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OPERATIONS DIVISION

MONTHLY REPORT

FOR

MONTH ENDING FEBRUARY 28, 1949

BY

M.E. RAMSEY
E.J. WITKOWSKI
A.F. RUPP
J.A. COX
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OPERATIONS DIVISION

MONTHLY REPORT

for

Month Ending February 28, 1949

by

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

DATE ISSUED

MAR 31 1949

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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SUMMARY

1. Lost pile operating time averaged 8.8%.
2. The slug, charged to the pile in January, which had a hole in the aluminum jacket finally ruptured and was discharged.
3. A ruptured slug was detected on February 16, 1949, and discharged.
4. The excess pile reactivity was decreased from 150 inhours to 75 inhours by the loading of experimental equipment and irradiation units.
5. The retesting of all Class I slugs has been completed with rejects averaging 1.19%.
6. Isotope production continued normally.
7. Exposure of sulfur to a fast neutron flux gives promise of increasing the pile yield of P^{32} by a factor of 3.5.
8. The storage of chemical waste solutions is rapidly approaching capacity. An evaporator will be constructed to reduce the volume of waste for storage and should reduce the quantity of activity discharged to White Oak Creek.
9. RaLa Run #30 was started on February 14, 1949, and finally shipped on February 28, 1949. Considerable difficulty was experienced due to an incomplete metathesis of the $BaSO_4$ which resulted in the loss of product and an extremely low yield. Los Alamos reported that this batch too contained the unidentified organic contaminant.
10. A total of 404 shipments of radioisotopes were made during February, the largest number per month to date. Since August, 1946, the start of the distribution program, 6549 shipments have been made.
11. The number of requests for specialized work is increasing rapidly.
12. Work continued at an increased rate on the construction of the Radioisotope Production Area.

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A. PILE DEPARTMENT

I. Operating Data:

	FEBRUARY 1949	JANUARY 1949	Year-to-Date 1949
Total Accumulated KWH	2,428,468	2,699,989	5,128,457
Average KW/operating hour	3964.33	3960.67	3962.40
Average KW/hour/24-hour day	3613.79	3629.02	3621.79
Percent Lost Time	8.8%	8.3%	8.6%
Approx. Excess Pile Reactivity	60-70 inhours	145-155 inhours	
Slugs Charged	1488	76	1564
Slugs Discharged	1465	58	1523
Product Made (grams)	88.63	98.54	187.17
Product Discharged (grams)	126.51	6.21	126.72

II. Pile Operation:

The pile-down time averaged 8.8%, as compared to 8.3% for January and 11.1% for December.

The slug with a known hole in the jacket, that was loaded into Channel 1964 on January 18, 1949, finally ruptured and was discharged on February 11, 1949. This slug had a hole in its aluminum jacket estimated to be about 3/100ths of an inch in diameter. It was loaded into the pile in an attempt to evaluate the two new activity detection instruments recently installed in the exhaust air duct. The test slug was maintained at a temperature of 165° C. from January 18th until January 24th, when the air flow through the channel was reduced so that a slug temperature of 210° C. could be obtained. The test slug was operated at 210° C. from January 24th until it was discharged on February 11th.

The exhaust air monitors gave the following results:

1. The oil-soaked probe gave a sufficient indication of a rupture by January 30, 1949, to warrant scanning of the pile. The scanner indicated higher than average activity emerging from Hole 1964, but not sufficiently high to definitely identify the channel as containing a ruptured slug.

[redacted]

2. The newly installed gummed tape instrument gave the first indication of a ruptured slug on February 1, 1949. As the degree of rupture increased, the indication became more definite.
3. The newly installed gaseous fission product decay instrument never gave a positive indication of a ruptured slug.
4. The ruptured slug was easily detectable by visual scanning on February 7, 1949.
5. The scanner gave reasonably good evidence that the ruptured slug was in Hole 1964 on February 7, 1949.
6. The ion chambers located in the Filter House gave no indication of the ruptured slug.

Visually scanning the pile remains the most reliable method of detecting ruptured slugs although the probe and the gummed tape instrument may give an indication of increased particulate matter in the exhaust air.

The gaseous fission product decay instrument has possibilities of being made more sensitive and used as a scanner to determine the position of the ruptured slug. It is to be reworked and evaluated as a scanning instrument.

Visual scanning of the pile is to be continued on a weekly basis. During the scanning on February 16, 1949, a ruptured slug was detected in Channel 1360. It had been exposed for 1,622 days at an approximate temperature of 175° C. The presence of this rupture was not suspected although the gummed tape instrument and the oil probe showed higher than the usual particulate activity in the exhaust air. It was believed that the high readings were caused by residual activity from the test slug

[redacted]

discharged from Channel 1964 on February 11, 1949.

The Technical Division has designed and is now constructing an isotope exposure channel insert. The cans of target material will be clipped to a chain which will carry them into and out of the pile. If successful, this arrangement will eliminate the need for the present graphite stringers and, we hope, reduce the active particles being discharged into the work area.

The excess pile reactivity is 60-70 inhours. The 85-inhour drop from last month is due chiefly to the installation of a water dissociation experiment, insertion of one pound of gold for mercury 198 production, several large cobalt irradiations, and additional experimental equipment.

III. Filter House:

The pressure losses encountered in the Filter House at date of initial use and until the end of this 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
OVERALL INCREASE	4.3	390	0.4	40	4.4	134

A coarser glass wool (F.G. #25) has been obtained and will be used in the next filter change. The filters will then consist of a layer of F.G. #25 backed up by a layer of F.G. #50 instead of two layers of F.G. #50 as is currently used.

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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 the pile power.

IV. Fans:

The timer on the No. 2 fan starter burned out on February 8, 1949, as the fan was being started. The fan was down for approximately one hour for repairs. Except for this failure, the fans have operated normally throughout the month.

V. Radioisotopes:

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

	JANUARY, 1949		FEBRUARY, 1949	
	Research	Radioisotopes	Research	Radioisotopes
Stringers 13, 14, and 16	9	148	58	120
Hole 22 (Pneumatic Tube)	39	4	55	3
All Other Holes	5	16	27	18
TOTAL BY GROUPS	53	168	140	141
TOTAL FOR MONTH	221		281	

A total of 281 radioisotope and research samples were charged into the pile during the month of February. Pile records show this to be the largest number of samples charged into the pile during one month.

At the end of February, 1949, there were 372 cans of target material in Stringers 13, 14, and 16, compared to 382 cans of target material in these stringers at the end of January, 1949.

[redacted]

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VI. Experimental Work:

The program of retesting all Class I slugs by the Modified Bubble Test Method was completed during the month with the following results:

TOTAL TESTED	WELD FAILURES	OVEN FAILURES	DAMAGED	TOTAL REJECTS
15,800	20 0.13%	121 0.77%	46 0.29%	187 1.19%

Practically all of the oven failures were due to external corrosion. Since the corrosion was believed to be due to storage in a damp vault, the boxes of slugs have been raised off the floor by placing them on pads and heaters are used in the vault. The weld failures were essentially all at the weld and were detected in an acetone bath.

All of these slugs were initially tested during late 1946 and early 1947 by the same process with the rejects averaging 1.35%. The storage of these slugs has apparently damaged then sufficiently to cause the rejection of another 1.19% during the retesting. The high frequency of rejects indicates the importance of developing a more satisfactory jacket.

The Metallurgy Division is having Hanford prepare fifty X-slugs with the aluminum jacket being bonded to the slug with Al-Si alloy by the standard Hanford method. These slugs are to be used for evaluation of the Al-Si alloy as a suitable barrier to prevent the inter-diffusion of aluminum and uranium. They will also be evaluated at temperatures considerably above the maximum X-slug operating temperature of 250° C.

[redacted]

B. CHEMICAL SEPARATIONS AND ISOTOPE DEVELOPMENT DEPARTMENTS

I. Radioisotopes:

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

Sixteen uranium slugs were processed and approximately 7,709 millicuries were shipped. The products were within specifications.

Half inch lead has been installed to further shield the iodine glassware equipment. Preliminary tests indicate the scattering of gamma radiation has been effectively reduced. During the coming month, further information will be gathered concerning the radiation level in the operating areas.

2. Phosphorus (P^{32} - 14-3d)

Twelve cans of irradiated sulfur were processed and approximately 5,145 millicuries were shipped. All products were within specifications.

The extraction equipment was decontaminated and minor repairs made.

Phosphorus Development Work

Fourteen grams of sulfur were irradiated in the pile donut (fast neutron region) for one week and the yield (determined by complete solution of the sample in nitric acid) calculated to the standard six-week sulfur irradiation time for comparison with yields obtained in slow neutron zones. The donut-irradiated material contained 6.25 mc P^{32} per gram of sulfur, compared with an average yield in our standard cans of 0.75 mc P^{32}/g. sulfur. The yield is therefore increased by a factor of 8.3 by irradiating sulfur in a fast neutron zone. However, it is believed that some of this increase in yield is caused by the more

[redacted]

favorable geometrical proportions of the donut sample, i.e., a greater surface-to-volume ratio than can be obtained with the large production cans. This "skin effect" has been evaluated by measuring the P^{32} content of the first sulfur melted out of production cans, which is the outside layer of sulfur; a maximum yield of 1.8 mc P^{32}/gram sulfur has been noted. Thus, one may conclude that the P^{32} yield is increased by irradiation in the fast neutron zone by a minimum factor of 3.5. The most practical means of taking advantage of the increase in P^{32} yield in fast neutron zones is to irradiate sulfur in 4"-long slugs in between uranium slugs in regular channels. This will be tried next.

Work continued on the purification steps in the P^{32} process. Very favorable results were obtained with the following technique. The acidic extraction liquor was fed to a Dowex cation resin column and the effluent passed directly to an anion resin column. The effluent from the second column was neutralized with NH_4OH and passed to a third anion column, where the $P^{32}O_4^{\equiv}$ was absorbed on the top of the column. The $P^{32}O_4^{\equiv}$ was then eluted from column #3 with weak HNO_3. Cations, such as Al^{+++}, were removed on column #1, some anions such as $SO_4^{\equiv}$ and Cl^- as well as an unknown yellow-colored substance, were removed on column #2, and the final purification was accomplished on column #3.

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

Four hundred calcium nitrate slugs were processed in four runs to yield 450 millicuries with an average isotopic ratio of approximately 4.9%.

Prior to beginning the runs the equipment was checked with a dummy run of ten calcium nitrate slugs.

C^{14} Development Work - Be_3N_2 Process

No experimental work could be done on the Be_3N_2 - C^{14} process this month because a broken water main shut off the supply of water to Building 204.

Design work continued on C^{14} equipment to be installed in the new Isotope Area.

A sample of high specific activity C^{14} (13% isotopic abundance) was sent to Chicago for standardization on the mass spectrograph.

An inventory and inspection of the Be_3N_2 slugs stored in Building 105 was made. It was found that some of the slugs stored in the canal are corroding; the slugs will be moved to dry storage as soon as some suitable location can be found.

Approximately 100 grams of beryllium, which had received 10^{20} nvt, was recovered from waste and will be made available to scientists who are interested in studying the beryllium radioactivity.

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

About 10,500 millicuries of S^{35} as carrier-free sulfate were produced during the month, chiefly as by-product from the purification of Cl^{36} and K^{40} in Hanford-irradiated KCl samples.

[redacted]

The four-curie batch of BaS^{35} produced last month is being re-processed because the percentage of S^{35} in the sulfide state in the final product was too low. It is believed this was caused by a reduction in the amount of carrier sulfur. More carrier will be added during the re-run.

5. Fission Products

Dissolver solution from one slug was processed during the month. Mixed fission product solution recovered from glassware in the cell was fractionated on a Dowex resin column in 706-D. The separation of F.P.'s from uranium was exceptionally clean during this run, no trace of uranium being noted in the HCL concentrate removed from column #2. The HCl concentrate was thoroughly fumed with HNO_3 and this is believed to have been beneficial in obtaining sharper separations, particularly from Pu, on columns #3 and #4 (finishing columns). The columns used for conversion of eluants from citrate to HCl solutions, with consequent volume reduction, were employed for the first time in tandem with the three main columns. This procedure permits the removal of smaller volumes of fission product solutions from the cell.

The #3 column scanning probe has proved to be quite valuable in locating and following the movement of bands of activity on the finishing column.

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

Approximately two curies of Zr-Cb are being re-processed to get the Pu content down to meet specifications. About 5 mc Cb^{95} were prepared and shipped. The columbium was separated from zirconium by TTA

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extraction followed by purification on an ion-exchange column.

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

Approximately 150 mc of Y^{91} were shipped on outstanding orders. Another two curies are in process of final purification (chiefly from Pu) on small columns in 706-D. A TTA extraction will also be used on this material for separation from Pu.

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

About 50 mc of Pr^{143} were purified and part of this was shipped during the month to fill all outstanding orders for this isotope. Approximately 5 mc of 61^{147} were obtained with a purity of 90%; this fraction will be further purified. Some Nd was separated but there are no orders on hand for this material.

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

About 200 mc of purified $Ce^{141-144}$ were produced during the month. One-half curie of old stock is being repurified and concentrated; this material should contain principally Ce^{144}.

e. Strontium (Sr^{89-90} - 54d, 25y)

The entire stock solution containing 10 curies of Sr^{90} (old material, all Sr^{89} has decayed out) is being repurified and concentrated.

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

Approximately 500 mc were purified and part of this material was shipped on outstanding orders.

[redacted]

[redacted]

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

Thirty-four concentrates were made this month. The water line valve feeding from the main underground supply at W-10 tank to the ruthenium equipment failed and an emergency supply was obtained by the use of a hose until the trouble could be corrected.

Ruthenium Development Work

About 330 mc of Ru^{106} were redistilled in order to remove a reported trace of Pu. A 98% yield was obtained on this distillation.

Thio-aniline and thioacetamide are subject to much the same difficulties which are encountered when using H_2S in making a heavy metal sulfide precipitation from a ferric iron solution of Ru^{106} -- too much elemental sulfur is formed.

It was noted that a satisfactory distillation of Ru could be obtained from the iron solution of it is stored in glass instead of stainless steel drums after the iron hydroxide is dissolved. This direct distillation process will probably be used for some time, since the demand for Ru^{106} can easily be supplied by this method.

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

No separations were made.

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

No runs were made.

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

A sample of enriched Fe^{54} which had been irradiated at Hanford for a year to produce Fe^{55} was received and processed.

[redacted]

[redacted]

The analysis is not complete.

The enriched Fe^{58} which was exposed at Hanford to produce Fe^{59} with a low Fe^{55} content gave very disappointing results. The ratio of Fe^{55} to Fe^{59} was approximately 1:1. A re-analysis of the material by Y-12 indicated that they had supplied us with enriched Fe^{54} instead of Fe^{58}. Another Hanford irradiation of Fe^{58} is underway.

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

Eight grams of enriched $K^{40}Cl$ obtained from Hanford KCl were sent to Y-12 for further enrichment.

11. Chlorine (Cl^{35} - 10^6y)

Cl^{36} was recovered from a sample of KCl irradiated three years in the ORNL pile. The chlorine was purified and recovered in the form of HCl. The analysis was as follows:

Concentration	-	0.53 microcuries/ml
Total Cl^{36}	-	106 microcuries
Specific Activity	-	9.6 microcuries Cl^{36}/g. Cl.

Cl^{36} was also recovered as HCl from KCl irradiated at Hanford for one year.

Concentration	-	0.73 microcuries/ml
Total Cl^{36}	-	200 microcuries
Specific Activity	-	307 microcuries Cl^{36}/g. Cl
Total Solids	-	None
Normality HCl	-	0.066.

It is interesting to note that the factor between the Hanford and ORNL piles is almost 100 for these particular samples; or, if one considers that only 50% flux was used at ORNL (or perhaps less, during a period of three years), the factor is still probably somewhere between 25 and 50.

[redacted]

[redacted]

12. Miscellaneous

a. Cobalt Pellets

Ten Hanford channel slugs were prepared containing $\frac{1}{4}$" diameter by $\frac{1}{4}$" long cobalt metal cylinders for irradiation. These cobalt pellets will be used as multi-curie gamma sources for therapeutic irradiation and radiography.

b. Scandium

Two high-purified scandium oxide samples were made for the Physics Division to be used in neutron absorption studies.

II. Tank Farm and Burial Ground:

1. Wastes Discharged to White Oak Creek

Approximately 154.59 curies of activity were discharged to the White Oak Creek this month, with an average of 5.52 curies per day.

Having made the equivalent of two RaLa runs this month, the free space in the chemical waste system is still critical. It was not necessary, however, to jet any chemical waste from W-6 to the East Pond directly.

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

Discharged From	Gallons	Curies
Settling Basin	9,761,000	154.59
Retention Pond	480,200	.19.

2. Waste Tank Inventory

CHEMICAL WASTE

Tanks	Gallons Capacity	Gallons In	Gallons Out	Discharged To	Free Space
W-3,5,6	381,000	102,670	54,000	White Oak Creek	19,200

[redacted]

METAL WASTE

Tanks	Gallons Capacity	Gallons In	Gallons Out	Discharged To	Free Space
W-4,7,8, 9,10	713,000	21,488	14,400	Chemical Waste	119,288

3. Special Wastes

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

a. Two shipments of alpha contaminated waste from Dayton were buried.

b. Eleven hundred, 55-gallon drums of trash from Y-12 were buried.

c. Fifteen pots;four,55-gallon drums; and two, 5-gallon drums were received from Chicago. All the pots contained chemical waste; three, 55-gallon drums contained chemical waste; one, 55-gallon drum contained hexone; and the two, 5-gallon drums contained plutonium solutions.

d. A shipment of chemical waste was received from NEPA.

e. The ruthenium recovery process consumed 13,600 gallons of precipitated metal supernate from W-7 tank. This contained an average of .0033% uranium.

f. A total of 1,091.57 kg. of uranium was added to the metal storage system. Of this, 453.6 kg. were from the Hot Pilot Plant; 153.6 kg. from the Semi-Works; 452.79 kg. from RaLa; and 31.58 kg. from the I^{131} process.

g. K-25 transferred 810 gallons of liquid waste to the Tank Farm and three loads of trash to the Burial Ground.

h. Mound Laboratory buried forty-one containers of alpha contaminated trash.

[redacted]

4. Maintenance

a. In order to have an additional opening into W-5 tank, the jet from W-5 to W-6 was removed and W-6 was tied into the Tank Farm transfer system.

b. J. A. Jones Construction Company has started the construction of a new calibrated diversion box ahead of the Settling Basin to facilitate tie-in of the new Isotope Area. This work is about 50% complete.

c. The Settling Basin floating baffles were raised; these had sunk due to cable stretch.

d. A 2300-gallon, stainless steel tank was removed from the Burial Ground and transferred to the Isotope Area. A Bird, 12" stainless steel centrifuge was transferred to 706-HB.

5. Evaporator for Concentration of Chemical Wastes

The construction of an evaporator for the concentration of chemical wastes has been approved and construction will start early in March, 1949. Sixty days have been estimated for completion.

[redacted]

[redacted]

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

Prior to the start of Run #30, the broken line from the reactor to the transfer vessel in Cell I was repaired and the reactor replaced. Upon testing the repairs it was found that the Hastelloy transfer vessel had a bad leak in a spot which could not be reached for close inspection. It is suspected that this leak was the cause of the unexplained product loss in Run #29.

Following the usual pre-run equipment check and necessary repairs, RaLa Run #30 was started on February 14, 1949. Thirty-eight Hanford, four-inch slugs and 113, X-slugs were dissolved and extracted in three batches. When it was apparent by analysis that the product content of the Hanford slugs was below the desired level, 161 additional X-slugs were added to the process.

The run proceeded apparently normal through the metathesis step with intermittenly high waste losses which were later recovered.

At the time of transfer to Cell B, it was noted that a complete transfer had not been obtained, so it was decided to split the run into two shipments. The run was processed through the glassware with great difficulty. The resulting product was so small it had to be discarded.

The lost product was found as an insoluble sulfate, as the result of an incomplete metathesis. All tanks through which the product had passed were treated with a metathesizing solution and the Ba^{140} collected in the extraction vessel in Cell A.

Three hundred eleven additional X-slugs were loaded and dissolved in five batches. These were extracted with the recovered material from Cell B.

[redacted]

Once again Cell A operations were smooth and no unusual conditions were noted other than high air contamination for forty-eight hours from some unexplainable source. The metathesizing solutions and dilution water were increased to guarantee complete metathesis. The metathesis went well and the transfer to Cell B indicated considerable product. The longest period of glassware operation on record took place from the first filtration at 2:00 pm, February 26, 1949, until the product was in the shipping cone at 4:00 pm, February 27, 1949. Some foreign material, possibly insoluble matter from the first glassware attempt, came down with the transfer from the evaporation tank and plugged the disc of the reactor vessel.

L.S.T. was reached at 1:30 pm on February 27, 1949, and the run was shipped on February 28, 1949, at 10:00 am.

The analytical summary of the run is tabulated below with all results corrected to the aforementioned L.S.T..

Slugs Loaded: 585 X-slugs and 38 Hanford slugs.
Slugs Dissolved: the equivalent of 639.7 Clinton pile slugs.

	CURIES	PERCENT
Total Curies Dissolved*	4,097	100.0
Cell A Losses	668	16.3
Cell B Losses	1,095	26.7
Losses Accounted For	1,763	43.1
Material Balance through B-6		81.5
Product Shipped (Skyshine)	1,345	32.8
Material Balance through Skyshine		75.9
Losses Unaccounted for through Skyshine		24.1

* All curies corrected to L.S.T.

Another run is to be made as soon as the cells can be made ready and necessary equipment replaced which will be about March 21, 1949.

Phoenix II carrier, to provide additional slugs for RaLa runs, is about 90% fabricated and should be ready to be sent to Hanford early in March.

[redacted]

Los Alamos reported that Run #30 also contained the unidentified organic contaminant which we felt had been eliminated by replacing the Tygon tubing with fluorethene. More investigational work will be done on this problem.

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C. ISOTOPE CONTROL DEPARTMENT

I. General:

There were 404 isotope shipments during the month of February compared with 390 in January, 1949. This represents the largest number of isotope shipments in any month to date.

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

	JANUARY 1949	FEBRUARY 1949	August, 1946, to February, 1949, Inc.
Separated Material 706-D Area	327	318	5,069
Unseparated Material 100 Area	63	86	1,480
	390	404	6,549

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

	January	February
Non-Project	296	311
Project	66	54
Foreign	28	39.

II. Special Requests:

During this month several special radioisotope services were prepared and a number of new inquiries received concerning this type of work. Fifty stainless steel sheaths were filled with radioactive cobalt for the Chicago Tumor Institute and sent to the Bureau of Standards for calibration. It is believed that similar needles will be quite popular as a substitute for radium and it is planned to stock pile several sizes of Co^{60} needles.

[redacted]

[redacted]

An inquiry regarding the depositing 30 mcs. of radioactive cerium on the end of a metal rod was received from Princeton University. Other requests consisted of concentration of various isotopes; preparing the radioactive material in various chemical forms; etc.

A request from the University of Iowa for I^{129} is being completed by isolating the material from tellurium exposed in the X-pile for more than one year.

III. Radioactive Cobalt:

A large cobalt source of a half-inch sphere irradiated at Hanford for a month to a strength of about eight curies was prepared for Notre Dame University. This source will be used in studying the effects of radiation upon chemical reactions.

A recent request was received from Brookhaven for a twenty-curie source of Co^{60} to be used in studies of radiation on growing corn plants.

Arrangements have finally been made with Hanford to begin irradiation of cobalt. While it will not be possible to irradiate the whole forty slugs of cobalt in a single irradiation as originally planned, it will be possible to irradiate single slugs or groups of slugs as pile reactivity is available. Due to other special irradiations at Hanford, the available inhours are limited.

The request for 3,000 curies of radioactive cobalt from the Naval Radiological Defense Laboratory was discussed with the director, Dr. Sullivan, and details are fairly well worked out. The cobalt rods, 1/8" diameter by 4" long, will be irradiated at Hanford and put into capsules in the X-10 canal after being returned.

[redacted]

IV. Carbon 14 Labeled Compounds:

Approval was obtained from AEC during the month for the price of $250.00 per millicurie for formaldehyde labeled with carbon 14.

According to previous arrangement with the Atomic Energy Commission, a batch of four carbon 14 labeled compounds consisting of 4.75 mcs. each (sodium butyrate, sodium valerate, sodium caproate, sodium heptanoate) was received from the University of California. A price was calculated on these compounds based on information furnished by the University of California and submitted to the Atomic Energy Commission for approval. When these compounds are distributed, they will plainly indicate that they were produced at the University of California.

V. Radiochlorine:

Another sample of irradiated KCl was received from Hanford and chlorine 36 extracted - about 200 mcs. of chlorine 36 with a specific activity better than .2 mcs. per gram. This isotope has turned out to be very popular and a number of orders have been awaiting this material.

VI. Radioisotope Production Area:

In construction of the new area, work continued on the structural steel for the process buildings and the structural concrete for the office and analytical buildings; laying of the concrete block and brick walls was started on the office building; and the insulation and aluminum sidings were started on process building E. Piping work continued on the hot off-gas, hot drain, semi-hot drain, and air exhaust systems; the distribution box for the semi-hot waste system was completed. Excavation was completed and the pad poured for the hot waste collecting tank. The acid-proof brick lining was started in the exhaust stack and at the end of the month was approximately 155 feet high; no work was done on top of the stack this month.

[redacted]

VII. Source and Fissionable Material Accountability:

A survey by the S.F. Accountability group of the Atomic Energy Commission was made during the week of February 21 through 25, 1949. A number of verbal suggestions were advanced and it is understood they will be confirmed in a letter.

L. B. Emlet, Director
Operations Division

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[redacted]

[redacted]

VIII. Source and Fissionable Material Accountability:

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

RECEIPTS

Received From	Material	S.F. Content
Argonne National Laboratory	Normal Uranium	.10 kg.
" " "	Plutonium	18.00 mg.
C&CCC, K-25 Area	Normal Uranium	7.00 gm.
" " "	Depleted Uranium	8.00 gm.
" " "	Depleted Uranium	13.00 gm.
" " "	Depleted Uranium	8.00 gm.
C&CCC, Y-12 Area	Normal Uranium	65.60 gm.
General Electric Company	Normal Uranium	315.08 kg.
" " "	Plutonium	60.40 gm.
" " "	Normal Uranium	6.99 kg.

SHIPMENTS

Shipped To		
Argonne National Laboratory	Normal Uranium	35.10 kg.
" " "	Plutonium	3.8 gm.
" " "	Normal Uranium	1.00 gm.
" " "	Plutonium	1.00 mg.
" " "	Plutonium	4.20 gm.
" " "	Normal Uranium	21.06 kg.
C&CCC, K-25 Area	Normal Uranium	3.51 kg.
C&CCC, Y-12 Area	Enriched Uranium	9.5 gm.
General Electric Company	Uranium 233	44.40 mg.
" " "	Plutonium	5.00 mg.

[redacted]