



# Radioisotope Distribution Program Progress Report for March 1976

E. Lamb

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OPERATIONS DIVISION

RADIOISOTOPE DISTRIBUTION PROGRAM  
PROGRESS REPORT FOR MARCH 1976

E. Lamb

Work Sponsored by  
ERDA Division of Biomedical and  
Environmental Research

JUNE 1976

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RADIOISOTOPE DISTRIBUTION PROGRAM  
PROGRESS REPORT FOR MARCH 1976

*E. Lamb*

RADIOISOTOPE PRODUCTION AND MATERIALS DEVELOPMENT

REACTOR-PRODUCED RADIOISOTOPES

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

Processed Units	
Radioisotope	Amount (mCi)
Calcium-47	27

ACCELERATOR-PRODUCED ISOTOPES

Cyclotron Products Pilot Production (*M. R. Skidmore*)  
(Production and Inventory Accounts)

March 1976 ORNL 86-Inch Cyclotron runs for ORNL and non-ORNL programs are given in Table 1.

Table 1. Cyclotron Irradiations and Runs for March 1976

Date	Customer	Product	Target	Total Time (hr:min)	Total Charges
<u>ORNL Programs</u>					
3- 1-76	ORAU	Carbon-11	Boron Oxide	4:00	\$ 387
3- 1-76	ORAU	Carbon-11	Boron Oxide	4:00	387
3- 2-76	ORAU	Carbon-11	Boron Oxide	8:00	767
3- 8-76	ORAU	Carbon-11	Boron Oxide	8:00	767
3- 8-76	Operations Div.	Thulium-167	Erbium-168 Oxide	5:15	511
3-15-76	ORAU	Carbon-11	Boron Oxide	7:30	1,201
3-16-76	ORAU	Carbon-11	Boron Oxide	7:30	1,651
3-22-76	ORAU	Carbon-11	Boron Oxide	7:30	901
3-29-76	ORAU	Carbon-11	Boron Oxide	<u>7:30</u>	<u>900</u>
				59:15	\$ 7,472
<u>Non-ORNL Programs</u>					
3- 1-76	Lovelace Biomedical & Env. Res.	Yttrium-88	Strontium Carbonate	9:15	\$ 1,377
3- 6-76	New England Nuclear	Germanium-68	Gallium	13:15	2,093
3- 6-76	New England Nuclear	Germanium-68	Gallium	13:15	2,288
3-12-76	New England Nuclear	Cobalt-57	Nickel-58	51:15	9,100
3-19-76	ICN Pharmaceuticals	Arsenic-74	Germanium	<u>7:15</u>	<u>1,353</u>
				94:15	\$16,211

### Cyclotron Operations

Two beam locations were made during the month. Two interruptions of operations occurred this month. A short was indicated in the d.c. ion source supply line. The short was found between the shunt lead on the source line and the conduit carrying the shunt wire. The conduit had been bent during the installation of the fire sprinkler system. The insulation on the shunt lead had worn through and shorted the lead to the conduit. The pumps supplying demineralized cooling water to the building failed March 23, 1976. When the pumps were started, the pressure surge ruptured a water line on the oscillator power supply resulting in the second operational shutdown.

### FISSION PRODUCTS

#### Krypton-85 Enrichment Facility (*F. N. Case*)

##### Status of Column Operation

A shutdown of the columns occurred on Saturday, March 6, 1976, due to a short and subsequent blowing of a fuse in the main power supply to the chilled water compressor units. The column heaters shut down automatically because of the temperature rise of the cooling water. Repairs were made and the columns started on March 9, 1976. A second column heater shutdown occurred at 7:15 a.m. on March 16, 1976. The columns were placed back in operation at 10:40 a.m. on the same day. This shutdown also occurred because of a temperature rise of the cooling water. While it is suspected that a problem exists in the chilled water compressor control circuit, the cause has not yet been found. A representative of the Carrier Corporation, manufacturer of the unit, has been asked to check the system to see if he can find a reason for the problem.

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

##### 1. Process Status

A total of 1,728 grams of source grade  $^{137}\text{CsCl}$  was recovered from the ARHCO Waste Encapsulation and Storage (WESF) container. Based on the analysis of one batch of powder, a total of 41,645 Ci of  $^{137}\text{Cs}$  was recovered from the unit which represents a 90.5% yield on the curie quantity shipped. A total of 58.2 grams of insoluble material was removed from the WESF can which represents 3.1 weight % of the quantity shipped. On a weight basis, less than 4% of the quantity shipped was unaccountable.

The chemical impurities (i.e., Al, Fe, K, Na, Mg, Ni, Pb, Si, etc.) in the final product were negligible, indicating an excellent grade of  $^{137}\text{Cs}$  source material. Mass assay data will be available in April, 1976.

A sample of the insoluble material removed from the WESF powder was spectrographically analyzed and the results showed a wide range of

chemical impurities (i.e., As, Fe, Cr, Ni, Pb, Sn, Si, Pd, Rh, Zr, Ti, Na, Mo). No quantitative values were determined due to the number of impurities found in the insoluble material.

## 2. Operational Summary

### Product Inventory

(Decay calculated through April 30, 1975)

<u>Inventory Material</u>	<u>Amount (Ci)</u>
In-Process	0
Cesium-137 chloride powder	37,450
Special form cans and Fabricated Sources	<u>6,000</u>
<u>Total Inventory Material</u>	<u>43,450</u>

<u>Non-Inventory Material</u>	<u>Amount (Ci)</u>
Material returned or stored for customer	
Puerto Rico sources	8,400
Lockheed	21,000
AECL powder	72,000
Radiation Resources	35,900
Minn. Mining & Mfg. Company	11,700
Gamma Industries	8,800
J. L. Shepherd	<u>17,800</u>
<u>Total Non-Inventory Material</u>	<u>175,600</u>

TOTAL INVENTORY AND NON-INVENTORY MATERIAL 219,050

### Fabrication Summary

	<u>March 1976</u>		<u>CY 1976</u>		<u>FY 1976</u>	
	<u>No.</u>	<u>Ci</u>	<u>No.</u>	<u>Ci</u>	<u>No.</u>	<u>Ci</u>
Sources						
Fabricated	2	3,000	2	3,000	28	26,232
Shipped	2	3,000	2	3,000	18	24,032
Special Form Cans						
Fabricated	42	4,200	42	4,200	80	9,100
Shipped	2	200	2	200	35	7,322

## 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  $^{90}\text{Sr}$  process and manipulator cells are being decontaminated under the ERDA Decommissioning Program. The  $^{90}\text{Sr}$  powder was removed from the FPD, encapsulated, and stored for future orders.

Product Inventory

(Decay calculated through April 30, 1975)

<u>Inventory Material</u>	<u>Amount (Ci)</u>
$^{90}\text{Sr}$ titanate powder ( $\pm 5\%$ )	491,800
Sources in fabrication	0
RCA source	59,200
$^{90}\text{Sr}$ silicate powder	28,900
Stock powder cans	<u>4,176</u>
<u>Total Inventory Material</u>	<u>584,076</u>
<u>Non-Inventory Material</u>	<u>Amount (Ci)</u>
FPDL recovery material	18,700
Quehanna recovery material	45,500
Weather Bureau source	12,100
SNAP-7B	165,600
SNAP-7C	26,000
SNAP-7D	151,500
SNAP material purchase <sup>a</sup>	<u>263,000</u>
<u>Total Non-Inventory Material</u>	<u>682,400</u>
<u>TOTAL INVENTORY AND NON-INVENTORY MATERIAL</u>	<u>1,266,476</u>

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

Fabrication Summary

	<u>March 1976</u>		<u>CY 1976</u>		<u>FY 1976</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	0	0	0	0	0	0
Shipped	3	39	4	134	8	504

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

<u>Isotope</u>	<u>Number of Batches</u>	<u>Amount (Ci)</u>
Xenon-133	1	350
Iodine-131	1	50

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>		
Schwarz/Mann	Tritium	1,500 Ci
ICN Pharmaceuticals	Tritium	1,000 Ci
New England Nuclear Corporation	Tritium	4,000 Ci
American Atomics Corporation	Tritium	1,000 Ci

Withdrawn Items

Cleveland General Hospital	Iodine-131	50 mCi
Mine Safety and Appliance Company	Iodine-131	150 mCi

Items Used in Cooperative Programs

ORAU	Dysprosium-157	190 mCi
University of Southern California	Platinum-195m	12 mCi
ORAU	Thulium-167	5 mCi
University of Maryland	Thulium-167	5 mCi

The radioisotope sales and shipments for the first nine months of FY 1975 and FY 1976 are given in Table 2.

Table 2. Radioisotope Sales and Shipments

<u>Item</u>	<u>7-1-74 thru 3-31-75</u>	<u>7-1-75 thru 3-31-76</u>
Inventory items	\$ 289,022	\$ 209,590
Major products	37,680	38,280
Radioisotope services	91,393	71,500
Cyclotron irradiations	69,614	126,584
Miscellaneous processed materials	93,937	41,544
Packing and Shipping	54,580	75,838
Total	\$ 636,226	\$ 563,336
Number of Shipments	1,153	1,240

## PUBLICATIONS

## REPORTS

E. Lamb, *Radioisotope Distribution Program Progress Report for February 1976*, ORNL/TM-5468, Oak Ridge National Laboratory (May 1976).

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