ORNL 830
Series A
Progress Report

7a

AEC RESEARCH AND DEVELOPMENT REPORT

OPERATIONS DIVISION MONTHLY REPORT FOR MONTH ENDING AUGUST 31, 1950

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
CARBIDE AND CARBON CHEMICALS DIVISION
UNION CARBIDE AND CARBON CORPORATION
UCC
POST OFFICE BOX P
OAK RIDGE, TENNESSEE

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OPERATIONS DIVISION

MONTHLY REPORT

for

Month Ending August 31, 1950

by

Logan B. Emlet

DATE ISSUED

SEP 26 1950

OAK RIDGE NATIONAL LABORATORY
operated by
CARBIDE AND CARBON CHEMICALS DIVISION
Union Carbide and Carbon Corporation
Post Office Box P
Oak Ridge, Tennessee

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SUMMARY ORNL-830

1. Lost pile-operating time averaged 10.3%, compared to 10.9% for the year-to-date. (Page 5.)
2. The pile canal, which was badly contaminated in handling the recent shipment of a sectioned Chalk River fuel rod, was decontaminated. (Pages 5 and 6.)
3. Approximately eight hundred pounds of tantalum were removed from the pile during the month. This material was for the RW Program and completes all outstanding commitments for the RW Program. (Page 6.)
4. The excess pile reactivity is now one hundred to one hundred and ten inhours. (Page 6.)
5. The construction work on the P^{32} extractor was completed this month and tracer runs were started. (Pages 9 and 10.)
6. The tritium packaging equipment was charged with H^3-He^3 mixture and the gas was pumped through the heated-palladium valve, separating the H^3 and He^3. An addition was made to the apparatus for the preparation of zirconium-tritium targets for nuclear research. (Page 12.)
7. The first hot run was made in the experimental TBP equipment. Most of the operation was quite satisfactory, although a surprising amount of fission product activity went with the organic phase and was not easily stripped from it. (Page 13.)
8. Installation of the electrical precipitator for the hot off-gas system at the 900 Area stack was completed and the Chemical Technology Division started testing the unit to determine optimum operating conditions. (Page 13.)

9. The activity discharged to White Oak Creek was 13.2 curies, compared to 19.1 curies during July, 1950. The discharge from the evaporator was 0.12 curie, compared to 0.47 curie last month. (Pages 16 and 17.)

10. At the request of Los Alamos, the next RaLa run has been postponed seven weeks. The run is now tentatively scheduled to start October 23, 1950. The 706-D alterations are expected to be completed without difficulty. (Pages 19 and 20.)

11. There were 689 radioisotope shipments during the month, compared to 688 shipments for July, 1950. (Page 21.)

A. PILE DEPARTMENT

I. Operating Data:

	AUGUST 1950	JULY 1950	YEAR-TO-DATE 1950
Total Accumulated KWH	2,289,904	2,032,220	17,961,152
Average KW/Operating Hour	3432.37	3337.24	3456.52
Average KW/24-Hour Day	3077.83	2731.49	3079.76
Percent Lost Time	10.3	18.2	10.9
Approx. Excess Pile Reactivity	100-110 inhours	15-25 inhours	
Slugs Discharged	56	402	1743
Slugs Charged	56	523	1871
Product Made (Grams)	83.57	74.17	655.52
Product Discharged (Grams)	0.54	42.39	115.13

II. Pile Operation:

The pile-down time was 10.3%, compared to 18.2% for the previous month and 10.9% for the year-to-date.

The north mattress plate, which had been removed on July 31, 1950, was replaced with a rebuilt mattress plate on August 7, 1950, without any further difficulty.

The south mattress plate, which had been without water cooling for some time, was in almost as good shape as the north mattress plate, which had a sheet of water flowing over it at all times. Since the water sprays did not appear to contribute much to the life of the mattress plates, the mattress plates will not be water-cooled in the future in order to reduce the flow of water to the pile canal. This is very desirable since sand filters and a demineralization bed is to be installed in the near future for removal of radioactivity from the canal effluent.

The canal was very badly contaminated in handling the recent shipment of a sectioned Chalk River fuel rod. During this period, canal water samples were frequently as high as 500 counts per minute per cubic centimeter and lowering of the canal water level by one foot uncovered wall surfaces reading 1,000 to 1,500 mr/hour at

II. Pile Operation: - (Continued)

six inches. After decontamination during the first half of the month, the wall surfaces read only 40 to 80 mr/hour at six inches and samples from the deep pit of the canal were reduced to 11 counts per minute per cubic centimeter. This is the lowest deep pit reading for at least the past three years.

There were no ruptured slugs during the month.

Two charges of tantalum weighing about four hundred pounds each were discharged during the month. One charge had a specific activity level of approximately five curies per pound and the other charge was approximately twenty-five curies per pound. The exposure of several cans of tantalum compounds was also completed during the month. All of this material was for the RW Program and completes all existing commitments for this program.

The excess pile reactivity is now one hundred to one hundred and ten inhours. The approximately eighty-five inhour increase in pile reactivity during the month was due principally to the discharge of the large amount of tantalum for the RW Program.

The replacement wiring for the pile controls has been installed from the junction boxes near the contactor cabinets to the equipment. The contactor cabinets arrived the last of the month and will be installed during the coming month. The final connections to the equipment and the control panel will be made by Oak Ridge National Laboratory personnel during the routine shutdowns and will require several weeks for completion.

III. Filter House:

The following table compares the pressure drop across the exit air filters 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	---
7-31-50	2.8	155	3.2	220	6.9	109
8-31-50	2.9	4	3.2	0	7.0	1

The Filter House operation was normal throughout the month.

IV. Fan House:

The disconnects for both fan motors were moved to the starter cubicles and the supplementary cubicles which contained the disconnects and extra oil switches were removed. The fan motors have been connected by underground lines to the new substation.

The replacement fans are scheduled for arrival near the middle of September, 1950. The previous schedule was for delivery of one fan the last of this month, but shipment was postponed until the vendor is able to run performance curves on one of the fans.

The masonry work on the building has been completed and many of the services rerouted to conform to the dimensions of the rebuilt portion of the Fan House.

Fan House operation was normal during the month.

V. Radioisotopes:

The following is a comparison of the radioisotope and research samples charged into the pile during August, 1950, with those handled in July, 1950:

V. Radioisotopes: - (Continued)

	JULY, 1950		AUGUST, 1950	
	Research	Radioisotopes	Research	Radioisotopes
Stringers 13, 14, and 16	41	188	18	172
Hole 22 (Pneumatic Tube)	72	19	89	17
All Other Holes	7	57	8	26
TOTAL BY GROUPS	120	264	115	215
TOTAL FOR MONTH	384		330	

At the end of August, 1950, there were 371 cans of target material in Stringers 13, 14, and 16, compared to 380 cans of target material in these stringers at the end of July, 1950.

VI. Water Demineralization Building:

The operation of the building was normal throughout the month with 689,880 gallons of water being demineralized of which 56,910 gallons were also deaerated.

GALLONS PRODUCED	AUGUST, 1950	JULY, 1950	YEAR-TO-DATE
Demineralized	689,880	597,900	4,885,160
Deaerated	56,910	43,250	336,000

[redacted]

B. CHEMICAL SEPARATIONS AND RADIOISOTOPE DEVELOPMENT DEPARTMENTS

I. Radioisotopes:

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

Sixty-four ORNL slugs were processed and 30,676 millicuries shipped.

The product from one of the eight slug runs was about twenty-five percent lower than normal due to a change in procedure which involved trapping of the product in H_2SO_3 instead of the usual Na_2SO_3 and NaOH solution. This change in procedure was made at the request of the Chemistry Division in order to provide them with 900 millicuries of special product for their experimental work.

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

Sixteen 2,000-gram ORNL cans were processed and 7,794 millicuries shipped.

One run had a greenish color and had to be reprocessed before it could be shipped. The impurities causing this color were traces of iron, chromium, and nickel.

No trouble was encountered this month in the glassware purification step; good yields were made on all runs.

Phosphorus Development Work

The construction work on the extractor was completed this month and tracer runs were started. Charging material for the tracer runs is sulfur which has been irradiated for only one week in the regular sulfur channels. Analytical results are not yet available on the first of these runs.

The glassware in the purification hood was also completed this month. Instruments for measuring radiation at various points in the process are not yet installed. [redacted]

I. Radioisotopes: - (Continued)

2. Phosphorus Development Work

Two hundred and twenty millicuries of carrier-free P^{32} were produced this month for special orders.

Three hundred and sixty millicuries of re-processed regular (carrier) P^{32} were produced for shipments to meet special customer specifications.

A complete new series of anion exchange resins was received for testing in P^{32} work. Results with all anion exchangers used for P^{32} purification have been discouraging so far.

3. Carbon (C^{14} - 5,720y)

No runs were made this month.

Last month, Run #119 was reported as having been made, but the analytical results were not available at that time. This run contained about 150 millicuries with an isotopic ratio of 4.84%.

The following is a list of the C^{14} available in the unprocessed Be_3N_2 and $Ca(NO_3)_2$ slugs:

No. of $Ca(NO_3)_2$ Slugs in Pile	1,365
No. of $Ca(NO_3)_2$ Slugs in Canal	291
Total C^{14} Content in $Ca(NO_3)_2$ (Estimated)	2,461 mc.
No. of Be_3N_2 Slugs on Hand	851
Total C^{14} Content in Be_3N_2 (Estimated)	38,295 mc.
Total Unseparated C^{14} Available (Estimated)	40,756 mc.
August 31, 1950, Inventory $BaC^{14}O_3$	498 mc.
Total C^{14} on Hand	41,254 mc.

[redacted]

I. Radioisotopes: - (Continued)

3. Carbon Development Work

There were 46.9391 grams of $BaCO_3$ re-worked to produce homogeneous material (585.4 mc.).

Fifty-five grams of Be_3N_2 were processed to produce 342.3 milligrams $BaCO_3$ with an isotopic ratio of 14.8% (18 mc. C^{14}).

Progress was made in the fabrication of C^{14} plaques in which $BaCO_3$ is incorporated in Lucite. Two plaques were finished to customer's specifications; however, another one was requested to have a G-M tube count of 300,000 to 600,000 counts per minute at two inches. This does not appear possible with the highest isotopic ratio (21%) material we have on hand.

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

Hanford-irradiated samples of normal and enriched Fe^{58} were processed. Analyses are not complete at this date.

5. Iridium (Ir^{192} - 70d)

A Hanford sample of IrO_2 was processed. IrO_2 is extremely hard to dissolve so it was necessary to resort to a NaOH fusion, followed by treatment with HCl to convert this unit to $IrCl_4$ solution. This unit was notable for the extremely intense gamma radiation encountered, even from this 0.1 gram sample. The irradiation unit target material should be changed to $IrCl_4$ or Ir metal in the future. Iridium metal pieces should make very useful intense gamma sources. Since it is a noble metal, it could be placed directly into body tissue without dispersion of activity into body fluids.

I. Radioisotopes: - (Continued)

6. Tantalum (Ta^{182} - 117d)

The tantalum preparation reported last month contained a total of 225 millicuries. No accurate figure for the specific activity was obtained.

7. Tritium (H^3 - 12.1y)

The tritium packaging equipment was charged with H^3-He^3 mixture and the gas was pumped through the heated-palladium valve, separating the H^3 and He^3. The purified H^3 will be packaged in various sizes of ampoules for shipment.

An addition was made to the apparatus for the preparation of zirconium tritium targets (for nuclear research). A 1 KW induction heater was borrowed from the Physics Division and found to be too small for this work. However, a 5 KW heater was made available through the courtesy of Dr. R. Bolomey of the Chemistry Division and was found to be suitable. Several runs were first made with ordinary H_2, absorbing the gas in a thin film of molten Zr metal. Two Zr-H^3 targets were then prepared, about one inch in diameter, containing 2.81 c.c. and 2.22 c.c. (@ STP) of H^3 each. Inquiries have been sent to several induction heater manufacturers, and it is hoped that the Operations Division will obtain one for work of this type.

8. Sodium (Na^{22} - 2y) (Cyclotron)

Fourteen millicuries of Na^{22} were separated, without addition of carrier, using the process reported last month.

I. Radioisotopes: - (Continued)

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

There was 0.5192 gram of elemental sulfur with a specific activity of 10.45 curies/gram S produced for a special order. The overall yield through the entire process was 99%. Some additional elemental sulfur was dissolved in benzene to take care of small orders.

A highly concentrated carrier-free $H_2S^{35}O_4$ source (250 mc. in 3 ml.) was prepared to customer specifications.

10. Fission Products

The first hot run was made in the experimental TBP equipment, primarily to fill some urgent orders for Ba^{140}.

Most of the operation was quite satisfactory although a surprising amount of fission product activity went with the organic phase and was not easily stripped from it. Apparently, it will be advantageous to remove the Zr-Nb by ion-exchange before the removal of U by solvent extraction; this will be quite simple, since this has been done for years in our other (706-C) equipment.

The rare earth fraction was taken off and is being re-fractionated on the hot column in Building 908 to obtain Y, Nd, and Pr for some current orders. These fractions will be removed during the coming week.

11. Miscellaneous Separations Work

Installation of the electrical precipitator for the hot off-gas system at the 900 Area stack was completed and testing of the unit to determine optimum operating conditions was started by the Chemical Technology Division.

[redacted]

I. Radioisotopes: - (Continued)

11. Miscellaneous Separations Work

A new alarm system was installed to signal when a shut-down occurs on the 900 Area electrically-driven ventilation and off-gas fans or the precipitators and water tank of the Cottrell precipitator.

In the radioisotope storage barricade in Building 902, extra lead was added to the "shine" shields in the four west sections of the barricade; one inch of lead was added to the upper half and one-half inch to the lower half of each section to give a total shielding of two inches and one and one-half inches of lead, respectively.

Cleaning of the cobalt needles to be transferred from the 105 canal to the radioisotope storage barricade was completed and inventorying and classifying of them were started.

Miscellaneous Development Work

a. Cobalt Sources

Six 500-millicurie and one 250-millicurie cobalt sources were packed in various source holders specified or furnished by customers.

b. P_2O_5 Irradiation

P_2O_5 was packed in quartz for special irradiations.

c. Hanford Samples

Eight tubes of chromium, normal and enriched, were prepared for Hanford irradiation.

I. Radioisotopes: - (Continued)

11. Miscellaneous Development Work

d. Equipment Testing

A micro-bellows pump was received and tested. The flow rate and mechanical features generally were satisfactory but liquid hold-up in the bellows is unsatisfactory. It was concluded that larger-sized bellows pumps are not too desirable for our work.

c. Optical Work

Dr. Monk, USAEC optical consultant, visited us during the month and gave us many valuable instructions on the conversion of old Navy drift sights to small periscopes. Two drift sights have been received and will be converted as soon as possible.

II. Tank Farm:

1. General

a. The J. A. Jones Construction Company continued work on the installation of the Plan "H" steam line through the Tank Farm. Pipe supports were installed and some of the old wooden poles removed.

b. The steam line, installed in the South Tank Farm by the Mechanical Department, has been completed.

c. The recently-installed black-iron air line to the South Tank Farm was replaced with a galvanized pipe installation.

d. The Health Physics Division has initiated a project to construct a weir box to collect, measure, and sample the water from all five discharge pipes from the Settling Basin. To date, only part of the concrete work has been completed. [redacted]

II. Tank Farm: - (Continued)

1. General

e. Difficulty was encountered in attempting to jet uranium waste from 706-C to W-9. Examination revealed that the steam line to the jet was plugged. Nitric acid was poured in through the steam line and the congestion was removed.

f. Work was started on the installation of a new concrete pit and revised piping west of 706-C. This revision will allow the tie-in of the new Physics of Solids Laboratory hot drain lines into the existing 706-C and 706-D facilities. This work is part of the Plan "H" Program.

2. Wastes Discharged to the White Oak Creek

Approximately 11.09 curies of beta activity were discharged from the Settling Basin this month.

A total of 2.14 curies of beta activity was discharged from the Retention Pond. This activity was jetted to the drywell system from the jet pit north of W-9 during the decontamination of this pit.

A new constant sampler, similar to the ones at the inlet and exit of the Settling Basin, was installed at the exit of the Retention Pond. The samples will be collected for a period of four hours and should be much more representative than the old-type "grab" samples.

[redacted]

II. Tank Farm: - (Continued)

2. Wastes Discharged to the White Oak Creek

ACTIVITY DISCHARGED TO WHITE OAK CREEK

	JULY, 1950		AUGUST, 1950	
Discharged From	Gallons	Beta Curies	Gallons	Beta Curies
Settling Basin	21,387,000	11.82*	26,767,000	11.09*
Retention Pond	535,527	7.31	530,175	2.14
TOTAL		19.13*		13.23*
Contributed by Evaporator		.47		.12

* Includes contribution of evaporator.

3. Chemical Waste Evaporator

Good evaporation rates and volume reductions prevailed until the last week of the month when about 54,000 gallons of supernate from the evaporator concentrate tank were jetted to W-5 for reconcentration. This slowed up operation considerably and dropped volume reductions to about 2:1. An average decontamination factor of 5,698 was obtained for the month, compared to a decontamination factor of 2,834 last month.

The following maintenance work was done during the month:

a. Three sheared pins on discharge valves from the evaporator to W-6 were replaced.

b. The sump pit jet was cleaned out.

c. An attempt was made to weld a leak in the bottom of the evaporator. This was not successful due to a lack of working time because of radioactivity. The evaporator will be shut down, decontaminated, and repaired at a later date.

[redacted]

II. Tank Farm: - (Continued)

3. Chemical Waste Evaporator

WASTE EVAPORATOR OPERATION

Gallons Fed to Evaporator	Gallons of Concentrate to W-6	Volume Reduction	Beta Curies to Evaporator	Beta Curies to Settling Basin
AUGUST - 232,376	25,424	8.1:1	690.10	.12
JULY - 227,555	19,934	10.4:1	1,318.17	.47

4. Waste Tank Inventory

HOT PILOT PLANT STORAGE

Tanks	Gallons Capacity	Gallons In	Gallons Out	Discharged To	Free Space
W3,13,14,15	48,500	300	400	Building 706-C	9,850
CHEMICAL WASTE STORAGE					
W-5	170,000	261,176	232,376	Evaporator	4,800
EVAPORATOR CONCENTRATE STORAGE					
W-6, 8	340,000	9,600	58,800	Evaporator	106,800
METAL WASTE STORAGE					
W4,7,9,10	543,000	5,980	-0-	---	104,136

[redacted]

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

At the request of Los Alamos, the next shipping date has been postponed for seven weeks. The run is now tentatively scheduled to start October 23, 1950.

The change in shipping date has relieved the Mechanical Department of a great deal of pressure to complete the 706-D alterations by September 1, 1950, the originally scheduled start-up date. Some of their manpower which was scheduled to work on this project was, therefore, diverted to other high priority work.

The following work was accomplished during the month:

1. A new panel board was installed for use with the new tank A-17 and its services.
2. All panel boards were painted and relettered.
3. A section of the second floor balcony was replaced with steel to support the process filter cubicle.
4. The resin column cubicles were set in place.
5. The process and crud filter cubicles were installed with all piping. These have been completely tested and repaired as necessary.
6. Condensers A-19 and A-20 were received and installed.
7. All Ring Balance instruments have been removed, repaired, recalibrated, and reinstalled.
8. All piping in and out of Cell A has been completed.

All that remain to be done before operation can be started are the following items:

1. Fabrication of the shielding plugs for both cubicles.
2. Fabrication of the valve extension handles.

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

3. Installation of the monorails and chain falls for the installation and removal of the shielding plugs from both cubicles.

4. The receipt and installation of the correct range liquid level gauge for Tank A-17.

5. The complete testing and repair, if necessary, of all equipment in Cell A. A new drainage system is being installed behind 706-D to remove storm water which has been flooding the building laboratory during heavy rainstorms. This work is 90% completed.

[redacted]

C. RADIOISOTOPE CONTROL DEPARTMENT

I. General:

During August, 1950, there were 689 radioisotope shipments, compared with 688 during July and 721 during June, 1950. In August, 1949, there were 534.

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

	August 1949	July 1950	August 1950	August, 1946, to August, 1950, Incl.
Separated Material 706-D Area	382	508	521	12,774
Unseparated Material 100 Area	152	180	168	3,945
TOTAL	534	688	689	16,719

The following table indicates the breakdown between non-project, project, and foreign orders for August, 1949, and July and August, 1950:

	August 1949	July 1950	August 1950
Non-Project	392	531	528
Project	118	140	148
Foreign	24	17	13
	534	688	689

II. Hanford Irradiations:

The following radioisotope samples were received from Hanford during August, 1950:

Sample No.	Material	Date Discharged	Date Received
ORNL-118	Tantalum Foil	5-24-50	8-9-50
ORNL-127	Iridium	5-17-50 (2 Pcs.)	8-9-50
		7-11-50 (1 Pc.)	8-9-50
ORNL-126	Cesium	6-7-50 (1 Pc.)	8-9-50
		6-7-50 (1 Pc.)	
ORNL-113	Scandium Oxide	10-18-49	8-10-50
ORNL-80	Mercuric Oxide	6-21-50	8-10-50
ORNL-110	Fe 58, Enriched	July, 1950	8-28-50
ORNL-87	Tungsten	July, 1950	8-28-50
ORNL-83	Titanium	July, 1950	8-28-50

II. Hanford Irradiations: - (Continued)

Sample No.	Material	Date Discharged	Date Received
ORNL-29	Phosphorus	July, 1950 (2 Pcs.)	8-28-50
ORNL-60	KCl	July, 1950	8-28-50
ORNL-100	Calcium Carbonate	July, 1950	8-28-50
ORNL-89	Cadmium	August, 1950	8-28-50
ORNL-85	Selenium	August, 1950	8-28-50
ORNL-59	Antimony	7-11-50	8-28-50

Arrangements are being made to irradiate a large can containing three to five pounds of sulfur in one of the side holes which is expected to be available in October, 1950. Designs of the irradiation can and shield will be worked out as far as possible at ORNL and sent to Hanford for approval.

Costs of irradiation and special work performed for ORNL at Hanford have in the past been charged through the Atomic Energy Commission. In accordance with a new procedure, such costs will be billed directly to ORNL by the General Electric Company on a purchase order from ORNL. The irradiations being performed for NEPA will be charged directly to NEPA on a NEPA purchase order. This procedure will be a considerable improvement, since it will be possible to challenge any billing which does not appear to be correct and also to allocate charges directly as basic costs.

A blanket purchase order is being furnished General Electric Company and specific items for which charges may be made will be listed in letter releases.

III. Radioiodine:

The demand for radioiodine continues to be high.

In an attempt to explain the discrepancy between I^{131} analyses at ORNL and the Bureau of Standards, it was found that the Bureau of Standards' work was done using a 4π counter. A comparison

III. Radioiodine: - (Continued)

was made of 4π counting with coincidence counting, upon which radioiodine analyses are based at ORNL, and it was found that 4π counting gave results approximately 14% lower than coincidence counting. Since it is believed that coincidence counting is the more accurate method, further correspondence will be carried out with the Bureau of Standards to attempt to reach an agreement on analyses.

IV. Potassium 42:

Samples of K_2CO_3, dried before irradiation, have given no further evidence of insoluble material when dissolved. Apparently, previous trouble in this respect has been due to small amounts of aluminum dissolved off the sides of the irradiation can.

V. Carbon 14:

Apparatus is now being set up to analyze $Na_2C^{14}O_3$ samples, submitted by the Bureau of Standards, by gas counting. When this has been done, it will be possible to tell how much variation exists between regular ORNL analyses for C^{14} and those by the Bureau of Standards. The tentative standards adopted by the Bureau appear to be about 15% lower in activity than ORNL standards, and the half-life of 5,360 years has been adopted by the Bureau of Standards compared with the half-life of 5,100 years previously accepted at Oak Ridge National Laboratory.

[redacted]

VI. Cyclotron Radioisotopes:

Following is a list of the outstanding orders for cyclotron radioisotopes now on hand:

Material	Amount	Status
Na 22	.040 mc	Special source being prepared.
Mn 54	3.00 mc	Irradiation ordered from Washington Univ.
Fe 59	1.00 mc	Will attempt to substitute Fe^{59} from enriched Fe^{58}.
As 73	11.00 mc	Irradiation ordered from Univ. of Pittsburgh.

BOMBARDMENTS RECEIVED

	M. I. T.		U. of CALIF.		U. of PITTSBURGH		WASHINGTON U.	
	Bombard-ments	Beam Hours	Bombard-ments	Beam Hours	Bombard-ments	Beam Hours	Bombard-ments	Beam Hours
Be 7					6	180.00		
Na 22	1	109.75			5	201.75	4	300.00
Mn 52					2	20.00		
Mn 54							1	50.00
Co 57							2	50.00
Fe 59			3	184.30				
Zn 65	1	100.00						
I 125							2	60.00
Molybdenum Metal					1	13.00	1	10.00
TOTAL RECEIVED	2	209.75	3	184.30	14	414.75	10	470.00

REQUESTED BUT NOT RECEIVED

Be 7					1	50.00		
Mn 54							1	50.00
Fe 59			1	40.00 (To be shipped directly to Washington U.)				
Zn 65			1	40.00				
As 73					1	10.00		
Mo Metal Plate							1	10.00
TOTAL HOURS OUTSTANDING (Not Received or Requested)		540.25		485.70		275.25		220.00

SHIPMENTS OF CYCLOTRON-PROCESSED RADIOISOTOPES

Material	No. Shipments August, 1950	No. Millicuries August, 1950	No. Millicuries To Date
Be 7	-0-	-0-	124.073
Na 22	2	1.1 mc	20.347
Mn 52	-0-	-0-	9.991
Co 57	1	.4 mc	.4
Fe 59	-0-	-0-	1.5
Zn 65	-0-	-0- [redacted]	1.0

VII. Cobalt 60:

The demand for sources ranging from 200 - 500 millicuries Cobalt 60 has been increasing. These sources are in wide demand by metal-working plants for use in radiography.

There appears to be a demand for very small needles between $\frac{1}{2}$ and 1 mm diameter, and 3 and 10 mm long. A large variety of these are now being prepared so that any reasonable request can be filled.

Several requests have been received recently from hospitals for teletherapy sources of Co^{60}. Since the specific activity required of 10 to 50 curies per gram is higher than it is possible to obtain in the United States, such requests are being filled by the Canadian pile at Chalk River.

VIII. Activation Analyses:

1. Vinylite Resins were submitted by Carbide and Carbon Chemicals Division, UCC, on November 25, 1949. One set of these samples was submitted for analysis of cadmium and other trace metals, and one set for iron and other trace metals.

   Present Status: Preliminary results for cadmium indicate that less is present than indicated by standard methods. A recheck is being made.

2. Stainless Steel, Ni-Cr-Mo-W-Alloy, and Ferrous Material were submitted by Carbide and Carbon Chemicals Division, UCC, Niagara Falls, New York, on February 13, 1950.

   Present Status: Analysis of the ferrous material shows less calcium than expected. This is being rechecked.

VIII. Activation Analyses: - (Continued)

3. Magnesium Metal Alloys were submitted by Dow Chemical Company on December 22, 1949, for analysis for trace elements.

Present Status: Sodium analysis by Dow indicated .001% sodium. Activation Analysis indicates .0012% in good agreement. The amount of Sodium 24 formed by n,p reaction on magnesium is being rechecked. Calcium, barium, and strontium appear to be about the same as Dow's results indicated.

4. Germanium Samples were submitted by Bell Telephone Laboratories, Inc., Murray Hill, New Jersey, for analysis for trace elements.

Present Status: Presence of antimony in the germanium metal is being confirmed. Also the amount varies with relation to the end of the ingot. The highest concentration appears to be at the tip of the ingot.

Logan B. Emlet by [illegible]
Logan B. Emlet, Director
Operations Division

wp

[redacted]

IX. S-F Material Control:

1. During the month an additional twenty kilograms of highly enhanced uranium was received from Y-12 for use in fabricating uranium-aluminum washers for the Schenectady Area.

The rolling mill has completed all work on the first batch (ten kilograms of enriched uranium) except for stamping each disc. This material is stored in the 103 Vault pending receipt of the stamping machine.

2. There were 295.068 grams of separated U-233 shipped to Los Alamos on August 3, 1950. This material was extracted from Hanford-irradiated thorium and fulfills an Atomic Energy Commission request for approximately three hundred grams of U-233.

3. Surveys of SF material balance areas were continued by the SF Office. Seven persons possessing SF material were visited, and their material was visually inspected, and weighed where feasible. No apparent discrepancy was detected.

4. In connection with Item 5 in the July report, an official reply was issued regarding usage and inventory status of SF materials located at X-10.

This reply indicated that we could release one hundred grams of plutonium to production channels. We have in turn written the Atomic Energy Commission, Division of Research and Medicine, requesting authority to return this material. Shipment will be effected following receipt of instructions.

[redacted]

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

5. In extending our efforts to salvage and return to production channels various special materials, we accumulated and shipped 172.25 pounds of scrap beryllium to Brush Beryllium Company during August, 1950. Aside from eighty-six pounds of beryllium, which is believed to be contaminated with small amounts of uranium, the above-referenced shipment constitutes all the beryllium that we have which is not at present being used in a duly-authorized research program.

6. On August 14, 1950, the SF survey group from the Atomic Energy Commission, Oak Ridge Operations, SF Accountability Office began their quarterly SF survey at X-10. This survey consisted largely of an audit of records and a review of analytical procedures, along with a few spot-checks of material balance areas. For the most part, the survey centered around the audit of accounting records. This work was not completed until September 1, 1950. No discrepancies were encountered.

7. The records of three analytical laboratories were audited during the month. It was found that these records were in good order, and proper accounting had been made for all samples.

8. There were twenty-two shipments received and twenty-eight shipments made during the month, compared with twenty-two shipments received and eighteen shipments made last month. In addition, there were thirty-eight new material requests received and processed during August, 1950.

[redacted]

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

9. Following is a summary of receipts and shipments of SF materials for the month of August, 1950:

RECEIPTS

From	Material	Content	
Argonne National Lab.	Enriched Uranium as U_3O_8	.003	gm.
	Depleted Uranium as U_3O_8	.170	gm.
" " "	Irradiated U_3O_8	3.4	gm.
" " "	Thorium Metal	2.0	gm.
" " "	Thorium Oxide	1.0	gm.
" " "	Thorium (Ionium) Dioxide	107.779	gm.
" " "	Normal Uranium	2,320.00	gm.
Brookhaven National Lab.	Normal Uranium Foil	0.08	gm.
" " "	Thorium Fluoride	1.31	gm.
" " "	Normal Uranium Foil	0.08	gm.
" " "	Normal Uranium Foil	0.288	gm.
C&CCD, K-25 Area	Normal Uranium	23.0	gm.
" " "	Normal Uranium	223.0	gm.
" " "	Normal Uranium	1,999.0	gm.
" " "	Normal Uranium	85.0	gm.
C&CCD, Y-12 Area	Nickel Cylinders Plated with Enriched Uranium	113.6	mg.
" " "	Nickel Discs Plated with Enriched Uranium	0.0609	gm.
" " "	Nickel Cylinders Plated with Enriched Uranium	0.0098	gm.
" " "	Enriched Uranium	0.203	gm.
" " "	Depleted Uranium	0.509	gm.
" " "	Super Q Material (Depleted)	14.5985	gm.
General Electric Co., Hanford	Plutonium Solution	2.10	gm.
Fairchild Engine and Airplane Corporation	Normal Uranium	11.882	gm.
" "	Normal Uranium	2.623	gm.
Los Alamos Scientific Laboratory	PuO_2	5.20	gm.

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

9. Receipts and shipments for August, 1950.

SHIPMENTS

To	Material	Content	
Argonne National Lab.	U-233 Alpha Standard	35,750.0	c/m
" " "	U-233 Alpha Standard	32,650.0	c/m
" " "	NRX Slugs (Depleted)	7,257.62	gm.
		3.67	gm.Pu
" " "	Irradiated Thorium Metal	2.0	gm.
" " "	Irradiated ThO_2	1.0	gm.
Brookhaven National Lab.	Irradiated Uranium Foil	0.10	gm.
" " "	Irradiated Normal Uranium Dioxide	234.0	gm.
" " "	Irradiated Normal Uranium Foil	0.08	gm.
" " "	Irradiated Thorium Fluoride	1.11	gm.
" " "	Irradiated Normal Uranium Foil	0.078	gm.
C&CCD, K-25 Area	Irradiated Normal Uranium Buttons	23.00	gm.
" " "	Normal Uranium-UNH Solution	127.00	gm.
C&CCD, Y-12 Area	Normal Uranium Scrap	400,151.20	gm.
" " "	Nickel Cylinders Plated with Enriched Uranium	113.6	mg.
" " "	Enriched Uranium Metal	15.053	gm.
" " "	Thorium (Ionium) Dioxide	107.779	gm.
" " "	Normal Uranium	170.0	gm.
" " "	U-Al Alloy (Enriched)	0.48	gm.
" " "	U-Al Alloy (Enriched)	5.89810	gm.
" " "	Normal Uranium	85.0	gm.
" " "	U-233 Solution	.10	gm.
" " "	Solutions of Enriched Uranium	64.8810	gm.
" " "	Solutions of Enriched Uranium	34.4120	gm.
" " "	Normal Uranium	175.0	gm.
" " "	Solutions of Enriched Uranium	48.5860	gm.
Los Alamos Scientific Laboratory	U-233 in $UO_2(NO_3)_2$ Solution	303.904	gm.
General Electric Co., Schenectady	Irradiated X-Slugs (Depleted)	275,176.0	gm.
		3.090	gm.Pu
Tracerlab, Inc.	Irradiated Normal U_3O_8	0.3732	gm.