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Radioisotope Distribution Program Progress Report for March 1979

E. Lamb

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OPERATIONS DIVISION

RADIOISOTOPE DISTRIBUTION PROGRAM

PROGRESS REPORT FOR MARCH 1979

Date Published - May 1979

E. Lamb

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RADIOISOTOPE DISTRIBUTION PROGRAM
PROGRESS REPORT FOR MARCH, 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	22

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

Six customer irradiation units and eight ORNL HFIR units (RB) containing 97,000 Ci of iridium-192 at HFIR discharge date were processed during the month of March, 1979. Twenty shipments containing 125,000 Ci of iridium-192 were made during this period.

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

During March, 1979, the ORNL 86-Inch Cyclotron operated 4:50 hours on ORNL programs for total charges of \$739. Non-ORNL programs were for 282:30 hours for total charges of \$57,167.

Two more 1000 pF vacuum capacitors failed in the RF system and had to be replaced. On March 1 the ion accelerating slit was broken while installing a new ion source tube and ion source. The cyclotron vacuum tank was opened, the accelerating slit replaced, pumpdown started, and RF bake-out commenced. The new source tube out-gassed excessively, resulting in reinstallation of the old source tube on March 3. No operations were scheduled from March 19 until March 25 due to the need of the Fusion Energy Division's changing a 13,800-volt circuit in the building. A run was interrupted March 27 due to the failure of an induction regulator on one of the power supplies for the RF system.

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

Processing of a WESF container of $^{137}\text{CsCl}$ continued for the waste management research program. The $^{137}\text{CsCl}$ product inventory is tabulated below.

Product Inventory

(Decay calculated through August 31, 1978)

<u>Inventory Material</u>	<u>Amount (Ci)</u>
Cesium-137 chloride powder	<u>5,900</u>
Total Inventory Material	5,900
 <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. Co.	<u>12,000</u>
Total Non-Inventory Material	143,305

Fabrication Summary

	<u>Mar. 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	12	15,180	29	45,280	29	45,280
Shipped	12	15,180	29	45,280	45	60,540
Special Form Cans						
Fabricated	0	0	0	0	0	0
Shipped	2	190	4	390	6	2,390

Strontium-90 Pilot Production (*R. W. Schaich*)The ^{90}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>
^{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	185
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	518,685
TOTAL INVENTORY AND NON-INVENTORY MATERIAL	521,815

Fabrication Summary

	<u>Mar. 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	0	0	0	0	0	0

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

Four irradiated 2.5-gram ²³⁵U targets were processed to yield the products tabulated below. Of the 1200 Ci of ¹³³Xe obtained, 117 Ci were shipped to customers. The ⁹⁹Mo product resulted from two experimental runs to test the ORNL procedure and to provide samples to interested companies.

<u>Isotopes</u>	<u>Number of Batches</u>	<u>Amount (Ci)</u>
Iodine-131	3	150
Molybdenum-99	2	95
Ruthenium-103	1	7
Xenon-133	4	1200

^aStrontium-90 purchased under DRRD program

The zinc bromide viewing windows in the SLFP cell have deteriorated to the point that vision of remote operations inside the cell is very poor. Since poor viewing conditions can result in mishaps during remote operations with a possible release of ^{131}I to the stack, it was decided (with DOE/ORO concurrence) to temporarily shut down operations as of March 31. The decontamination of the cell and repair of the windows are expected to take four months.

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

Leak testing of the south bank was continued during the month and the No. 1 ionization chamber on CD column was found to be leaking. The chamber has been removed and will be replaced during the next shutdown of the south bank. Column volumes were determined using the free expansion method. During this operation it was discovered that two more valves were leaking through the seats. These will be replaced before startup, which is planned for the first week in April. An additional valve was installed in section 4 of "C" column in order to split the section and alleviate the need for peak shifting at unloading.

The north bank (columns AB and B) operated normally throughout the month. Both columns are ready to shut down and remove the enriched product.

All of the greater than 20% enriched ^{85}Kr product will be reloaded on "C" column in the south bank for the next campaign.

Tritium Operations (*J. R. DeVore*)

Eleven gas cylinders, nine glass ampoules, and ten nonreturnable containers were loaded with 158,200 Ci of tritium for shipment to customers.

A tritium monitor system has been designed, and a work order has been issued for its installation in the ventilation duct serving the tritium hood.

The design of a flow-through trap system for storing tritium is in progress. This system will permit the storage of 100,000 Ci of tritium, compared to 10,000 Ci stored in the present system. It will also provide for the separation of ^3He from tritium immediately prior to shipment to provide the high purity product needed by some customers.

The safety analysis report for this facility is 10% complete. The design of a uranium-trap shipping container for tritium has been initiated.

SRO has selected a vendor for the new LP-50 tritium shipping containers.

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

Fifteen gas cylinders were loaded with 430 Ci of 5% ^{85}Kr for shipment to customers. The safety analysis of the ^{85}Kr equipment is being included with the tritium equipment in the Building 3033 safety analysis.

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

The packages processed and shipped are tabulated below. The total weight shipped was 35,600 pounds.

<u>Radioactive Solid Shipments</u>	<u>Radioactive Gas Shipments</u>	<u>Radioactive Liquid Shipments</u>	<u>Empty Containers</u>	<u>Total</u>
87	125	62	15	289

Fifty-six empty containers were received and decontaminated.

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

Fourteen packages containing 535 grams of ^{241}Am were prepared for shipment.

FPDL Operations (*F. V. Williams*)

Maintenance personnel started the modifications of Cell 10W. The safety plate glass (cell side) of the viewing window was removed and a new non-browning glass plate was installed. The cutting of the transfer port through the wall to Cell 11 was started, but progress was slow.

Maintenance work included the cleaning of the Cell 12 window and refilling it with mineral oil.

Miscellaneous (*R. W. Schaich*)

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

A design for a new tritium handling system was initiated in 1978 and is approximately 99% complete. Installation of the new system is scheduled for the second quarter of 1979.

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 will be available in April.

Three batches of elemental ^{131}I were prepared for Inspection Engineering.

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.

The preliminary design and estimate for converting Cell 11E to a manipulator cell were completed. The estimated cost is \$115,000.

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 July.

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
ICN Pharmaceuticals, Inc.	Tritium	3,000 Ci
New England Nuclear Corporation	Tritium	10,000 Ci
E.I. duPont de Nemours (Savannah River Plant)	Tritium	22,578 Ci
American Atomics Corporation	Tritium	50,000 Ci
Saunders-Roe Development, Ltd.	Tritium	30,000 Ci
Brandhurst Co., Ltd.	Tritium	30,000 Ci
United States Radium Corporation	Tritium	5,000 Ci
<u>Withdrawn Items</u>		
Mallinckrodt, Incorporated	Selenium-75	3,750 mCi
Mine Safety Appliances	Iodine-131	125 mCi
ORNL (Inspection Engineering)	Iodine-131	90 mCi
ORNL (Chemical Technology)	Iodine-131	2 mCi
New England Nuclear	Carbon-14	5,000 mCi
<u>Items Used in Cooperative Programs</u>		
University of MS Medical Center	Potassium-43	6 mCi
Medical College of Wisconsin	Potassium-43	8 mCi
Veterans Admin. Medical Center	Potassium-43	8 mCi
National Institute of Health	Potassium-43	4.5 mCi
Univ. of Southern California	Platinum-195m	7 mCi
University of Kentucky	Platinum-195m	20 mCi

The radioisotope sales and shipments for the first six 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 3-31-78	10-1-78 thru 3-31-79
Inventory Items	\$ 67,792	\$ 149,385
Tritium	604,810	1,020,046
Major Products	357,649	224,970
Iridium-192	365,740	654,102
Radioisotope Services	172,526	197,140
Cyclotron Irradiations	165,165	194,901
Miscellaneous Processed Materials	3,976	7,810
Packing & Shipping	104,125	100,220
Total	\$1,841,783	\$2,548,574
Number of Shipments	1,252	1,202

PUBLICATIONS

REPORTS

E. Lamb, *Radioisotope Distribution Program Progress Report for February, 1979*, ORNL/TM-6842, Oak Ridge National Laboratory (April, 1979).

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