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OPERATIONS DIVISION MONTHLY REPORT

FOR

MONTH ENDING OCTOBER 31, 1953

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OPERATIONS DIVISION MONTHLY REPORT

for

Month Ending October 31, 1953

by
A. F. Rupp

DATE ISSUED

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OPERATIONS DIVISION MONTHLY REPORT

SUMMARY

The activities of the Operations Division for the month ending October 31, 1953 are summarized and indexed below:

1. Lost graphite reactor operating time averaged 5.6%, compared with 7.8% for the year to date (p. 3).
2. There was one ruptured slug during the month; the slug was one in which the metal was not beta transformed (p. 3).
3. The LITR down time was 13.5%, compared with 18.0% last month (p. 3).
4. The LITR continued to operate satisfactorily at 3000 kw (p. 3).
5. Difficulty was experienced in removing a plug section in the LITR. New procedures were developed, and some design changes are contemplated (p. 8).
6. The new I^{131} plant is 60% complete (p. 8).
7. Testing was completed on the semiworks facilities for separating fission products from waste (p. 8).
8. An improved method for final purification of Cs^{137} was developed (p. 10).
9. There were 1060 radioisotope shipments this month, compared with 942 during September (p. 12).
10. A total of 6.3 curies of beta activity was discharged to White Oak Creek; this was the lowest amount ever recorded for a one-month period (p. 12).

REACTOR OPERATIONS

Operating Data

	OCTOBER 1953	SEPTEMBER 1953	YEAR TO DATE 1953
ORNL Graphite Reactor			
Reactor power			
Total accumulated (kwhr)	2,587,962	2,496,497	25,286,174
Average kw/operating hr	3,687	3,726	3,757
Average kw/24-hr day	3,478	3,467	3,466
Lost time (%)	5.65	6.94	7.76
Excess reactivity (inhr)	139	135	
Slugs discharged	113	105	1,085
Slugs charged	95	105	1,010
Product made (g)	94.45	91.11	922.03
Product discharged (g)	6.17	2.03	31.00
Low-Intensity Test Reactor			
Reactor power			
Total accumulated (kwhr)	1,927,573	1,763,962	11,252,242
Average kw/operating hr	2,994	2,989	1,788
Average kw/24-hr day	2,591	2,450	1,542
Lost time (%)	13.5	18.0	13.8
Position of No. 2 shim rod (in. out)	20.382*	19.28	

*This corresponds to approximately 2.9% excess reactivity.

ORNL Graphite Reactor

A slug rupture (No. 125) was discovered on October 13 in channel 1670 after the slug had been in the reactor for 559 days at a temperature of about 151°C. This bonded slug was from batch 110, none of which were beta transformed; the slug was the twenty-third from the west end of the row.

One of the neutron chambers being used with the operating galvanometer was found not to be gamma compensated; the chamber will be removed soon.

A new channel, 1767, was set aside on October 5 for the production of radioiodine. The frequency of discharge of slugs for radioiodine had become so high that slugs were sometimes being removed when they had not been in the reactor for more than 40 days.

Hole 12 is now being operated as a general-purpose facility. A recent measurement of this facility has indicated a maximum thermal-neutron flux of 9×10^{11} neutrons/cm^2·sec.

A new Micarta container has been designed and tested for the channel 2079 pneumatic tube. This container is large enough to carry an aluminum isotope-irradiation can.

Two thermopiles which had previously gone out of service were removed, and other thermopiles were inserted. One of the latter proved to have a very small output and will probably be removed. This will leave five thermopiles in the reactor.

The usage of experimental facilities in the ORNL Graphite Reactor is shown in Table 1.

Low-Intensity Test Reactor

The LITR has continued to operate satisfactorily at a power of 3000 kw.

It has been possible to maintain sufficient reactivity by changing one fuel element every two weeks. The fuel elements being removed have a burnup of about 25%, including both fission and capture losses.

The reactor was down for approximately 35 hr on October 27 and 28 in order to test a new shim

TABLE 1. USAGE OF EXPERIMENTAL FACILITIES – ORNL GRAPHITE REACTOR

HOLE NUMBER AND ORIENTATION	DIMENSIONS (in.)	DIVISION ASSIGNED TO	PERSON IN CHARGE	TYPE OF EXPERIMENT OR USAGE
1, north and south	4 × 4			Regulating rod
2, north and south	4 × 4			Regulating rod
3, north and south	4 × 4	Operations	J. A. Cox	Sulfur exposure for radiophosphorus production
4, north and south	4 × 4	Operations	J. A. Cox	Miscellaneous exposures of special samples
5, north and south	4 × 4			Shim rod
6, north and south	4 × 4			Shim rod
7, vertical	4 × 4			Safety rod
8, vertical	4 × 4			Safety rod
9, vertical	4 × 4			Safety rod
10, vertical	4 × 4	Solid State	J. H. Crawford	Low-temperature sample-exposure facility (no samples during month)
11, vertical	4 × 4	Operations and Chemical Technology	J. P. McBride	Boron shot safety tube and HRP fuel studies (no samples during month)
12, vertical	4 × 4	Operations	J. A. Cox	General exposures of samples in water-cooled facility
13, north and south	4 × 4	Operations	J. A. Cox	Target exposures for radioisotopes and research
14, north and south	4 × 4	Operations	J. A. Cox	Target exposures for radioisotopes and research
15, north and south	4 × 4	Operations	J. A. Cox	Miscellaneous large-sample exposures
16, north and south	4 × 4	Operations	J. A. Cox	Target exposure for radioisotopes and research
17, north	4 × 4	Unassigned		Empty
17, south	4 × 4	Physics	E. O. Wollan	Neutron polarization
18, north and south	4 × 4	Operations	J. A. Cox	Miscellaneous large-sample exposures
19, north and south	4 × 4	Solid State	O. Sisman	Water-cooled exposure facility
20, north	4 × 4			Graphite temperature thermocouples
20, south	4 × 4	Solid State	J. C. Wilson	Creep of metals (no samples during month)
21, north and south	4 × 4	Operations	J. A. Cox	Sulfur exposure for radiophosphorus production

TABLE 1 (continued)

HOLE NUMBER AND ORIENTATION	DIMENSIONS (in.)	DIVISION ASSIGNED TO	PERSON IN CHARGE	TYPE OF EXPERIMENT OR USAGE
22, north	4 × 4	Unassigned		Empty
22, south	4 × 4	Operations	J. A. Cox	Two pneumotic tubes for general usage
30	9 × 9	Solid State (G.E.)	L. E. Stanford (G.E.)	Life tests of equipment in radiation (no tests during month)
31	9 × 9			Blocked by one end of air seal H beam across top of graphite
32	9 × 9			Contains chamber for high-power-level trip circuit
33	9 × 9			Contains chamber for high-power-level trip circuit
34	9 × 9			Contains chamber for No. 2 power-level galvanometer
35	9 × 9			Blocked by one end of air seal H beam across top of graphite
36	9 × 9			Contains chamber for high-power-level trip circuit
37	9 × 9	Training School	H. S. Pomerance	Contains chamber for reactor kinetics study
40	9 × 9			Contains chamber for No. 1 power-level galvanometer
41	6-in. dia			Rear wall suction pressure tap; hole into west plenum
42	6-in. dia			Unit pressure differential tap; hole into west plenum
43	6-in. dia			Unused (inaccessible); hole into west plenum
44	6-in. dia			Unused; hole into west plenum
45	6-in. dia			Gas discharge from hole 22 pneumatic tubes; hole into west plenum
46	6-in. dia			Used for viewing west end of graphite with periscope; vertical hole into west plenum

TABLE 1 (continued)

HOLE NUMBER AND ORIENTATION	DIMENSIONS (in.)	DIVISION ASSIGNED TO	PERSON IN CHARGE	TYPE OF EXPERIMENT OR USAGE
47	6-in. dia			Used for viewing west end of graphite with periscope; vertical hole into west plenum
50, north	4 × 4	Solid State	J. H. Crawford	General sample-exposure facility
50, south	4 × 4	Physics	E. O. Wollan	Neutron spectrometer
51, north	4 × 4	Solid State	J. H. Crawford	Water-cooled U^{235} neutron converter
51, south	4 × 4	Physics	C. G. Shull	Neutron spectrometer
52, north	4 × 4	Solid State	J. H. Crawford	Facility for exposing samples at the temperature of liquid nitrogen
53	4 × 4	Solid State (G.E.)	L. E. Stanford (G.E.)	Half-hole for miscellaneous large-sample exposures
54	4 × 4	Solid State (G.E.)	L. E. Stanford (G.E.)	Half-hole for miscellaneous large-sample exposures
55	4 × 4	Solid State (G.E.)	L. E. Stanford (G.E.)	Half-hole for miscellaneous large-sample exposures
56, north	4 × 4	Physics	E. C. Campbell	Fast pneumatic tube
56, south	4 × 4	Physics	H. S. Pomerance	Oscillator for measuring neutron absorption cross sections
57, north	4 × 4	Training School	H. S. Pomerance	General purpose neutron collimator
57, south	4 × 4	Physics	S. Bernstein	Neutron polarization
58, north	4 × 4	Solid State	O. Sisman	Circulating loops for Na and NaK
58, south	4 × 4	Chemistry	H. Levy	Neutron spectrometer
59	4 × 4	Unassigned		Half-hole; blocked by work at hole 17, south
60	4 × 4	Solid State	J. C. Wilson	Half-hole; transferred to Solid State during September 1953 (no samples during month)
61	4 × 4			Half-hole; general large-sample exposures
East animal tunnel				General exposures of large samples to low flux

TABLE 1 (continued)

HOLE NUMBER AND ORIENTATION	DIMENSIONS (in.)	DIVISION ASSIGNED TO	PERSON IN CHARGE	TYPE OF EXPERIMENT OR USAGE
West animal tunnel				General exposures of large samples to low flux
Thermal column		Physics		Used by several groups for low-level neutron flux work
Inclined animal tunnel in thermal column				Exposures of biological specimens
West core hole		Physics	E. P. Blizard	Lid tank for shielding studies
A	1.68-in. dia	Operations	E. E. Beauchamp	Charging-face hole containing 20 small cans of $CaCO_3$
B	1.68-in. dia	Solid State		Coaxial cable exposure
C	1.68-in. dia	Unassigned		Charging-face hole – empty
D	1.68-in. dia	Solid State		Charging-face hole
1768	1.75 in. square	Solid State	R. H. Kernohan	Charging hole containing neutron converter donut; used for general exposures of samples to fast-neutron flux
1867	1.75 in. square	Solid State	R. H. Kernohan	Charging hole containing neutron converter donut; used for general exposures of samples to fast-neutron flux
1968	1.75 in. square	Solid State	R. H. Kernohan	Charging hole containing neutron converter donut; used for general exposures of samples to fast-neutron flux
1069	1.5-in. dia	Unassigned		Charging hole containing an aluminum liner; used for general exposure of suitable samples
2079	1.5-in. dia	Operations	J. A. Cox	Charging hole containing pneumatic tube; used for exposure of research and radioisotope samples
0857, 0880, 1484, 1853, 2857, 2880				Charging-face holes containing boron-coated thermopiles for reactor instrumentation

TABLE 1 (continued)

HOLE NUMBER AND ORIENTATION	DIMENSIONS (in.)	DIVISION ASSIGNED TO	PERSON IN CHARGE	TYPE OF EXPERIMENT OR USAGE
Others				Seven uncharged peripheral holes contain $CaCO_3$ for radioisotope production; 409 uncharged peripheral holes remain unused

rod which has been designed. This shim rod has part of the stainless steel replaced by aluminum and appears to function satisfactorily, except that a conclusive test has not been obtained on the release time.

A plug in the 7-in. section of facility HB-2 stuck while being removed on October 6, and the removal tool did not function properly. It was therefore necessary to fabricate a special tool before the plug could be removed, and approximately 20 hr of operating time was lost. This removal, together with the shim-rod test noted above, was responsible for the rather high down time this month.

New procedures have been developed for inserting plugs in the horizontal beam holes, and a stainless steel liner will be installed as soon as possible in the HB-2 hole. This should make insertion and removal of plugs considerably simpler.

Temperatures taken with Tempilsticks inside cadmium in the magnesium rabbit were in the range from 225 to 275°F.

The usage of experimental facilities in the LITR is indicated in Table 2.

Filter House

Table 3 shows a comparison of the pressure drop across the exit air filters last month with the pressure drop this month and with that experienced with clean filters.

Fan House

The electrical cubicle on the No. 2 fan was checked during the month.

Irradiation Services

Stringers 13, 14, and 16 contained 198 cans of target material at the end of October, as compared with 195 cans of target material at the end of September.

Table 4 shows a comparison of the radioisotope and research samples charged into the ORNL Graphite Reactor during October with those handled in September.

RADIOISOTOPE PRODUCTION

In addition to 203 unprocessed units shipped directly after irradiation, the processed radioisotopes shown in Tables 5 and 6 were also produced. No unusual difficulties were encountered in radioisotope production work during October.

RADIOISOTOPE DEVELOPMENT WORK

New Iodine-131 Plant, Building 3028

The instrument panel board for the new I^{131} plant was installed, and work was started on connecting the various instruments. All piping associated with the two dissolvers were pressure-tested for leaks. The total installation is 60% complete; the revised construction schedule calls for completion by January 1, 1954.

Fission-Product Precipitation Process, Building 3515

Chemical test runs on the fission-product precipitation process were completed, and routine hot runs were started on October 29. The equipment performed satisfactorily during the test runs, and it is expected that operations will proceed smoothly, except for slow filtrations in the alkaline carbonate precipitation step caused by the excessive amount of iron in the Purex 1AW starting material.

TABLE 2. USAGE OF EXPERIMENTAL FACILITIES – LITR

FACILITY NUMBER	TYPE OF FACILITY	DIVISION ASSIGNED TO	PERSON IN CHARGE	TYPE OF EXPERIMENT OR USAGE
HB-1	6-in.-ID beam hole	Physics	E. D. Smith	Chopper-type neutron velocity selector
HB-2	6-in.-ID beam hole	Solid State (G.E.)	D. S. Billington	General exposures of large samples and loops
HB-3	6-in.-ID beam hole	Solid State	J. C. Wilson	Creep of metals
HB-4	6-in.-ID beam hole	Chemistry	G. H. Jenks	
HB-5	6-in.-ID beam hole	Chemistry	H. F. McDuffie	HRP fuel stability and corrosion tests
HB-6	6-in.-ID beam hole	Chemistry	H. F. McDuffie	HRP fuel stability and corrosion tests
HR-1	Pneumatic tube	Operations	J. A. Cox	General short exposures of research and radio-isotope samples
HR-2	Pneumatic tube	Operations	J. A. Cox	General short exposures of research and radio-isotope samples
C-28	Hollow fuel element in core	Solid State	T. H. Blewitt	Exposure of metal crystals to high, fast flux
C-38	Hollow fuel element in core	Solid State	J. B. Trice	Exposure of specimens for flux determination methods
C-42	Hollow Be core piece with access tube from top plug	Solid State (G.E.)	L. E. Stanford (G.E.)	Exposure of miscellaneous small specimens
C-44	Hollow Be core piece with access tube from top plug	Chemistry	H. F. McDuffie	Empty
C-46	Hollow Be core piece with access tube from top plug	Solid State	G. W. Keilholtz	ANP fuel tests
C-48	Hollow Be core piece with access tube from top plug	Solid State	G. W. Keilholtz	ANP fuel tests
C-49	Be core piece with four vertical holes	Operations	J. A. Cox	Exposures of research and radioisotope samples
C-53	Mg tray in core space	Operations	J. A. Cox	Exposures of research and radioisotope samples
C-56	Mg tray in core space	Operations	J. A. Cox	Exposures of research and radioisotope samples
V-1	Inclined low-flux hole			Contains boron-coated thermopile for reactor instrumentation

TABLE 2 (continued)

FACILITY NUMBER	TYPE OF FACILITY	DIVISION ASSIGNED TO	PERSON IN CHARGE	TYPE OF EXPERIMENT OR USAGE
V-2	Inclined low-flux hole	Analytical Chemistry	G. W. Leddicotte	Exposure facility for activation analyses
V-3	Inclined low-flux hole	Unassigned		Empty
V-4	Inclined low-flux hole	Unassigned		Empty

TABLE 3. PRESSURE-DROP DATA

	PRESSURE DROP (in. water gage)		
	Glass Wool	CWS No. 6	Total Across House
10/31/53	2.7	2.9	6.5
9/30/53	2.8	2.5	6.4
Clean filters	1.1	1.3	3.3

TABLE 4. RADIOISOTOPE AND RESEARCH SAMPLES

	OCTOBER 1953		SEPTEMBER 1953	
	Research	Radioisotopes	Research	Radioisotopes
Stringers 13, 14, 16	2	164	10	133
Hole 22	37	0	40	10
All other holes	12	38	4	22
Total by groups	51	202	54	165
Total for month	253		219	

Multikilocurie Loading Cell, Building 3029

Design criteria and specifications for a remote manipulator cell, in which hot sources with strengths up to 10,000 curies of Co^{60} can be handled, were drawn up and forwarded to the Engineering Department. The preliminary proposal for this project was submitted to the AEC.

Carbon-14 (5720 y)

Work continued on the examination of C^{14} gas obtained in the Be_3N_2 process. After the separation of methane, the balance of the gas was burned to CO_2 and absorbed in LiOH. Approximately 80 mc of C^{14} was obtained with an isotopic abundance of 36%; this material will be retained for research purposes.

Cesium-137 (37 y)

Equipment for the final purification of Cs^{137} was completed, and test runs were made. It was demonstrated that $Al(OH)_3$ could be precipitated in granular form by passing air saturated with ammonia vapor through the solution. Sulfate removal on IRA-410 anion-exchange resin is also

TABLE 5. RADIOISOTOPES PRODUCED DURING OCTOBER

PRODUCT	SOURCE	AMOUNT (mc)	SPECIFIC ACTIVITY (mc/g)
Arsenic-73,74 (76 d, 17.5 d)	86-in. cyclotron	27.5	Carrier-free
Barium-140 (12.8 d)	Hanford metal	2.5	Carrier-free
Beryllium-7 (53 d)	86-in. cyclotron	123	Carrier-free
Calcium-45 (152 d)	Graphite Reactor irradiation	540	3.8
Carbon-14 (5720 y)	Hanford irradiation	908	1,070
		755	1,280
Cerium-141,144 (28 d, 275 d)	Hanford metal	67	Carrier-free
Chromium-51 (26.5 d)	LITR irradiation	2,090	2,570
Iodine-131 (8 d)	Graphite Reactor metal	66,765	Carrier-free
Iron-59 (46.3 d)	LITR irradiation	60	4,220
Phosphorus-32 (14.3 d)	Graphite Reactor irradiation	17,905	40,000
Ruthenium-106 (1 y)	Hanford metal	839	26,000
Ruthenium-103 (42 d)	Hanford metal	133	62,000
Sodium-24 (14.9 h)	LITR irradiation	1,900	2,900
Strontium-89 (53 d)	Hanford metal	114	Carrier-free
Tungsten-185 (73.2 d)	LITR irradiation	485	466
Yttrium-91 (57 d)	Hanford metal	240	Carrier-free

TABLE 6. SPECIAL PREPARATIONS

	NUMBER	TOTAL AMOUNT (mc)
Co^{60} sources	28	787,000
Cs^{137} source	1	100
Sr^{90} source	1	1
Tl^{204} sources	2	1
H^3-Zr targets	3	4,380
A^{37} ampoules	5	6
He^3 ampoules	7	17 cc

feasible at relatively high influent flow rates, and radiation damage to the resin can therefore be kept to a minimum. Cesium purification is accomplished by repeated crystallization of cesium and ammonium alum, and these two procedures will allow the removal of the main chemical carriers, Al^{+++} and SO_4^{--}. The effluent from the anion exchanger contains only CsOH and NH_4OH, from which the NH_4^+ is easily removed by distillation of NH_3. Ten batches of approximately 200 curies each will be processed during the period from November to February.

Miscellaneous

Work was started on the completion of the Building 3029 fission-product cell associated with the new iodine plant. Process flow sheets were revised, and the equipment specifications were prepared.

Strontium-90 purification equipment was decontaminated, and a new, mercury-cathode electrolytic cell was installed to improve the removal of traces of heavy metals.

Among the Co^{60} sources loaded this month was the 425-curie teletherapy source encapsulated for the ORINS Medical Division. A number of special tools were designed to accomplish this loading, which proceeded uneventfully.

A total of 5370 mc of Ru^{106} has been prepared for the Chemical Technology Division and will be used in Thorex experimental work.

RADIOISOTOPE SALES

Radioisotope shipments made during October 1953 are compared in Table 7 with those made during September 1953 and October 1952. A breakdown according to separated and unseparated material (including totals for August 1946 through October 1953) and for project, nonproject, and foreign shipments is also shown.

RADIOACTIVE-WASTE DISPOSAL

A total of 31,200 gal of chemical-waste concentrate bearing 802 curies of beta activity was transferred from waste-tank W-8 to chemical-waste storage pit No. 2. The total transferred to date is 236,400 gal containing 7951 curies of beta activity.

The installation of a flow-measuring and proportional-sampling device at manhole No. 190 of the process-waste system which services buildings 4500, 4501, 4505, and 5500 is under way. The movement of the flow-measurement and sampling device from manhole No. 3 to manhole No. 22 of the process-waste system at the southeast corner of Building 3019 is in progress.

The installation of the diversion boxes as a replacement for valve group No. 1 in the north tank farm is well under way. The boxes have been set and the concrete has been poured around them.

New corrosion coupons have been received for tank WC-5. They were installed on October 19 and were suspended by means of chemically inert plastic tape, which will prevent the loss that has occurred in the past. The analysis of the tank WC-5 contents revealed nothing of a specific corrosive nature that would cause failure of the suspending stainless steel cable and bring about the past difficulty of losing the corrosion coupons into the tank.

A shipment of waste was received from Argonne National Laboratory. Sixteen black-iron drums and their contents of contaminated solvents were buried, and the contents of two pots were jetted to chemical-waste tank W-5.

The Cottrell precipitator was shut down for 1¼ hr to allow the installation of a solution-addition line for the purpose of decontaminating the water-collection basin.

A total of 6.30 curies of beta activity was discharged to White Oak Creek from the settling basin and the retention pond (see Table 8); this discharge is 55% of that of last month and is one of the lowest discharges ever encountered for a one-month period.

The waste evaporator was shut down for 94 hr because of the low volume of waste entering the chemical-waste system. Evaporator operation is shown in Table 9; waste-tank inventory is shown in Table 10.

TABLE 7. RADIOISOTOPE SHIPMENTS

	OCTOBER 1953	SEPTEMBER 1953	OCTOBER 1952	AUGUST 1946 THROUGH OCTOBER 1953
Separated material	857	777	715	39,116
Unseparated material	203	165	165	10,457
Total	1060	942	880	49,573
Nonproject	931	825	769	
Project	105	97	93	
Foreign	24	20	18	
Total	1060	942	880	

TABLE 8. ACTIVITY DISCHARGED TO WHITE OAK CREEK

DISCHARGED FROM	OCTOBER 1953		SEPTEMBER 1953	
	Gallons	Beta Curies	Gallons	Beta Curies
Settling basin	18,744,000	5.71	20,258,000	10.69
Retention pond	326,000	0.59	347,000	0.68
Total	19,070,000	6.30	20,605,000	11.37

TABLE 9. WASTE-EVAPORATOR OPERATION

MONTH	SOLUTION FED TO EVAPORATOR (gal)	CONCENTRATE TO W-6 (gal)	VOLUME REDUCTION	BETA CURIES TO EVAPORATOR	BETA CURIES TO SETTLING BASIN
October 1953	188,358	23,304	8.08:1	2071	0.46
September 1953	174,717	16,087	10.86:1	6611	0.11

TABLE 10. WASTE-TANK INVENTORY

TANKS	CAPACITY (gal)	FREE SPACE (gal)	
		October 1953	September 1953
Hot-Pilot-Plant Storage			
W-3, 13, 14, 15	48,500	32,020	32,500
Chemical-Waste Storage			
W-5	170,000	100,400	74,000
Evaporator-Concentrate Storage			
W-6, 8	340,000	101,800	102,500
Metal-Waste Storage			
W-4, 7, 9, 10	543,000	310,000	313,000

MISCELLANEOUS OPERATIONS

Water Demineralization

A comparison of the amount of water demineralized during October and September is given below:

	October 1953	September 1953
Water demineralized (gal)	459,000	423,060

Hanford Irradiations

The following radioisotope samples, which were discharged during October, were received from Hanford on October 19.

Sample Number	Material	Number of Pieces
ORNL-141	Samarium	1
ORNL-142	Samarium	1

Cyclotron Radioisotopes

No cyclotron targets were received during the month.

Activation Analyses

A total of 135 requests for information concerning activation analyses has been received; 52 have developed into requests for analyses, 42 of which have been completed.

RaLa (Ba^{140} – 12.5 d)

Reinsulation of the RaLa charging-head air heater, filter, and attached piping with material especially recommended for high-temperature operation did not reduce the heat loss sufficiently to provide the proper temperature of air to the charging heads. The difficulty was eliminated by installing three clam-shell-type, 230-volt electrical heaters on the pipe on the inlet side of the filter. Several successful drying tests have been made, and the drying equipment is considered to be in operating condition.

A prerun check was made of all process equipment, and all necessary repairs were made. All equipment is considered to be ready for the next run, which is scheduled to start on November 6, 1953.

SF MATERIAL CONTROL

Four shipments consisting of a total of 111 drums containing UNH solutions of depleted uranium were sent to Carbide and Carbon Chemicals Company, Y-12, during the month. The total uranium content of the 111 drums was 9434 kg. These shipments, numbered 28 through 31, were of uranium recovered under the Metal Recovery Program, and make a total of 70,007 kg shipped to date.

During October, 15 fuel assemblies and 2 shim safety-control rods were shipped to the Phillips Petroleum Company, Scoville, Idaho. This makes a total of 560 fuel assemblies and 58 control rods shipped to date.

Twenty-two modified MTR fuel assemblies and 36 U-Al alloy plates containing 3.45 kg of U^{235} were shipped to Argonne National Laboratory, Lemont, Illinois.

Five pieces of highly enriched uranium metal foil containing a total of 20.33 g of U^{235} were shipped to the University of California Radiation Laboratory, Livermore, California.

On October 6, 30 enriched uranium Convair fuel assemblies, 3 enriched uranium special assemblies, and 4 enriched uranium shim safety-control rods were shipped to Consolidated Vultee Aircraft Corporation, Fort Worth, Texas; these pieces contained a total of 4.70 kg of U^{235}.

Metal containing 1.09 kg of U^{235} in a form suitable for fabricating LITR assemblies was received from Y-12 during the month.

During October, the SF Accountability Control Office completed and submitted the Laboratory's estimated basic and special quota requirements for CY 1954 and a special report on the estimated quantities of fissionable materials to be diverted from production channels during FY 1954.

Work was continued on the *SF Procedures Manual*, Volume 1. Sections 1 through 3, and 5 through 8 have been completed in rough draft form and were submitted for editing. Issuance of Section 4, "Measurement Procedure," will likely be delayed beyond November 15.

SF surveys during the month consisted in auditing the records of three analytical laboratories. Results of the audit disclosed that all records were in good order and proper accounting had been made for all samples.

During October, there were 21 receipts and 29 outgoing shipments, compared with 22 receipts and 37 shipments last month. Tables 11 and 12 are summaries of receipts and shipments for October.

TABLE 11. SF MATERIALS RECEIVED

FROM	MATERIAL	NUMBER OF SHIPMENTS	AMOUNT (g)
Battelle Memorial Institute, BMI	Thorium	1	2,030.00
Carbide and Carbon Chemicals Co., Y-12, CYT	Enriched uranium	4	1,225.97
	Thorium	1	2,112.00
	Plutonium	1	Negligible
	Normal uranium	5	2,418.00
General Electric Co., AGT	Enriched uranium	2	1.32
General Electric Co., HGE	Normal uranium	1	14,347.00
North American Aviation, Inc., DNA	Normal uranium	3	145.00
Phillips Petroleum Co., MTI	Enriched uranium	1	0.16
University of Arkansas	Normal uranium	1	0.20
	Enriched uranium		0.006
USAEC, New Brunswick Laboratory, NYL	Thorium	1	2,000.00

TABLE 12. SF MATERIALS SHIPPED

TO	MATERIAL	NUMBER OF SHIPMENTS	AMOUNT (g)
Argonne National Laboratory, ANL	Enriched uranium	4	3,455.31
Carbide and Carbon Chemicals Co., K-25, CCC	Depleted uranium	1	233.70
Carbide and Carbon Chemicals Co., Y-12, CYT	Depleted uranium	5	9,434,106.20
	Enriched uranium	2	7.42
	Plutonium	1	Negligible
	Normal uranium	1	4,475.11
Consolidated Vultee Aircraft Corp. (Convair)	Enriched uranium	1	4,698.10
General Electric Co., SGE	Enriched uranium	1	1.05
Iowa State College, ISC	Normal uranium	1	126.70
Naval Radiological Defense Laboratory, NHP	Normal uranium	1	1.28
North American Aviation, Inc., DNA	Normal uranium	3	266.00
Phillips Petroleum Co., MTI	Enriched uranium	4	2,785.54
University of California Radiation Laboratory, LAB	Enriched uranium	1	20.33
USAEC, New Brunswick Laboratory, NBL	Thorium	1	2,000.00
USAEC, Oak Ridge Operations Office, CPA	Normal uranium	1	0.20
	Enriched uranium		0.006
Westinghouse Electric Corp., WEM	Normal uranium	1	63.00