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OPERATIONS DIVISION MONTHLY REPORT

FOR MONTH ENDING MAY 31, 1954

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OPERATIONS DIVISION MONTHLY REPORT

for

Month Ending May 31, 1954

by

A. F. Rupp

DATE ISSUED

JUL 27 1954

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OPERATIONS DIVISION MONTHLY REPORT

REACTOR OPERATIONS

ORNL Graphite Reactor

No slug ruptures were found during May. Approximately eight months have elapsed since the last rupture was found (October 12, 1953). This is the longest period without any ruptures since a similar period in 1944–1945. It is believed that the absence of ruptures is due to reducing the thermal shock to the slugs during startup. Operating data are given in Table 1.

The underwater slug cutter in the canal has been reinstalled and is now powered with an air motor. The cutting speed was too low until a 2-in. exhaust line was added, but it now appears to be satisfactory. Some trouble is still being encountered in breaking the cutting wheels during installation or when feeding the slug into the cutter.

The design of the canal demineralizer addition was completed and installation has begun.

The canal has become very crowded because of the need for storing Thorex slugs. To remedy this, one of the LITR fuel-element boxes has been removed so that another slug bin can be put into the canal. Some cleanup work has been done, but the press of slug-cutting and work of higher priority limit the amount of working time which can be given to cleaning operations.

The spare 900-hp motor which was removed from the No. 2 fan position on April 26 has been disassembled and the armature decontaminated. The manufacturer, Allis-Chalmers, has been asked whether it will be possible to repair the armature alone or whether it will be necessary to return the whole motor to the factory. In the latter event, it may be necessary to remove all the stator windings, since they probably cannot be decontaminated.

Table 2 shows a comparison of the pressure drop across the exit air filters last month with that experienced this month and with clean filters.

The usage of experimental facilities in the ORNL Graphite Reactor is shown in Table 3.

TABLE 1. REACTOR DATA

	ORNL GRAPHITE REACTOR			LITR		
	May 1954	April 1954	Year to Date	May 1954	April 1954	Year to Date
Total energy, Mwd	105.3	101.0	515.0	84.1	77.0	402.3
Average power/operating hr, kw	3629	3632	3667	3000	3000	2998
Average power/24-hr day, kw	3396	3367	3411	2712	2566	2665
Lost time, %	6.4	7.3	7.0	9.6	16.9	11.1
Excess reactivity	73 inhr	87 inhr		3.2%	2.8%	
Fuel pieces charged	72	80	445	2	3	9
Fuel pieces discharged	72	89	613	2	3	9
Research samples	57	78	386	18	5	37
Radioisotope samples	206	228	1097	15	18	103

TABLE 2. PRESSURE-DROP DATA

	PRESSURE DROP (in. water gage)		
	Glass Wool	CWS No. 6	Total Across House
5-31-54	2.1	3.4	6.8
4-30-54	3.0	3.3	7.5
Clean filters	1.1	1.3	3.3

[redacted]

TABLE 3. 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, 2, north and south	4 × 4			Regulating rods
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, 6, north and south	4 × 4			Shim rods
7, 8, 9, vertical	4 × 4			Safety rods
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, 14, north and south	4 × 4	Operations	J. A. Cox	Target exposures for radioisotopes and research
15, north	4 × 4	Solid State (G.E.)	L. E. Stanford (G.E.)	Miscellaneous large-sample exposures
15, south	4 × 4	Operations	J. A. Cox	Miscellaneous large-sample exposures
16, north and south	4 × 4	Operations	J. A. Cox	Target exposures 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
22, north	4 × 4	Solid State (G.E.)		Ionization-chamber tests
22, south	4 × 4	Operations	J. A. Cox	Two pneumatic 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, 33	9 × 9			Contain 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

TABLE 3. (continued)

HOLE NUMBER AND ORIENTATION	DIMENSIONS (in.)	DIVISION ASSIGNED TO	PERSON IN CHARGE	TYPE OF EXPERIMENT OR USAGE
36	9 × 9			Contains chamber for high-power-level trip circuit
37	9 × 9			Test facility for ionization chambers
40	9 × 9			Contains chamber for No. 1 power-level galvanometer
41	6-in. dia			Rear wall suction-pressure tap; hole into discharge manifold
42	6-in. dia			Unit pressure differential tap; hole into discharge manifold
43	6-in. dia			Unused (inaccessible); hole into discharge manifold
44	6-in. dia			Unused; hole into discharge manifold
45	6-in. dia			Gas discharge from hole 22 pneumatic tubes; hole into discharge manifold
46, 47	6-in. dia			Used for viewing west end of graphite with periscope; vertical holes into discharge manifold
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 liquid-nitrogen temperatures
52, south	4 × 4	Physics	L. D. Roberts	Low-temperature work
53, 54, 55	4 × 4	Solid State (G.E.)	L. E. Stanford (G.E.)	Half-holes 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	Unassigned		Empty
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 for creep of metals (no samples during month)
61	4 × 4	Operations	J. A. Cox	Half-hole for miscellaneous large-sample exposures
East and west animal tunnels				General exposures of large samples to low flux

TABLE 3. (continued)

HOLE NUMBER AND ORIENTATION	DIMENSIONS (in.)	DIVISION ASSIGNED TO	PERSON IN CHARGE	TYPE OF EXPERIMENT OR USAGE
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	Unassigned		Charging-face hole; empty
C, D	1.68-in. dia	Solid State	J. C. Pigg	Charging-face holes; insulation test
1069	1.5-in. dia	Unassigned		Charging hole containing an aluminum liner; used for general exposure of suitable samples
1768, 1867, 1968	1.75 in. square	Solid State	R. H. Kernohan	Charging holes containing neutron converter donut; used for general exposures of samples to fast-neutron flux
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
Others				Seven uncharged peripheral holes contain $CaCO_3$ for radioisotope production; 409 uncharged peripheral holes remain unused

Low-Intensity Test Reactor

The down time was somewhat high in May because a large number of shutdowns, as shown below, were required for experiments.

	May	April
Unscheduled shutdowns for operational reasons, hr	2.334	2.583
Regular operational shutdowns, hr	45.266	53.150
Special shutdowns for research, hr	23.833	48.317

Operating data for the LITR are given in Table 1.

The new resin column was received early in May but has not yet been installed because of a shortage of pipefitters.

On May 27 a new, intermittent servo-controller was installed on the No. 3 shim rod by the Reactor Control Department to test this type of controller and compare it with the continuous servo now used at the LITR. So far, the new controller seems to be satisfactory, although it is somewhat more erratic than the continuous servo.

Work is almost complete on installation of the ANP circulating-fuel loop in hole HB-2. It is planned to have a five-day shutdown early in June to complete installation. At hole HB-4 the homogeneous reactor test loop was inserted, but a rubber seal stuck badly. The design of this gasket will be revised before the loop is inserted.

The usage of experimental facilities in the LITR is given in Table 4.

TABLE 4. 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. C. 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	Experiment being prepared
HB-5	6-in.-ID beam hole	Chemistry	C. H. Secoy	HRP fuel stability and corrosion tests (no tests during month)
HB-6	6-in.-ID beam hole	Chemistry	C. H. Secoy	HRP fuel stability and corrosion tests
HR-1, 2	Pneumatic tubes	Operations	J. A. Cox	General short exposures of research and radioisotope 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	C. H. Secoy	Uranium exposures by J. Halperin
C-46, 48	Hollow Be core pieces with access tube from top plug	Solid State	G. W. Keilholtz	ANP fuel tests (no tests during month)
C-49	Be core piece with four vertical holes	Operations	J. A. Cox	Exposures of research and radioisotope samples
C-53, 56	Mg trays 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
V-2	Inclined low-flux hole	Analytical Chemistry	G. W. Leddicotte	Exposure facility for activation analyses
V-3, 4	Inclined low-flux holes	Unossigned		Empty

RADIOISOTOPE PRODUCTION AND SALES

Data on processed and unprocessed radioisotope production are given in Tables 5 and 6. Operations were normal during the month and there were no unusual incidents.

Special radioisotopes that were prepared during May are listed in Table 7.

A summary of radioisotope shipments is given in Table 8.

RADIOISOTOPE DEVELOPMENT

Iodine-131 Equipment Installation

Work continued on the installation and testing of equipment in the finishing cell and the analytical

TABLE 5. PROCESSED RADIOISOTOPE PRODUCTION DURING MAY

PRODUCT	SOURCE	AMOUNT (mc)	SPECIFIC ACTIVITY (mc/g)
Antimony-124	W irradiation	803	1,180
Barium-133	Graphite Reactor irradiation	4.2	0.27
Cerium-144	Scrup waste	157	20,000
Iodine-131	Graphite Reactor metal	43,298	No carrier added
Iodine-131	W metal	46,689	No carrier added
Manganese-54	ORNL 86-in. cyclotron	4.0	No carrier added
Mercury-203	W irradiation	3,072	351
Phosphorus-32	Graphite Reactor irradiation	10,672	40,000
Sodium-24	LITR irradiation	1,268	2,900
Silver-110	W irradiation	1,200	1,970
Strontium-89	LITR irradiation	364	4.0
Sulfur-35	W irradiation	3,300	No carrier added
Tungsten-185	W irradiation	424	480
Zinc-65	W irradiation	12,800	1,330
Zirconium-95–Niobium-95	W metal	3,038	No carrier added

TABLE 6. UNPROCESSED RADIOISOTOPE PRODUCTION DURING MAY

PRODUCT	UNITS
Service irradiations	56
Arsenic-76	1
Bromine-82	12
Copper-64	2
Europium-152, -154	1
Gold-198	48
Gold-199	1
Hafnium-181	1
Iodine-131	4
Iridium-192	6
Mercury-197	1
Mercury-203	1
Molybdenum-99	1
Phosphorus-32	17
Potassium-42	11
Rhenium-186	1
Rubidium-86	4
Selenium-75	2
Silver-111	5
Sodium-24	24
Tantalum-182	1
Tungsten-185	1
Yttrium-90	1
Total	202

TABLE 7. SPECIAL RADIOISOTOPE PREPARATIONS DURING MAY

	NUMBER	TOTAL AMOUNT (curies)
Co^{60} sources	252	728
Ir^{192} sources	13	178
Cs^{137} sources	18	15*
H^3 ampoules	19	18.68
Kr^{85} ampoules	4	4

*Millicuries.

cubicle of the new iodine plant. Operations on a limited basis will be started June 15.

Loading Cell, Building 3029

Working drawings were completed for the construction of the multikilocurie loading cell. The high-density glass for the window was received, but one piece was rejected because of flaws in the glass and was returned to the manufacturer. The model 8 manipulators to be used in this cell will be delivered August 15.

An increase of $35,000 (in the final estimate) to the preliminary cost estimate has necessitated a

TABLE 8. RADIOISOTOPE SHIPMENTS

	MAY 1954	APRIL 1954	MAY 1953	AUGUST 1946 THROUGH MAY 1954
Separated material	846	882	809	45,139
Unseparated material	207	213	180	11,913
Total	1053	1095	989	57,052
Nonproject	954	973	885	
Project	87	106	78	
Foreign	12	16	26	
Total	1053	1095	989	

reappraisal of the project. As much equipment and as many features as possible will be deleted from the project, and a request for additional funds will be initiated.

Absorption of Cs^{137} and Ce^{144} Gamma Rays

Pellets of CsCl and CeO_2, 1 cm in diameter, were made by hydraulic-pressing at a pressure of 50,000 psi. The gamma-ray absorption of various thicknesses of the pressed materials was measured by determining the attenuation of well-collimated beams of gamma rays from Cs^{137} and Ce^{144} sources through various layers of pellets. Beta particles were absorbed in aluminum; the radiation was measured with a G-M tube and recording count-rate meter. The absorption coefficient for Cs^{137} gammas in pressed CsCl (density 3.89 g/cu cm) was found to be 0.3 cm^{-1}; this is in fair agreement with the calculated value.

The value obtained for the absorption of Ce^{144} gammas in pressed CeO_2 (density 4.27 g/cu cm) was 22 cm^{-1}. This result indicates that the gamma radiation of Ce^{144} may be too soft to allow fabrication of practical kilocurie Ce^{144} sources for industrial use. It also points up the fact that Ce^{144} radiation would be almost completely absorbed in the unrefined gross fission products which have been proposed by many workers for use as industrial gamma-ray sources.

Composition of Fission-Product Cesium

Fission-product $Cs^{137}Cl$, from which the recently reported 1540-curie teletherapy source was made, was analyzed by the Mass Spectrometer Laboratory for isotopic composition, with the following results:

Cs^{133}	43.37%
Cs^{134}	0.05%
Cs^{135}	20.11%
Cs^{137}	36.53%

Only traces of rubidium and potassium were found. Calculations were made from the known specific activity and the above isotopic composition to obtain a value for the half life of Cs^{137} (now variously reported as 33 to 37 years) of about 30 years. Further analyses of other batches of Cs^{137} will be made as they become available so as to check this result. However, present evidence indicates strongly that the half life is closer to 30 years than to 37 years.

Another interesting point found in this investigation is that the neutron capture cross section of the fission-product 10^6-year Cs^{135} (to form 13.7-day Cs^{136}) is probably high, since the relative amount of Cs^{135} present in the fission-product mixture is lower than was predicted.

Both the shorter half life of Cs^{137} and the burnup of Cs^{135} are advantageous in producing Cs^{137} products of high specific activity.

The absence of potassium and rubidium in the final product indicates that in the final purification steps the relatively large amount of cesium present tends to promote the formation of very pure cesium alum crystals; potassium and rubidium pass into the wastes which are reworked.

Cesium Process Development

Operations were temporarily closed down in the fission-product pilot plant; 1050 curies of Cs^{137} product was removed and put into underground storage. The concentration of this product was 0.6 curie/ml; the Cs:Rb:K ratio, determined spectrographically, was 10:5:<1.

The cell was decontaminated to permit about ½ hr of working time, which is sufficient to allow the necessary minor repairs to be made.

Studies continued on processes to dissolve the cesium ferrocyanide sludge which will be obtained from Hanford. The most attractive procedure investigated so far is alkaline oxidation with 0.1 *M* sodium peroxide solution, which oxidizes the ferrocyanide to ferricyanide; the ferricyanide is then precipitated as cupric ferricyanide, and about 90% of the cesium is allowed to remain in the supernatant liquid. The supernatant liquid can then be acidified and the cesium recovered by the alum process.

Small Cesium Sources

Techniques were developed for pressing pellets of $Cs^{137}Cl$ in sizes as small as 5 curies. The pellets are sealed in double stainless steel capsules closed by silver-brazing in which high-frequency induction heating is used.

Eight stainless steel needles were filled with Cs^{137} so that there was 1 mc of Cs^{137} per centimeter of length. The needles were sealed by silver-brazing and were sent to the University of Texas for medical research work.

Argon-37

Six curies of A^{37} was produced by irradiation of CaO in the LITR; the material was purified and will be used by the Physics Division.

Boron Evaporation

Equipment for evaporating boron and depositing it in very thin films was designed and is being constructed. The equipment will be used for experiments to be conducted by the Physics Division.

Experiments with 3-M Ion Exchanger

Experiments were continued with 3-M inorganic ion-exchange material to determine its operating characteristics, particularly with cesium. The 3-M exchanger was converted to the ammonium form, and the break-through point was determined by adding Cs^{137} containing known amounts of cesium to a 2.3-ml bed of exchanger at a flow rate of 2.3 ml/min until activity was detected in the effluent. The following amounts of cesium were held on the column: at 1 *N* acid, 0.037 meq; at 0.5 *N* acid, 0.05 meq; at 0.1 *N* acid, 0.15 meq; at pH 2.9, 1.85 meq; at pH 3.1, 1.75 meq; at pH 9.6, 2.12 meq.

Several equilibrium batch tests that were made by contacting the 3-M exchanger with solutions of cesium aluminum sulfate indicated that cesium can be recovered directly with about 80% efficiency if the solution is kept adjusted to pH 5.

Cyclotron Target Yields

A test target of sodium was irradiated for 48 hr with protons in the 86-in. cyclotron to produce low-specific-activity Na^{22}. A yield of 44.5 mc of Na^{22} with a specific activity of 6 mc per gram of sodium was obtained. This isotope preparation will be made routinely, since it can be sold more cheaply than carrier-free Na^{22}.

A test target of magnesium irradiated for 12.9 hr with protons in the 86-in. cyclotron yielded 6.3 mc of Na^{22}, carrier-free.

RADIOACTIVE-WASTE DISPOSAL

A total of 24.6 curies of beta activity was discharged to White Oak Creek from the settling basin and the retention pond (see Table 9). This discharge is 38% greater than that of last month and 69% of the average per month in 1953. The increase over last month was due, in part, to the radioactive spill and subsequent decontamination of Building 3026; decontamination of Building 3515 hot cell, decontamination of a highly contaminated I^{131} vacuum pot, and the jetting of water from a contaminated jet pit to the process waste system also contributed to the increased activity.

The trailer used to haul contaminated wastes was removed from service twice for emergency repairs because of leakage. The replacement trailers are at the shops awaiting alterations.

The black-iron drain line from the waste trailer unloading area to the waste storage pit was completely destroyed by low-pH wastes. The drain line was replaced with one made of terra cotta.

The pumping station in the line from the tank farm to chemical-waste storage pit No. 2 is essentially complete. Some minor work remains to be performed before the project is accepted for use.

The equipment has been tested and meets the manufacturer's specifications.

The stainless steel monitoring tank which will replace concrete monitoring tanks W-1 and W-2 is also nearing completion.

It was necessary once more to replace both fan-shaft bearings and pillow blocks on the electric-powered, hot off-gas blower because of a bearing failure. The present installation is operating satisfactorily.

The north fan shaft bearing of the hood and cell exhaust fan serving the Radioisotope Area failed because of a broken oil ring. This bearing has been satisfactorily repaired.

A total of 22,613 gal of waste contaminated with natural uranium was transferred to chemical-waste storage pit No. 2. Of this amount, 4420 gal of $Al(NO_3)_3$ was received from Unit Operations, Building 4505, and 18,193 gal of NH_4NO_3 from metal recovery operations, Building 3505.

Operating data for the waste evaporator are given in Table 10.

MISCELLANEOUS OPERATIONS

Water Demineralization

The No. 1 cation column in the demineralized-water plant was found to have developed a very high resistance to flow. It was opened on May 18, and the resin was found to contain several layers of a jelly-like substance, which, upon closer examination, proved to be broken particles of resin. This fine material was removed by backwashing out the top of the bed; during this process about 10 cu ft of resin out of a total of 55 cu ft was lost. When the remaining resin was inspected under a microscope, it was found to contain a large number of cracked particles which, it is assumed, will gradually break up and cause further trouble. The manufacturer will be asked to make an adjustment, since the resin has been in service only two years.

Table 11 shows the number of regenerations and the average amount of water passed through each unit during April and May. A total of 321,240 gal of water was demineralized in May, compared with 263,280 gal in April.

TABLE 9. ACTIVITY DISCHARGED TO WHITE OAK CREEK

DISCHARGED FROM	MAY 1954		AVERAGE PER MONTH, YEAR TO DATE		AVERAGE PER MONTH, 1953	
	Gallons	Beta Curies	Gallons	Beta Curies	Gallons	Beta Curies
Settling basin	16,580,000	23.0	14,920,000	16.0	19,450,000	24.1
Retention pond	470,000	1.6	590,000	1.8	500,000	11.7
Total	17,050,000	24.6	15,510,000	17.8	19,950,000	35.8

TABLE 10. WASTE-EVAPORATOR OPERATION

	SOLUTION FED TO EVAPORATOR (gal)	CONCENTRATE PRODUCED (gal)	VOLUME REDUCTION	BETA CURIES IN FEED	BETA CURIES IN CONDENSATE
May 1954	158,900	4,800	33.1:1	18,600	0.93
Average per month, year to date	150,900	8,600	17.5:1	12,900	0.45
Average per month, 1953	188,300	18,100	10.4:1	12,300	1.62

[redacted]

TABLE 11. AVERAGE AMOUNTS OF WATER PASSED THROUGH REGENERATION UNITS DURING APRIL AND MAY

UNIT	NUMBER OF REGENERATIONS		AMOUNT OF WATER THROUGH EACH UNIT (gal)	
	May	April	May	April
No. 1 cation	3	3	78,400	63,000
No. 2 cation	4	4	62,450	51,225
No. 1 anion	9	6	15,811	19,550
No. 2 anion	11	7	25,727	32,383

Hydrogen Liquefaction

Nine liters of liquid hydrogen was produced in two runs in May, with a trial batch of "yellow dot" hydrogen used as feed material. Production by the use of this material was, apparently, only slightly more than that by the use of the hydrogen previously obtained from Stores. However, it will have to be used for several more runs before a decision can be made concerning the best type of feed material to use. A new hydrogen liquefier is being constructed according to designs obtained from The Johns Hopkins University. Several months will probably be required to complete the fabrication.

Activation Analyses

A total of 166 requests for information concerning activation analyses has been received; 63 have developed into requests for analyses, 42 of which have been completed.

RALA – SF MATERIAL CONTROL

The material which has been included in the Operations Division Monthly Report on Rala and Source-Fissionable Material Accounting has been discontinued. Rala summary reports will be given in the bimonthly ORNL Status Report; data on SF accounting are given adequately in special reports. It is hoped that with these deletions the Operations Division Monthly Report can generally be issued with a security classification lower than that previously used.

[redacted]