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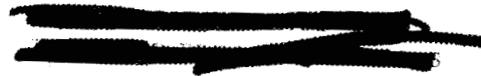
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# Radioisotope Distribution Program Progress Report for December 1975

E. Lamb



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OPERATIONS DIVISION

RADIOISOTOPE DISTRIBUTION PROGRAM  
PROGRESS REPORT FOR DECEMBER 1975

E. Lamb

Work Sponsored by  
ERDA Division of Biomedical and  
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MARCH 1976

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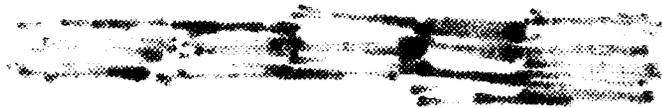


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RADIOISOTOPE DISTRIBUTION PROGRAM  
PROGRESS REPORT FOR DECEMBER 1975

*E. Lamb*

RADIOISOTOPE PRODUCTION AND MATERIALS DEVELOPMENT

REACTOR-PRODUCED RADIOISOTOPES

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

<u>Processed Units</u>	
<u>Radioisotope</u>	<u>Amount (mCi)</u>
Calcium-47	21
Copper-67	11

ACCELERATOR-PRODUCED ISOTOPES

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

No cyclotron runs were made during the month of December; the entire month was spent making repairs to the cyclotron.

FISSION PRODUCTS

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

Material Transfer Into Columns

Material enriched during the last operating cycle was removed from storage tanks and placed in column CD. Column CD was started on December 8, 1975. The remaining columns were loaded with normal fission krypton and started on December 12, 1975.

Status of Column Operation

Column CD was loaded with enriched first cycle product stored in the 40 liter storage tanks to the normal operating pressure of -2 inches mercury. After loading, radiation readings indicated a considerable quantity of air was introduced into the column during loading. Plans were made to remove this air and reload the column with enriched feed. All other columns are operating normally.

### Unusual Occurrences

Column AB was shut down by the automatic shutdown and safety system at 8:49 p.m. during the evening shift on December 22, 1975, caused by the cooling water temperature from the north bank columns (which includes column AB) increasing  $\sim 10^{\circ}\text{F}$ . No other cause for the shutdown was observed. The time lapse from column shutdown to temperature observation was approximately 30 minutes. The column was restarted and has operated normally since. This column has an automatic shutdown when cooling water reaches  $120^{\circ}\text{F}$  (all other columns have a shutdown at  $180^{\circ}\text{F}$ . Temperature controls on the other columns will be changed at the end of the present operating cycle). Several hypotheses for explaining this temperature rise have been proposed; i.e., 1) blockage with a foreign substance in the cooling water inlet or outlet to the column, 2) a power surge affecting the control system, 3) a loss of coolant water flow, and 4) a loss of coolant water pressure. Items 2, 3 and 4 are not feasible since any one of the occurrences would shut down all six of the columns, not just one. Item 1 remains a possibility with some limitation. The possibility of a mass large enough to block a 3-in. water line and then correcting itself is discounted; however, an air blockage is considered possible.

As postulated, the following sequence of events could take place. Air is drawn into the closed loop system through the seals on the circulating pump. This air is vented out of the system and makeup water added automatically; however, upon close examination it is concluded that the bleed-off system is not located in the optimum location and the design is inadequate to handle a large in-leakage of air. If an air bubble built up in the system and managed to feed through the loop into one column it could heat and expand sufficiently to cause bypassing of that column by the cooling water. Temperature would then begin to rise in that column and subsequently would shut that column down. Upon cooling, the air blockage would contract allowing water to enter the column and flushing the bubble out and allowing the column to be restarted and operate normally. Examination of the flow characteristics of the water distribution system indicates that this would most likely occur in the middle column; i.e., column AB. This hypothesis will be checked out when the columns can be conveniently shut down or another automatic shutdown occurs.

### Routine and Non-Routine Maintenance

The loadout station of the north bank was rebuilt (columns A, AB and B). All valves were replaced, new rupture disks were installed, a new stainless steel dewar was installed to replace the old glass dewar in the cold trap, and new cold trap heaters were installed.

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

#### 1. Process Status

The  $^{137}\text{Cs}$  process equipment is in standby condition.

## 2. Operational Summary

Product Inventory

(Decay calculated through April 30, 1975)

<u>Inventory Material</u>	<u>Amount (Ci)</u>
Cesium-137 chloride powder	0
Special form cans	<u>6,100</u>
<u>Total Inventory Material</u>	<u>6,100</u>
<u>Non-Inventory Material</u>	<u>Amount (Ci)</u>
Material returned or stored for customer	
Puerto Rico sources	8,400
Lockheed <sup>1</sup>	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>
<u>TOTAL INVENTORY AND NON-INVENTORY MATERIAL</u>	<u>181,700</u>

<sup>1</sup>Converted 6,600 Ci of Lockheed material to 6,100 Ci of product for inventory.

Fabrication Summary

	<u>Dec. 1975</u>		<u>CY 1975</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	10	1,200	55	31,606	26	23,232
Shipped	5	2,023	45	30,406	16	22,032
Special Form Cans						
Fabricated	38	4,900	38	4,900	38	4,900
Shipped	27	4,952	37	9,103	32	7,022

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

1. Process Status

The  $^{90}\text{Sr}$  process and manipulator cells are being decontaminated under the ERDA Decommission 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>4,310</u>
<u>Total Inventory Material</u>	<u>584,210</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>
TOTAL INVENTORY AND NON-INVENTORY MATERIAL	1,266,610

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

Fabrication Summary

	<u>Dec. 1975</u>		<u>CY 1975</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	4	370	6	390	4	370

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	2	700
Iodine-131	1	56
Niobium-95	1	7
Strontium-89	1	28

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	6,000 Ci
Self-Powered Lighting	Tritium	1,500 Ci
Saunders-Roe Development, England	Tritium	5,000 Ci
Schwarz/Mann	Tritium	2,000 Ci
ICN Pharmaceuticals	Tritium	1,000 Ci
American Atomics	Tritium	2,000 Ci

Withdrawn Items

University of Rochester	Iodine-131	50 mCi
University of California	Iodine-131	25 mCi
Cleveland General Hospital	Iodine-131	75 mCi

Items Used in Cooperative Programs

ORAU	Dysprosium-157	90 mCi
ORAU	Erbium-171	270 mCi

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

Table 2. Radioisotope Sales and Shipments

Item	7-1-74 thru 12-31-74	7-1-75 thru 12-31-75
Inventory items	\$ 226,363	\$ 149,508
Major products	23,315	21,533
Radioisotope services	88,881	55,327
Cyclotron irradiations	51,255	79,579
Miscellaneous processed materials	41,150	29,593
Packing and Shipping	37,865	45,198
Total	\$ 468,829	\$ 380,738
Number of shipments	784	835

## PUBLICATIONS

## REPORTS

E. Lamb, *Radioisotope Distribution Program Progress Report for November 1975*, ORNL/TM-5260, Oak Ridge National Laboratory (December 1975).

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