ORNL/TM-6367

Radioisotope Distribution Program Progress Report for March 1978

E. Lamb

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OAK RIDGE NATIONAL LABORATORY
OPERATED BY UNION CARBIDE CORPORATION · FOR THE DEPARTMENT OF ENERGY

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OPERATIONS DIVISION

RADIOISOTOPE DISTRIBUTION PROGRAM PROGRESS REPORT FOR MARCH 1978

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E. Lamb

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OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee 37830
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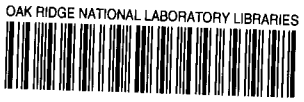

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RADIOISOTOPE DISTRIBUTION PROGRAM
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SUMMARY

Information is reported on new production, inventory status, operational problems, and radioisotope sales.

RADIOISOTOPE PRODUCTION AND MATERIALS

REACTOR-PRODUCED RADIOISOTOPES

Reactor Products Production (*R. W. Schaich*)
(Production and Inventory Accounts)

Processed Units	
Radioisotope	Amount (mCi)
Calcium-47	23

Iridium-192 Production (*R. W. Schaich*)

Four customer irradiation units and six ORNL HFIR units (RB) containing 63,000 curies of iridium-192 at HFIR discharge date were processed during the month of March 1978. Thirteen shipments containing 89,000 curies of iridium-192 were made during this period.

Other GETR Products and Services (*E. Lamb*)

Further study on the production of 600 curies of molybdenum-99 weekly by irradiating molybdenum targets in the HFIR indicates that this production rate is not feasible because of the 23-day HFIR cycle and the space limitation in the hydraulic tube. The ORR hydraulic tube, although much lower in flux, may be capable of approaching a production rate of 600 curies/week. We have prepared a sample of molybdenum metal for a test irradiation in the ORR hydraulic tube early in April.

We received authorization from DOE/ORO to initiate the irradiation of sufficient nickel-62 to produce 20 curies of nickel-63 with a specific activity of approximately 12 curies/gram. The entire inventory (2.8 g) of 96.4% nickel-62 was purchased, 0.5 g was inserted in the HFIR hydraulic tube in a flux of 2×10^{15} n/cm^2•sec for the fastest production ($\sim$4 mos), and 2.3 g was inserted in an RB position in a flux of 1×10^{15} n/cm^2•sec during the March 28 shutdown.

We received an inquiry from the General Electric Vallecitos Nuclear Center concerning the supply of 210 curies of xenon-133 per week by ORNL. We replied that we can supply, but we have received no order.

An inquiry from India regarding the supply of carbon-14 by ORNL was received and was transmitted to ORO for approval.

The General Electric Vallecitos Nuclear Center has indicated there is sufficient iron-55 in their inventory to supply at the current rate of demand through CY 1978. Assuming GETR resumes operation in June, they will have sufficient reactor production by the end of the year. Their stock of mercury-203 is almost depleted and their stock of thallium-204 is depleted.

ACCELERATOR-PRODUCED ISOTOPES

Cyclotron Service Irradiations (*M. R. Skidmore*) (Production and Inventory Accounts)

March 1978 ORNL 86-Inch Cyclotron runs for ORNL and non-ORNL programs are given in Table 1.

Table 1. Cyclotron Irradiations and Runs for March 1978

Date	Customer	Product	Target	Total Time (hr:min)	Total Charges
		ORNL Programs			
3-14-78	ORAU	Carbon-11	Boron Oxide	3:15	$ 515
		Non-ORNL Programs			
2-16-78	New England Nuclear	Cobalt-57	Nickel-58	31:15	6,005
3- 2-78	New England Nuclear	Germanium-68	Gallium	15:15	2,579
3- 6-78	New England Nuclear	Gallium-67	Zinc-68	25:15	3,980
3-13-78	New England Nuclear	Gallium-67	Zinc-68	28:30	4,468
3-14-78	New England Nuclear	Gallium-67	Zinc-68	36:45	5,705
				137:00	$22,737
		Isotopes Sales Inventory			
3- 9-78	Isotopes Sales Dept.	Cobalt-57	Nickel	51:15	$ 8,956

Recently operations have been plagued with RF instabilities. On March 3rd the F134 oscillator tube, which had 3,300 hours of operating time, was changed. However, changing the oscillator tube did not improve the RF instabilities. After struggling through four more runs, operations were stopped on March 22nd for maintenance of the machine. The dees and liner were found to be extremely dirty.

FISSION PRODUCTS

Krypton-85 Enrichment Facility (*R. W. Schaich*)

All krypton-85 enrichment columns were inoperative during the month of March due to the power shortage. All units and systems have been placed in a standby mode.

Cesium-137 Pilot Production (*R. W. Schaich*)
(Production and Inventory Accounts)

1. Process Status

The ^{137}Cs processing equipment has been placed in standby status.

2. Operational Summary

Product Inventory

(Decay calculated through August 31, 1977)

Inventory Material	Amount (Ci)
Cesium-137 chloride powder	29,680
Total Inventory Material	29,680

Non-Inventory Material	Amount (Ci)
Special Form Cans	4,200
Material returned or stored for customer	
Nuclear Research Corporation	0
J. L. Shepherd	40,600
New England Nuclear Corporation	2,300
Puerto Rico Sources	7,900
Lockheed	19,600
AECL powder	38,100
Radiation Resources	19,800
Minn. Mining & Mfg. Company	2,800
Gamma Industries	8,400
Total Non-Inventory Material	143,700
TOTAL INVENTORY AND NON-INVENTORY MATERIAL	173,380

Fabrication Summary

	Mar. 1978		CY 1978		FY 1978	
	No.	Ci	No.	Ci	No.	Ci
Sources						
Fabricated	22	33,500	25	43,500	25	43,500
Shipped	22	33,500	25	43,500	25	43,500
Special Form Cans						
Fabricated	0	0	0	0	1	5
Shipped	0	0	3	300	7	500

3. Current Orders

All orders on hand have been completed and the material placed into storage awaiting receipt of release for the material.

Strontium-90 Pilot Production (*R. W. Schaich*)
(Production and Inventory Accounts)

1. Process Status

The ^{90}Sr source fabrication equipment has been placed in standby status.

Product Inventory

(Decay calculated through August 31, 1977)

Inventory Material	Amount (Ci)
^{90}Sr titanate powder (±5%)	0
Sources in fabrication	0
Stock powder cans	3,095
Stock solution	200
Total Inventory Material	3,295

Non-Inventory Material	Amount (Ci)
New England Nuclear Corporation	230
Batch 26Sr-74RE	7,900
Calorimeter Standards	4,800
Weather Bureau source	11,400
SNAP-7B	156,300
SNAP-7C	24,600
SNAP-7D	143,000
SNAP material purchase[a]	248,300
AGN-4 Powder	38,400
Total Non-Inventory Material	634,930
TOTAL INVENTORY AND NON-INVENTORY MATERIAL	638,225

[a]Strontium-90 purchased under DRRD program.

Fabrication Summary

	Mar. 1978		CY 1978		FY 1978	
	No.	Ci	No.	Ci	No.	Ci
Sources						
Fabricated	0	0	0	0	0	0
Shipped	0	0	0	0	0	0
Special Form Cans						
Fabricated	0	0	0	0	0	0
Shipped	0	0	0	0	0	0

Short-Lived Fission Product Production (*R. W. Schaich*) (Production and Inventory Accounts)

The production of short-lived fission products is listed in the table below.

Isotope	Number of Batches	Amount (Ci)
Ruthenium-103	1	30
Xenon-133	5	3000
Zirconium-95/Niobium-95	1	35

RADIOISOTOPE SALES

J. E. Ratledge

Shipments made during the month that may be of interest are listed below:

Customer	Isotope	Amount
Large Quantities		
New England Nuclear Corporation	Tritium	10,000 Ci
American Atomics	Tritium	110,000 Ci
Merz & Benteli Nuclear, Switzerland	Tritium	30,000 Ci
Radiochemical Centre, Ltd., England	Tritium	60,000 Ci
Saunders-Roe Developments, England	Tritium	30,000 Ci
Self-Powered Lighting, Ltd.	Tritium	3,000 Ci
U.S. Radium Corporation	Tritium	10,000 Ci
Withdrawn Items		
Mine Safety Appliances Company	Iodine-131	150 mCi
Gamma Industries	Iridium-192	6,372 Ci
Industrial Nuclear Company	Iridium-192	2,365 Ci
Automation Industries	Iridium-192	10,196 Ci
Technical Operations, Inc.	Iridium-192	31,357 Ci
Source Production & Equipment Company	Iridium-192	11,151 Ci
Gulf Nuclear, Inc.	Iridium-192	5,285 Ci

Customer	Isotope	Amount
Items Used in Cooperative Programs		
VA Data Processing Center	Platinum-195m	15 mCi
Mary Hitchcock Memorial Hospital	Platinum-195m	∿5 mCi
University of Southern California	Platinum-195m	10 mCi
National Institutes of Health	Potassium-43	1 mCi
University of Mississippi Medical Ctr.	Potassium-43	3 mCi

The radioisotope sales and shipments for the first five months of fiscal year 1977 and fiscal year 1978 are given in Table 2.

Table 2. Radioisotope Sales and Shipments

Item	10-1-76 thru 3-31-77	10-1-77 thru 3-31-78
Inventory items	$ 187,402	$ 67,792
Tritium		604,810
Major products	57,602	258,962
Iridium-192		365,716
Radioisotope services	131,251	178,772
Cyclotron irradiations	170,551	165,165
Miscellaneous processed materials	35,492	96,444
Packing and shipping	99,419	104,125
Total	$ 681,717	$1,841,786
Number of shipments	1,255	1,252

PUBLICATIONS

REPORTS

E. Lamb, *Radioisotope Distribution Program Progress Report for February 1978*, ORNL/TM-6348, Oak Ridge National Laboratory (April 1978).

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INTERNAL DISTRIBUTION

1. F. N. Case
2. W. R. Casto
3. J. A. Cox
4. R. F. Hibbs
5. E. Lamb
6. H. H. Nichol
7. C. L. Ottinger
8. J. K. Poggenburg
9. H. Postma
10. M. E. Ramsey
11. J. E. Ratledge
12. C. R. Richmond
13. R. W. Schaich
14. M. R. Skidmore
15. M. J. Skinner
16-17. Central Research Library
18-19. Laboratory Records Department
20. Laboratory Records - RC
21. Document Reference Section

EXTERNAL DISTRIBUTION

22. B. J. Dropesky, LASL, Los Alamos, New Mexico
23-24. J. H. Jarrett, PNL, Richland Washington
25. D. K. Jones, Richland Operations Office, Richland, Washington
26. J. N. Maddox, DOE-DBER, Washington, D.C.
27. H. A. O'Brien, LASL, Los Alamos, New Mexico
28. F. J. Skozen (Krizek), Argonne Cancer Research Hospital, Chicago
29. L. G. Stang, Jr., BNL, New York
30. W. H. Weyzen, DOE-DBER, Washington, D.C.
31-32. R. W. Wood, DOE-DBER, Washington, D.C.
33. Donner Laboratory Library, Univ. of California, Berkeley, Calif., 94720
34. Research and Technical Support Division, ORO
35-36. Technical Information Center