.
Pentobarbitol (nembutal)-----0.5 mc.

Prices on the material received from Berkeley have been calculated and forwarded to the A.E.C. for approval and prices will be forwarded shortly on the compounds received from Los Alamos.

V. Phosphorus 32 Beta Ray Plaques:

Plastic discs which have been impregnated with red phosphorus and irradiated in the pile have been used by the biologists for some time as strong sources of beta radiation. Requests have been received from Los Alamos for similar sources and it is believed that there will be some demand for similar sources from

off-project users. The calibration of these discs is not sufficiently accurate at the present time to furnish accurate data. It is hoped that by June the problem will have been worked out so that this information can be furnished. Ruthenium discs prepared by plating radioactive ruthenium on metal plates offer considerable promise as a source of beta radiation and it is felt that both the ruthenium and phosphorus discs will be useful.

VI. Sb-Be Neutron Sources:

In the near future, it is expected that the radioisotope program will include a program for distribution of antimony-beryllium sources. Since the antimony isotope required for this reaction has a sixty-day half-life, the program will include periodic re-irradiation of the units.

The units will consist of a solid cylinder of antimony, 23/32" in diameter and 23/32" long, surrounded by a 5/64" shell of beryllium. This assembly is enclosed in a sealed aluminum capsule having a small attached handle. These units have approximately 1.5 curies of the 1.72 mev, sixty-day half-life isotope when exposed for two months. Such a source emits approximately 10^6 neutrons per second.

One source was removed from the pile on March 14, 1949. Neutron flux and gamma intensity calibrations are being made. These calibrations will be used to determine the best container for shipping and storage and as information to the future uses.

VII. Radioisotope Production Area:

In the construction of the Isotope Processing Area, structural work continued on the office, analytical, and process buildings. The work in the office building included the completion of the block and brick walls, pouring of the concrete floor slab and completion of approximately one half of the tile walls of the first floor. The hot and cold water lines were also completed and tested, and the installation of the sprinkler system was started. The work in the analytical building included the pouring of the concrete walls and roof for the west end of

[redacted]

the building; most of the forms for the concrete in the east end of the building were completed. Work in the process buildings included the completion of the structural steel frame work and the installation of most of the outside aluminum siding; the inside aluminum walls have been started. The pyrofill roofs were poured for the decontamination and service buildings and process buildings A, B, C, and D.

Piping work continued, and at the end of the month the sanitary sewer, underground exhaust system, hot off-gas lines, and semi-hot drains were almost complete; the hot drainage system was also near completion except for the jets and line from the collection tank to the Tank Farm. The outside of the brick exhaust stack reached its full height of 250 feet, and at the end of the month the acid-proof brick lining was approximately 240 feet high.

L. B. Emlet, Director
Operations Division

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VIII. Source and Fissionable Material Accountability:

Following is a summary of shipments and receipts of S. F. Materials for the month of March, 1949:

SHIPMENTS

Shipped To	Material	S.F. Content
Argonne National Laboratory	Normal Uranium	51.48 kg.
" " "	Plutonium	6.05 gm.
" " "	Normal Uranium	42.12 kg.
" " "	Normal Uranium	18.72 kg.
" " "	Plutonium	.03 mg.
" " "	Plutonium	2.00 mg.
Brookhaven National Laboratory	U^{238}	5.70 gm.
" " "	U_3O_8	1.002 gm.
C&CCC (Y-12 Area)	Enriched Uranium 93.8%	1.12 gm.
" "	Enriched Uranium 90.1%-95%	50.00 gm.
General Electric Company	Natural Uranium	3.24 gm.
" " "	Normal Uranium	22.00 gm.
Monsanto Chemical Company	Plutonium Alpha Standards	8.00micrograms
Tracerlab Inc.	U_3O_8 Normal Uranium	238.00 mg.
University of California	Plutonium	1.00 mg.
University of Rochester	Normal Uranium	0.50 gm.
" " "	Normal Uranium	50.00 mg.
US AEC, Oak Ridge Operations	Normal Uranium	0.06 kg.
US AEC Warehouse	Plutonium	22.80 mg.

RECEIPTS

Received From		
Argonne National Laboratory	UNH Solution	5.77 kg.
" " "	UNH Solution	83.32 kg.
" " "	UNH Solution	23.60 kg.
Battelle Memorial Institute	Normal Uranium Specimens	0.18 kg.
Brookhaven National Laboratory	U_3O_8	17.38 gm.
C&CCC (K-25 Area)	Radioactive Glass and Paper	11.00 gm.
" "	Depleted Uranium	116.00 gm.
" "	Uranium Metal Waste Supernate	36,000.00 gm.
" "	Radioactive Glass and Paper	9.00 gm.
" (Y-12 Area)	U_3O_8	50.00 gm.
" "	U_3O_8	5.70 gm.
General Electric Company	Enriched Uranium 90-1%-95%	802.559 gm.
" " "	Hot Uranium Slugs	135,478.26 gm.
" " "	Hot Uranium Slugs	240.28 kg.
Iowa State College	Thorium Foil	4.92 kg.
Los Alamos Scientific Laboratory	Plutonium Foils	0.00152 gm.

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