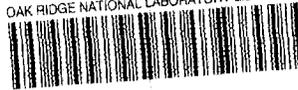
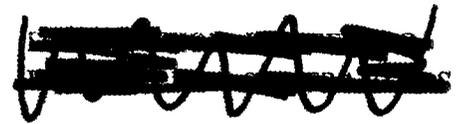


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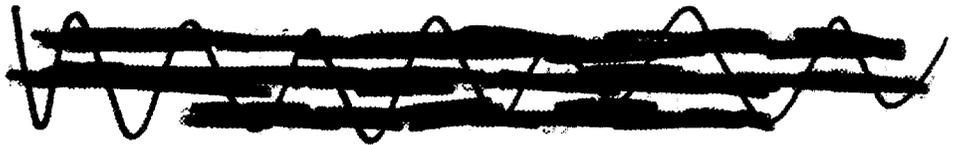


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# Radioisotope Distribution Program Progress Report for December 1978

E. Lamb



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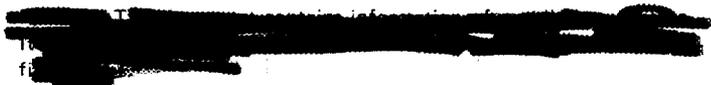
RADIOISOTOPE DISTRIBUTION PROGRAM

PROGRESS REPORT FOR DECEMBER 1978

Date Published - March 1979

E. Lamb

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RADIOISOTOPE DISTRIBUTION PROGRAM  
PROGRESS REPORT FOR DECEMBER 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. Schaich*)  
(Production and Inventory Accounts)

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

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

Eleven customer irradiation units and thirteen ORNL HFIR units (RB) containing 167,000 curies of  $^{192}\text{Ir}$  at HFIR discharge date were processed during the month of December 1978. Sixteen shipments containing 74,765 curies of  $^{192}\text{Ir}$  were made during this period.

ACCELERATOR-PRODUCED ISOTOPES

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

During December 1978, the ORNL 86-Inch Cyclotron operated 6:15 hours for ORNL and Oak Ridge DOE Programs for total charges of \$971. Non-ORNL Program irradiations were for 37:30 hours with total charges of \$6,275.

In early December systems were getting back to normal after recovering from a major power outage in November. One irradiation was performed on December 6, 1978. Two runs were aborted due to a vacuum leak in the target dolly. The target dolly was disassembled and the necessary repairs completed. Due to two more power outages, one of which affected the entire plant and resulted in diffusion pump oil diffusing back into the Cyclotron vacuum system, the Cyclotron did not operate again until December 20, 1978. The dees had to be removed and all components degreased. During the bake-out following, a shorted capacitor in the oscillator

cabinet was replaced. One run was terminated prematurely due to both grounding straps on the south trimmer burning in two. Repairs were made and the systems were back to normal prior to the end of the month.

To circumvent future problems resulting in power outages, a valving system utilizing normally closed-manual reset vacuum valves has been designed and is in the process of being installed. Also included in this plan is for certain components of the Cyclotron to be placed on the emergency power system within our building.

## FISSION PRODUCTS

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

The krypton-85 tails were removed from AB, B, C, and CD columns and a total of 400 curies of 4.74% krypton-85 feed was added to the system. The columns operated normally during the month of December with no outages or abnormal conditions.

A conversion factor was developed for detector count rates to krypton-85 enrichment (based upon an assumption of 100% krypton-85 in the detector) and a correlation between an electrometer reading versus krypton-85 enrichment for gas samples. A determination will be made on how to average the four G-M tube readings on the Column to obtain an estimate of the amount and enrichment of krypton obtainable from the center cut.

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

#### 1. Process Status

The  $^{137}\text{Cs}$  processing equipment remains in standby status.

#### 2. Operational Summary

##### Product Inventory

(Decay calculated through August 31, 1978)

<u>Inventory Material</u>	<u>Amount (Ci)</u>
Cesium-137 chloride powder	<u>8,100</u>
<u>Total Inventory Material</u>	<u>8,100</u>

<u>Non-Inventory Material</u>	<u>Amount (Ci)</u>
Reject Pellets and Sources	4,300
Special Form Cans	4,000
Material returned or stored for customer	
J. L. Shepherd	11,000
New England Nuclear Corporation	1,975
Puerto Rico Sources	7,700
Lockheed	19,100
AECL powder	36,949
Radiation Resources	16,800
Gamma Industries	8,200
Minn. Mining & Mfg. Co.	12,000
<u>Total Non-Inventory Material</u>	<u>122,024</u>
TOTAL INVENTORY AND NON-INVENTORY MATERIAL	130,124

Fabrication Summary

	<u>Dec. 1978</u>		<u>CY 1978</u>		<u>FY 1979</u>	
	<u>No.</u>	<u>Ci</u>	<u>No.</u>	<u>Ci</u>	<u>No.</u>	<u>Ci</u>
Sources						
Fabricated	0	0	41	76,110	0	0
Shipped	1	120	50	72,895	16	15,260
Special Form Cans						
Fabricated	0	0	21	15,600	0	0
Shipped	2	2,000	13	5,625	2	2,000

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

Four  $^{90}\text{Sr}$  titanate heat sources were loaded into thermoelectric generators and shipped to Teledyne Energy Systems. Each unit contained an average of 250  $\text{W}_T$ . The  $^{90}\text{Sr}$  processing equipment has been placed in standby status.

Product Inventory

(Decay calculated through August 31, 1978)

<u>Inventory Material</u>	<u>Amount (Ci)</u>
<sup>90</sup> Sr titanate powder (±5%)	0
Sources in fabrication	0
Stock powder cans	3,170
Stock solution	<u>180</u>
<u>Total Inventory Material</u>	<u>3,350</u>

<u>Non-Inventory Material</u>	<u>Amount (Ci)</u>
<sup>90</sup> Sr Fluoride	60,000
New England Nuclear Corporation	175
Calorimeter Standards	4,700
Weather Bureau Source	11,100
SNAP-7B	152,500
SNAP-7C	24,000
SNAP-7D	139,500
SNAP material purchase	<u>126,700</u>
<u>Total Non-Inventory Material</u>	<u>518,675</u>

TOTAL INVENTORY AND NON-INVENTORY MATERIAL	522,025
--	---------

Fabrication Summary

	<u>Dec. 1978</u>		<u>CY 1978</u>		<u>FY 1979</u>	
	<u>No.</u>	<u>Ci</u>	<u>No.</u>	<u>Ci</u>	<u>No.</u>	<u>Ci</u>
Sources						
Fabricated	0	0	4	153,000	4	153,000
Shipped	0	0	4	153,000	4	153,000
Special Form Cans						
Fabricated	0	0	6	40	0	0
Shipped	0	0	4	55	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.

<u>Isotope</u>	<u>Number of Batches</u>	<u>Amount (Ci)</u>
Xenon-133	3	2740

## 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>		
Minnesota Mining & Manufacturing Co.	Cesium-137	2,012 Ci
The Radiochemical Centre, England	Promethium-147	4,750 Ci
Teledyne Energy Systems	Strontium-90	152,761 Ci
Trio-Tech International	Krypton-85	280 Ci
Merz & Benteli Nuclear, Switzerland	Tritium	30,000 Ci
Saunders-Roe Development, England	Tritium	30,000 Ci
American Atomics Corporation	Tritium	50,000 Ci
New England Nuclear Corporation	Tritium	6,000 Ci
Self-Powered Lighting, Ltd.	Tritium	33,200 Ci
Radium-Chemie, Ltd., Switzerland	Tritium	48,404 Ci
<u>Withdrawn Items</u>		
ORNL, Chemistry Division	Carbon-14	1 Ci
Mallinckrodt Nuclear	Selenium-75	1.3 Ci
Gulf Nuclear, Inc.	Iridium-192	11,407 Ci
Technical Operations	Iridium-192	28,708 Ci
Automation Industries	Iridium-192	14,465 Ci
Gamma Industries	Iridium-192	14,471 Ci
Source Production & Equipment Co.	Iridium-192	3,332 Ci
Industrial Nuclear	Iridium-192	2,382 Ci

The radioisotope sales and shipments for the first three months of fiscal year 1978 and fiscal year 1979 are given in Table 1.

Table 1. Radioisotope Sales and Shipments

Item	10-1-77 thru 12-31-77	10-1-78 thru 12-31-78
Inventory Items	\$ 193,598	\$ 100,909
Tritium		574,826
Major Products	172,769	86,075
Iridium-192		74,609
Radioisotope Services	80,241	135,623
Cyclotron Irradiations	92,866	100,273
Miscellaneous Processed Materials	20,858	11,002
Packing and Shipping	48,425	45,710
Total	\$ 608,757	\$1,129,027
Number of Shipments	579	549

## PUBLICATIONS

## REPORTS

E. Lamb, *Radioisotope Distribution Program Progress Report for November 1978*, ORNL/TM-6768, Oak Ridge National Laboratory (March 1979).

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