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OAK RIDGE NATIONAL LABORATORY

UNION CARBIDE

Radioisotope Department Progress Report for December 1979

E. Lamb

[redacted]

OPERATED BY
UNION CARBIDE CORPORATION
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

ORNL/TM-7252

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RADIOISOTOPE DEPARTMENT PROGRESS REPORT FOR DECEMBER 1979

E. Lamb

Work Sponsored by
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OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee 37830
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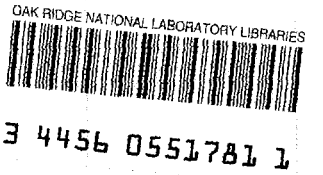

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Information is reported on new production inventory status, operational problems, and radioisotope sales.

RADIOISOTOPE PRODUCTION AND MATERIALS

Reactor Products Production *(R. W. Schaich)*

Processed Units	
Radioisotope	Amount (Ci)
Calcium-47	18

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

Two customer irradiation units and nine ORNL HFIR units (RB) containing 87,000 Ci of ^{192}Ir at HFIR discharge date were processed during the month of December 1979. Eleven shipments containing 67,000 Ci of ^{192}Ir were made during this period. Eight test units from the ORR were processed for irradiation data.

Cyclotron Service Irradiations *(M. R. Skidmore)*

During December 1979 the ORNL 86-Inch Cyclotron operated 5:25 hours for ORNL and Oak Ridge DOE Programs for total charges of $823.

The entire month, except for the one carbon-11 run, was spent repairing the Cyclotron.

Cesium-137 Production *(R. W. Schaich)*

Twenty teletherapy units (36,000 Ci) are in fabrication for AECL for delivery in February 1980. The ^{137}CsCl product inventory follows.

Product Inventory

(Decay calculated through January 1, 1980)

Inventory Material	Amount (Ci)
Cesium-137 chloride powder	8,470
Total Inventory Material	8,470
Non-Inventory Material	
Reject pellets and sources	9,000
Special form cans	13,500
Material returned or stored for customer	
J. L. Shepherd	60,200
Gulf Nuclear	1,400
Puerto Rico Sources	7,500
Lockheed	18,600
AECL powder	50,000
Radiation Resources	12,300
Gamma Industries	7,900
Minn. Mining & Mfg. Co.	9,800
Isomedix (estimated)	50,000
Total Non-Inventory Material	240,200
TOTAL INVENTORY AND NON-INVENTORY MATERIAL	248,670

Fabrication Summary

	Dec. 1979		CY 1979		FY 1980	
	No.	Ci	No.	Ci	No.	Ci
Sources						
Fabricated	0	0	50	82,980	0	0
Shipped	0	0	51	84,980	21	37,700
Special Form Cans						
Fabricated	0	0	0	0	0	0
Shipped	1	100	14	3,115	4	305

Strontium-90 Production *(R. W. Schaich)*

The status of ^{90}Sr is given in the table which follows.

Product Inventory

(Decay calculated through August 31, 1979)

Inventory Material	Amount (Ci)
Stock powder cans	2,800
Stock solution	170
Total Inventory Material	2,970
Non-Inventory Material	
^{90}Sr fluoride	68,500
New England Nuclear Corporation	170
Calorimeter Standards	3,800
Weather Bureau Source	10,800
SNAP-7B	148,800
SNAP-7C	23,400
SNAP-7D	136,100
SNAP material purchase	123,600
Total Non-Inventory Material	515,170
TOTAL INVENTORY AND NON-INVENTORY MATERIAL	518,140

Fabrication Summary

	Dec. 1979		CY 1979		FY 1979	
	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	3	80	1	50

Short-Lived Fission Production *(H. Bailey)*

The Short-Lived Fission Product Facility operated normally during the report period. The production of ^{133}Xe has been deleted by the DOE as of December 15, 1979, and minor fission products will be produced semi-annually in the future. The following products were made available for shipment:

Isotope	Number of Batches	Amount (Ci)
Xenon-133	1	740
Yttrium-91	1	13
Zirconium-95/Niobium-95	1	21
Strontium-89	1	17
Barium-140	1	20
Ruthenium-103	1	25

Krypton Enrichment Facility (J. R. DeVore)

The north bank of ^{85}Kr Thermal Diffusion Columns (TDC) remains shut down as an energy conservation measure. During this report period, leak testing and repairs were continued on the north bank to place it in operation if additional capacity is required in the future. The unloading of the south bank of TDC has been delayed until January 1980 due to manpower shortage.

The design of the enriched ^{85}Kr storage and sampling system is scheduled for completion in January 1980.

Tritium Operations *(J. R. DeVore)*

Fabrication of the new tritium hood system is scheduled for completion in January 1980. Installation of the system should be completed by April 1980.

Fourteen gas cylinders and eight nonreturnable containers were loaded with 56,400 Ci of tritium for shipment to customers.

Krypton-85 Operations *(J. R. DeVore)*

The shipments of normal ^{85}Kr (<5%) continued to increase during 1979. In December, 20 gas cylinders were loaded with 703 Ci of normal ^{85}Kr and shipped to customers. The ^{85}Kr (normal and enriched) product inventory follows.

Product Inventory

(Decay calculated through January 1, 1980)

Inventory Material	Amount (Ci)
Normal krypton-85 (<4.5%)	2,250
Enriched krypton-85	
10 to 20%	450
31%	640
49%	480
Total Inventory Material	3,820
Non-Inventory Material	
Normal krypton-85 (<4.5%)	18,200
Enriched krypton-85 (<10%)	970
Sandia Laboratory	4,480
Total Non-Inventory Material	23,650
TOTAL INVENTORY AND NON-INVENTORY MATERIAL	27,470

Packing and Shipping *(R. D. Johnston)*

One hundred and sixty-four packages were processed and shipped during the reporting period. The total weight shipped was 28,300 kg.

Radioactive Solid Shipments	Radioactive Gas Shipments	Radioactive Liquid Shipments	Empty Containers	Total
68	58	36	2	164

Alpha Handling Facility *(R. D. Johnston)*

Eight packages of ^{242}Pu material were prepared for shipment containing a total of 1.7 g ^{242}Pu.

Miscellaneous *(R. W. Schaich)*

The fabrication of 23 new containers for use in the ^{85}Kr and tritium business is approximately 90% complete. Delivery has been delayed again due to the vendor's inability to weld valves on the cylinders. ORNL may have to perform this operation.

Fabrication of a new tritium cylinder decontamination station was completed in the Plant and Equipment shops. Installation of this station has been delayed until February 1980 due to lack of manpower.

ISOTOPE SALES

J. E. Ratledge

Significant sales of radioisotopes and non-EM stable isotopes made this month are shown in Table 1.

Table 1. Radioisotope and non-EM stable isotope selected data

Customer	Isotope	Quantity
Large Quantities		
New England Nuclear	Tritium	8,000 Ci
Radiochemical Centre	Tritium	20,000 Ci
Self-Powered Lighting	Tritium	10,000 Ci
U.S. Radium Corporation	Tritium	7,500 Ci
Airco Industrial Gas	Krypton-85	150 Ci
Cryogenic Rare Gas Labs, Inc.	Krypton-85	50 Ci
Texas Instruments	Krypton-85	75 Ci
Trio Tech Int'l	Krypton-85	250 Ci
New England Nuclear	Phosphorus-33	120 mCi
The Harshaw Chemical Company	Lithium-6	9,000 g
Withdrawn Items		
American Hoechst Corporation	Tin-133	340 mCi
New England Nuclear	Tin-119m	150 mCi
Mallinckrodt Nuclear	Selenium-75	4 Ci

Unusual orders and requests received this month were as follows:

Customer	Item
Atomic Energy Company of Canada, Ltd.	(1) Order placed for 20 cesium-137 sources (36,000 Ci)
General Electric Company (Vallecitos Nuclear)	(1) Quotation for bulk cobalt-60 (300,000 Ci)
Brandhurst Co., Ltd.	(1) Order placed for 750,000 Ci tritium
ICN	(1) Quotation for carbon-14 (15-20 Ci)
University of Maryland	(1) Order placed for tritium target (containing 3,000 Ci)

Customer	Item
Measurex Corporation	(1) Orders placed for 400 Ci krypton-85 gas (48% enrichment) and 400 Ci krypton-85 gas (30% enrichment)
J. L. Shepherd & Associates	(1) Order placed for 14 cesium-37 sources (27,200 Ci)

Sales of all isotopes and services in December totaled $636,344, distributed as shown below:

	Revenue	No. of Shipments
Radioisotopes	$354,332	142
Non-EM stable isotopes	14,308	33
EM stable isotopes	135,281	155
Heavy elements	132,423	21
Total	$636,344	351

Visitors during December were as follows:

Name	Organization	Subject
Bob Heinrich	Argonne National Laboratory	To arrange shipment of BSR service irradiations

A comparison of FY 1980 sales to date with the comparable period in FY 1979 is given in Table 2.

Table 2. Isotope sales summary

Item	Revenue 10/1/78 - 12/31/78	Revenue 10/1/79 - 12/31/79
Radioisotopes		
Tritium	$ 574,826	$172,535
Other inventory items	100,910	61,843
Iridium-192	74,609	424,954
Other major products	95,092	71,949
Miscellaneous products	3,796	1,491
86-Inch Cyclotron	100,272	127,863
Packing & Shipping	45,710	42,950
Other services	133,810	88,087
Total	$1,129,025	$991,672
Non-EM Stable Isotopes		
Boron-10 and 11	$ 20,327	$ 180
Lithium-6 and 7	7,051	18,814
Services	10,750	4,350
Total	$ 38,128	$ 23,344
EM Stable Isotopes		
Products	$ 750,122	$313,866
Services	58,559	58,825
Total	$ 808,681	$377,692
Heavy Elements		
Products	$ 888,777	$226,644
Services	140,695	38,940
Total	$1,029,472	$265,584

PUBLICATIONS

Reports

E. Lamb, *Radioisotope Department Progress Report for November 1979*, ORNL/TM-7216 (in press).

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