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# Radioisotope Distribution Program Progress Report for April 1978

E. Lamb



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OPERATIONS DIVISION

RADIOISOTOPE DISTRIBUTION PROGRAM  
PROGRESS REPORT FOR APRIL 1978

Date Published - June, 1978

E. Lamb

Work Sponsored by  
DOE Division of Biomedical and  
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RADIOISOTOPE DISTRIBUTION PROGRAM  
PROGRESS REPORT FOR APRIL 1978

*E. Lamb*

SUMMARY

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

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RADIOISOTOPE PRODUCTION AND MATERIALS

REACTOR-PRODUCED RADIOISOTOPES

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

<u>Processed Units</u>	
<u>Radioisotope</u>	<u>Amount (mCi)</u>
Calcium-47	17

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

Three customer irradiation units and eleven ORNL HFIR units (RB) containing 87,000 curies of iridium-192 at HFIR discharge date were processed during the month of April 1978. Fourteen shipments containing 96,900 curies of iridium-192 were made during this period.

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

ORO approval was given to provide a quotation to India for 10 curies of  $^{14}\text{C}$  at \$3.00/Ci. AECL has requested price and delivery for 100 and 200 curie lots of  $^{14}\text{C}$ . Both New England Nuclear Corporation and General Electric Company have requested information concerning our supply of  $^{14}\text{C}$ , but neither has asked for a formal quotation. The present inventory of  $^{14}\text{C}$  at ORNL is 350.4 curies, of which 233.6 curies is 85% or higher in  $^{14}\text{C}$  and 116.8 curies is less than 85%, ranging down to 54%.

The test irradiation of molybdenum metal in the ORR hydraulic tube for six days resulted in a specific activity of 2.5 Ci/g of molybdenum at discharge. Based on this yield in the high flux position of the tube, the average yield would be  $\sim 2.0$  Ci/g at discharge. The production rate of  $^{99}\text{Mo}$  (1 week irradiation) would be 300 Ci/week in each ORR hydraulic tube on the basis of 30 grams of molybdenum metal per target capsule. The five hydraulic tubes in the ORR give a potential production rate at discharge of  $\sim 1500$  Ci/week of  $^{99}\text{Mo}$  based on the irradiation of metal. This maximum production rate may be

reduced by 50% by limitations on the weight of material that can be irradiated in each target. We have received inquiries from General Electric Company for the irradiation of MoO<sub>3</sub> targets and from Medipysics for the irradiation of molybdenum targets.

#### ACCELERATOR-PRODUCED ISOTOPES

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

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

Table 1. Cyclotron Irradiations and Runs for April 1978

Date	Customer	Product	Target	Total Time (hr:min)	Total Charges
<u>ORNL Programs</u>					
4-20-78	ORAU	Carbon-11	Boron Oxide	6:15	\$ 745
<u>Non-ORNL Programs</u>					
4-27-78	New England Nuclear	Cobalt-57	Nickel-58	51:15	\$ 8,835

The dees were pulled and transported to the dry dock where repairs and cleaning were done. The walls of the liner were cleaned and the dees reinstalled. Operations were restarted on April 20th.

#### FISSION PRODUCTS

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

The south bank of the <sup>85</sup>Kr thermal diffusion columns was loaded with enriched material (~9%) and placed in operation this month. The north bank will be emptied, leak tested and repaired during the month of May, 1978. If no major repairs are required the north bank should be operable in June, 1978.

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

##### 1. Process Status

The <sup>137</sup>Cs processing equipment has been placed in standby status.

## 2. Operational Summary

Product Inventory

(Decay calculated through August 31, 1977)

<u>Inventory Material</u>	<u>Amount (Ci)</u>
Cesium-137 chloride powder	<u>29,680</u>
<u>Total Inventory Material</u>	<u>29,680</u>
<u>Non-Inventory Material</u>	<u>Amount (Ci)</u>
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	0
Gamma Industries	<u>8,400</u>
<u>Total Non-Inventory Material</u>	<u>140,900</u>
TOTAL INVENTORY AND NON-INVENTORY MATERIAL	170,580

Fabrication Summary

	<u>Apr. 1978</u>		<u>CY 1978</u>		<u>FY 1978</u>	
	<u>No.</u>	<u>Ci</u>	<u>No.</u>	<u>Ci</u>	<u>No.</u>	<u>Ci</u>
Sources						
Fabricated	14	32,600	39	76,100	39	76,100
Shipped	0	0	25	43,500	25	43,500
Special Form Cans						
Fabricated	0	0	0	0	1	5
Shipped	2	1,900	5	2,200	9	2,400

## 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. Schleich*)  
(Production and Inventory Accounts)

1. Process Status

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

Product Inventory

(Decay calculated through August 31, 1977)

<u>Inventory Material</u>	<u>Amount (Ci)</u>
$^{90}\text{Sr}$ titanate powder ( $\pm 5\%$ )	0
Sources in fabrication	0
Stock powder cans	3,095
Stock solution	<u>200</u>
<u>Total Inventory Material</u>	<u>3,295</u>

<u>Non-Inventory Material</u>	<u>Amount (Ci)</u>
New England Nuclear Corporation	225
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 <sup>a</sup>	248,300
AGN-4 Powder	<u>38,400</u>
<u>Total Non-Inventory Material</u>	<u>634,925</u>

TOTAL INVENTORY AND NON-INVENTORY MATERIAL 638,220

<sup>a</sup>Strontium-90 purchased under DRRD program.

Fabrication Summary

	<u>Apr. 1978</u>		<u>CY 1978</u>		<u>FY 1978</u>	
	<u>No.</u>	<u>Ci</u>	<u>No.</u>	<u>Ci</u>	<u>No.</u>	<u>Ci</u>
Sources						
Fabricated	0	0	0	0	0	0
Shipped	0	0	0	0	0	0
Special Form Cans						
Fabricated	6	40	6	40	6	40
Shipped	1	5	1	5	1	5

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.

<u>Isotope</u>	<u>Number of Batches</u>	<u>Amount (Ci)</u>
Barium-140	1	1
Cerium-141	1	17
Cerium-144	1	43
Iodine-131	2	70
Strontium-89	1	43
Yttrium-91	1	18
Xenon-133	4	2300

RADIOISOTOPE SALES

*J. E. Ratledge*

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

<u>Customer</u>	<u>Isotope</u>	<u>Amount</u>
<u>Large Quantities</u>		
New England Nuclear Corporation	Tritium	10,000 Ci
Merz & Benteli Nuclear, Switzerland	Tritium	30,000 Ci
Radium-Chemie, Ltd., Switzerland	Tritium	45,000 Ci
ICN Pharmaceuticals	Tritium	1,500 Ci
Radiochemical Centre, Ltd., England	Tritium	60,000 Ci
University of California, LLL	Tritium	6,443 Ci
American Atomics	Tritium	100,000 Ci
Self-Powered Lighting, Ltd.	Tritium	6,000 Ci
Becton-Dickinson Immunodiagnostics	Tritium	1,000 Ci
Brandhurst Co., Ltd., England	Tritium	15,000 Ci
<u>Withdrawn Items</u>		
Gulf Nuclear	Iridium-192	5,337 Ci
Gamma Industries	Iridium-192	6,935 Ci
Industrial Nuclear Co.	Iridium-192	5,065 Ci
Technical Operations	Iridium-192	30,355 Ci
Source Production and Equipment Co.	Iridium-192	6,141 Ci
Automation Industries	Iridium-192	6,447 Ci
<u>Items Used in Cooperative Programs</u>		
University of Southern California	Platinum-195m	10 mCi
University of Arizona	Platinum-195m	~5 mCi

The radioisotope sales and shipments for the first six 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 4-30-77	10-1-77 thru 4-30-78
Inventory items	\$ 228,089	\$ 79,563
Tritium		809,630
Major products	66,878	315,038
Iridium-192		455,151
Radioisotope Services	137,245	185,988
Cyclotron irradiations	170,551	167,117
Miscellaneous processed materials	41,265	104,649
Packing and shipping	<u>114,434</u>	<u>124,635</u>
Total	\$ 758,462	\$2,241,771
Number of shipments	1,441	1,491

#### PUBLICATIONS

##### REPORTS

E. Lamb, *Radioisotope Distribution Program Progress Report for March 1978*, ORNL/TM-6367, Oak Ridge National Laboratory (April 1978).

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