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Radioisotope Distribution Program Progress Report for April 1979

E. Lamb



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OPERATIONS DIVISION

RADIOISOTOPE DISTRIBUTION PROGRAM

PROGRESS REPORT FOR APRIL 1979

E. Lamb

Work Sponsored by
DOE Division of Biomedical and
Environmental Research

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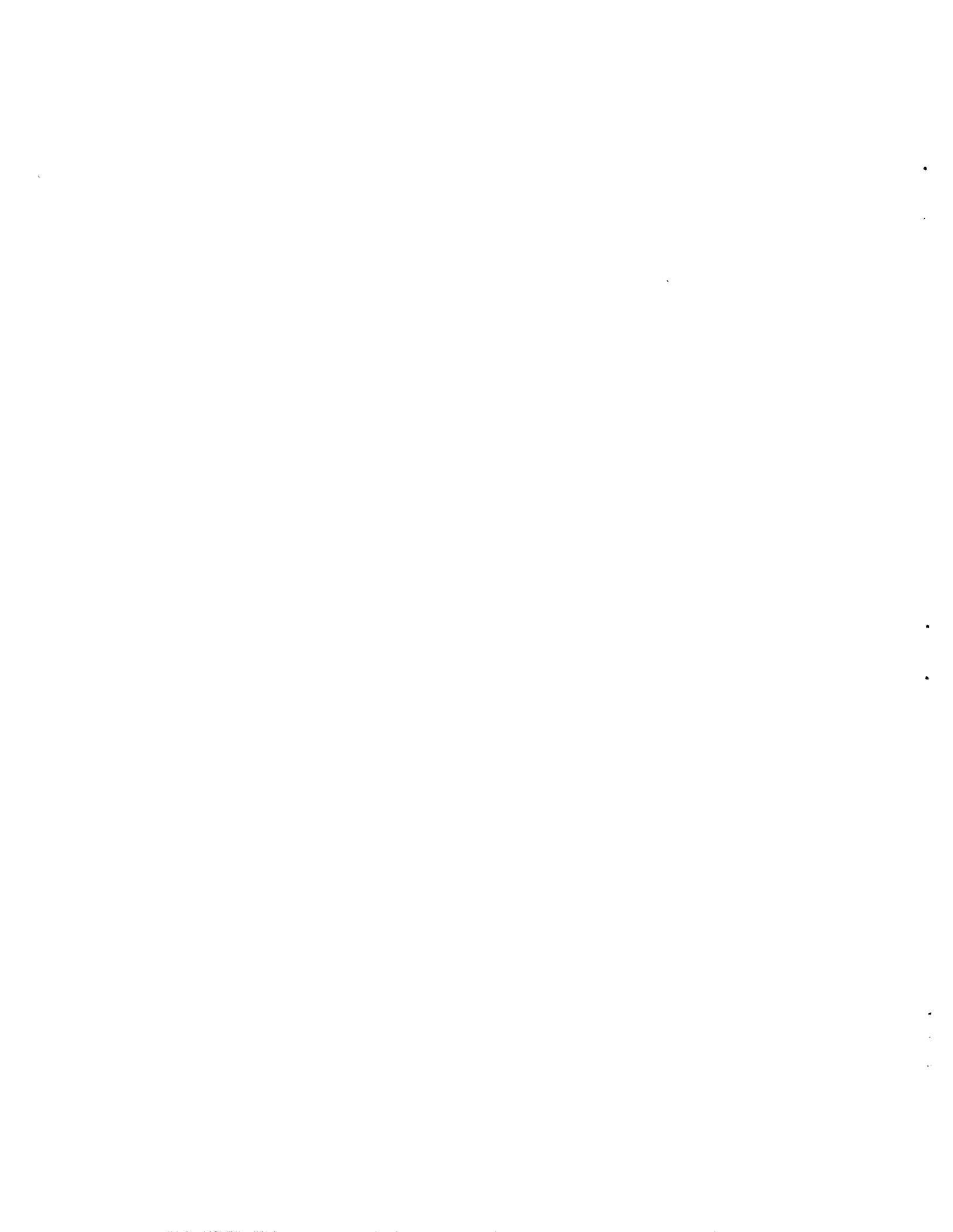
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RADIOISOTOPE DISTRIBUTION PROGRAM
PROGRESS REPORT FOR APRIL 1979

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SUMMARY

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

RADIOISOTOPE PRODUCTION AND MATERIALS

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

<u>Processed Units</u>	
<u>Radioisotope</u>	<u>Amount (mCi)</u>
Calcium-47	30

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

Six customer irradiation units and seven ORNL HFIR units (RB) containing 91,000 Ci of iridium-192 at HFIR discharge date were processed during the month of April, 1979. Fourteen shipments containing 92,000 Ci of iridium-192 were made during this period.

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

During April, 1979, the ORNL 86-Inch Cyclotron operated 14:45 hours for ORNL and Oak Ridge DOE programs for total charges of \$2,222. Non-ORNL and Isotope Sales Inventory Irradiations were 240:15 hours for total charges of \$47,124.

No irradiations were interrupted this month due to malfunction or failure of components of the cyclotron. Routine maintenance consisted of checking the power supplies and replacing some high-current contacts in the supplies, replacing a magnetic field pushing coil power supply with a surplus heavy-duty supply from the Isotope Separation Program, and replacing a 1000 pf glass vacuum capacitor in the oscillator grid circuit with a ceramic capacitor for a reliability test.

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

Processing of a WESF container of $^{137}\text{CsCl}$ continued for the Terrestrial Radioisotope Application Program. The $^{137}\text{CsCl}$ product inventory follows.

Product Inventory

(Decay calculated through August 31, 1978)

<u>Inventory Material</u>	<u>Amount (Ci)</u>
Cesium-137 chloride powder	<u>5,800</u>
Total Inventory Material	5,800
 <u>Non-Inventory Material</u>	
Reject Pellets and Sources	4,300
Special Form Cans	4,000
Material returned or stored for customer	
J. L. Shepherd	62,620
New England Nuclear Corporation	1,785
Puerto Rico Sources	7,700
Lockheed	19,100
AECL powder	6,800
Radiation Resources	16,800
Gamma Industries	8,200
Minn. Mining & Mfg. Company	<u>12,000</u>
Total Non-Inventory Material	143,305

Fabrication Summary

	<u>Apr. 1979</u>		<u>CY 1979</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	29	45,280	29	45,280
Shipped	0	0	29	45,280	45	60,540
Special Form Cans						
Fabricated	0	0	0	0	0	0
Shipped	1	100	5	490	7	2,490

Strontium-90 Production (*R. W. Schaich*)The status of ^{90}Sr material is given in the table below.Product Inventory

(Decay calculated through August 31, 1978)

<u>Inventory Material</u>	<u>Amount (Ci)</u>
^{90}Sr titanate powder ($\pm 5\%$)	0
Sources in fabrication	0

Product Inventory (contd)

<u>Inventory Material</u>	<u>Amount (Ci)</u>
Stock powder cans	2,950
Stock solution	180
Total Inventory Material	3,130
<u>Non-Inventory Material</u>	
⁹⁰ 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 ^a	126,700
Total Non-Inventory Material	518,675
TOTAL INVENTORY AND NON-INVENTORY MATERIAL	521,805

Fabrication Summary

	<u>Apr., 1979</u>		<u>CY 1979</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	0	0	4	153,000
Shipped	0	0	0	0	4	153,000
Special Form Cans						
Fabricated	0	0	0	0	0	0
Shipped	1	10	1	10	1	10

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

This decontamination of the Short-Lived Fission Product Facility and the Xenon-133 Purification Cubicle proceeded on schedule. The maintenance phase of this operation should commence about June 1, 1979.

One irradiated ²³⁵U target was processed to produce the quantities tabulated below. A total of 32 Ci of ¹³³Xe was loaded for shipment.

^aStrontium-90 purchased under DRRD program

<u>Isotopes</u>	<u>Number of Batches</u>	<u>Amount (Ci)</u>
Iodine-131	1	75
Xenon-133	1	970
Niobium-95	1	1

Krypton Enrichment Facility (*J. R. DeVore*)

Maintenance work was completed on the south bank of the ^{85}Kr Thermal Diffusion Columns (TDC) during the month of April. The TDC system was tested, loaded, and placed into operation on April 9, 1979. Enriched material containing 1,650 Ci of 17.5% ^{85}Kr was loaded onto "C" column. The other columns in the south bank were loaded with normal ^{85}Kr (4.6%).

The north bank of the TDC columns was unloaded during this period and enriched material ranging from 12-18% was obtained. A complete analysis will be reported next month. The north bank system will remain shut down until further notice to assist in electrical energy conservation for ORNL.

Work continued on the enriched ^{85}Kr storage cell to remove materials that have been in storage for several years. After the storage tanks are emptied, a new storage, sampling, and loadout system will be installed to reduce exposure to personnel during these operations.

Tritium Operations (*J. R. DeVore*)

Ten gas cylinders, eight glass ampules, and thirteen non-returnable containers were loaded with 204,000 Ci of tritium for shipment to customers. A tritium monitor system has been designed and work orders issued to install.

A design for a new tritium handling system was returned to Engineering to include a flowthrough trap system. Design is scheduled to be completed by June, 1979.

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

Nineteen gas cylinders were loaded with 815 Ci of ^{85}Kr for shipment to customers.

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

Two hundred and fifty packages were processed and shipped during the reporting period. The total weight shipped was 29,800 pounds.

<u>Radioactive Solid Shipments</u>	<u>Radioactive Gas Shipments</u>	<u>Radioactive Liquid Shipments</u>	<u>Empty Containers</u>	<u>Total</u>
84	67	69	30	250

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

Seventeen packages of alpha material were prepared for shipment. A total of 254 grams of ^{241}Am was shipped to customers during April.

FPDL Operations (*F. V. Williams*)

Decontamination of ORNL equipment and materials was continued. Items included a shielded shipping container, lead bricks from an old burial ground, and a dump truck used in radioactive solid waste burial operations.

Several containers of contaminated solid waste were received from other radioisotope production buildings and were stored or processed for transfer to the Solid Waste Storage Area.

The temperature attained by the vacuum hot press in Cell 12 was checked by using test cones which were formulated to melt at 1260°, 1390°, and 1485°C. With maximum power on the hot press heating element for 2.5 hours, all cones melted.

A campaign to purify $^{137}\text{CsCl}$ continued. This ^{137}Cs will be used to make ^{137}Cs pollucite pellets for the Terrestrial Radioisotope Applications Program.

The decontamination of Cell 19 proceeded with work focused on the lead cubicle access to the cell. Maintenance personnel removed all service piping and dismantled the cubicle.

The seal welding and dye penetrant checking of the Cell 10W window flange were completed. A new drill bit was received, and cutting of the access hole into Cell 11 was resumed.

Miscellaneous (*R. W. Schleich*)

The design for a new ^{133}Xe loadout system was completed and installation was ~50% complete at the end of the month.

The design of an electropolisher system for FPDL decontamination operations was completed at the end of March. Installation of this equipment is tentatively set for the end of FY 1979. Estimated costs were not available in April.

A purchase order was issued to fabricate 23 new containers for use in the ^{85}Kr and tritium business. Delivery is scheduled for July, 1979.

An ORNL Radioactive Shipping Container catalog will be published when ORO-DOE issues new Certificates of Compliance for Chemical Technology casks.

An ORNL Radioactive Materials Packaging Guide will be published when ORO-DOE issues the Certificates of Compliance for Chemical Technology casks.

The preliminary design and estimation for converting Cell 11E to a manipulator cell was completed. The estimated CPFF cost is \$115,000. No further action taken on this project.

An ORR Radioisotope Production Facility (A1-A2) was designed by the Reactor Operations personnel for the removal of ^{133}Xe rings during ORR operating periods. This unit is in fabrication and should be ready for installation and testing in the second quarter of 1979.

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>		
Airco Cryoplants	Krypton-85	100 Ci
Battelle Northwest	Krypton-85	100 Ci
Trio Tech International	Krypton-85	300 Ci
American Atomics Corporation	Tritium	100,000 Ci
Brandhurst Company, Ltd.	Tritium	60,000 Ci
E.I. DuPont de Nemours & Co., Inc.	Tritium	1,450 Ci
ICN Pharmaceuticals Inc.	Tritium	1,000 Ci
Lawrence Livermore Laboratory	Tritium	5,809 Ci
New England Nuclear	Tritium	12,000 Ci
Saunders-Roe Development, Ltd.	Tritium	30,000 Ci
<u>Withdrawn Items</u>		
Mallinckrodt, Inc.	Selenium-75	4 Ci
ORNL, Dept. of Quality Assurance & Inspection	Iodine-131	60 mCi
ORNL, Chemical Technology	Iodine-131	44 mCi
<u>Items Used in Cooperative Programs</u>		
Univ. of Southern CA School of Medicine	Platinum-195m	3 mCi
UCLA	Platinum-195m	10 mCi
University of Kentucky	Platinum-195m	20 mCi

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

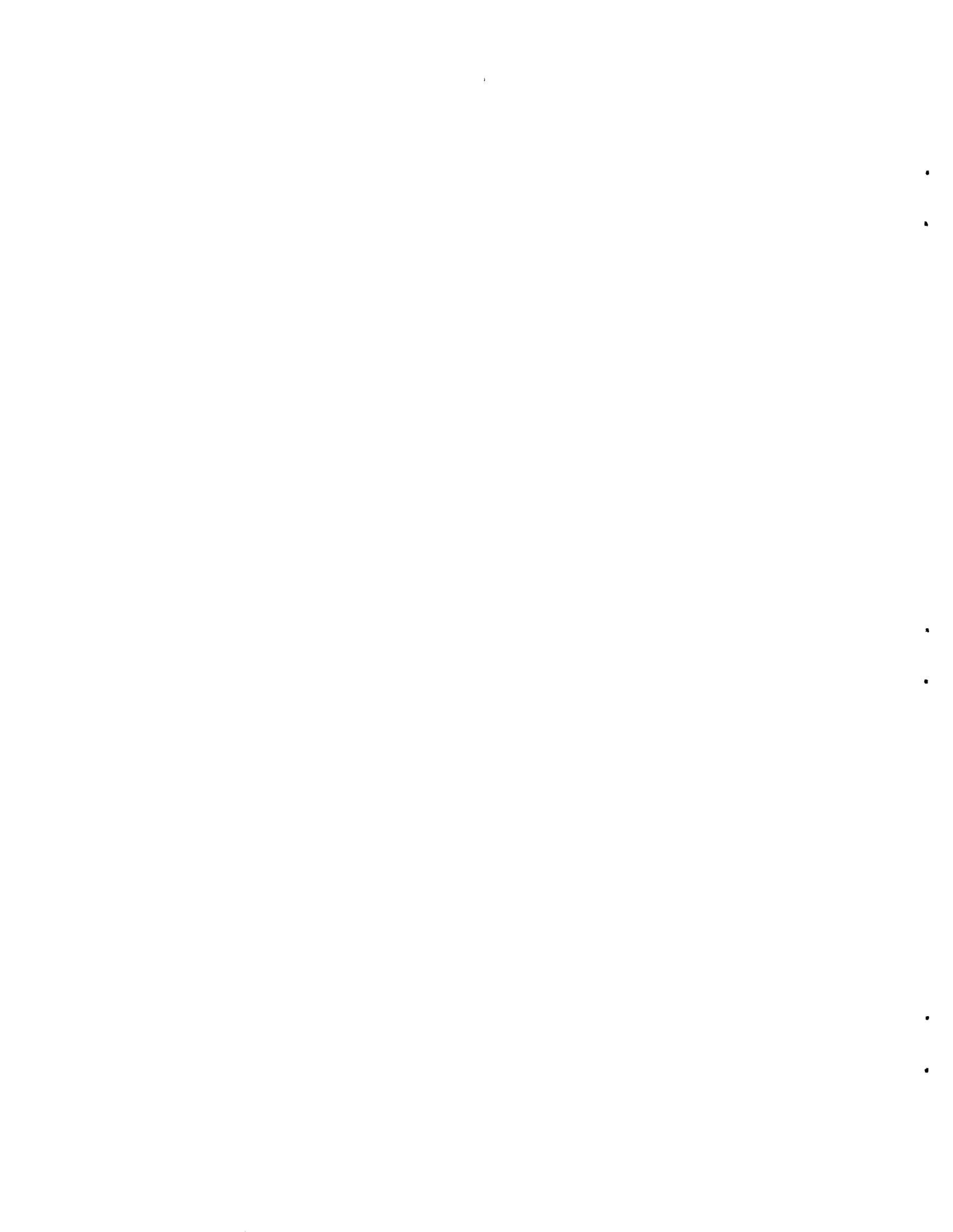
Table 1. Radioisotope Sales and Shipments

Item	10-1-77 thru 4-30-78	10-1-78 thru 4-30-79
Inventory Items	\$ 79,563	\$ 164,852
Tritium	809,630	1,087,257
Major Products	315,038	239,898
Iridium-192	455,151	749,070
Radioisotope Services	185,988	206,477
Cyclotron Irradiations	167,117	265,034
Miscellaneous Processed Materials	104,649	9,293
Packing and Shipping	124,635	112,120
TOTAL	\$2,241,771	\$2,834,001

PUBLICATIONS

REPORTS

E. Lamb, *Radioisotope Distribution Program Progress Report for March, 1979*, ORNL/TM-6901, Oak Ridge National Laboratory (in press).



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