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**UNION
CARBIDE**

**Radioisotope Distribution Program
Progress Report for
September 1979**

E. Lamb

MASTER

**OPERATED BY
UNION CARBIDE CORPORATION
FOR THE UNITED STATES
DEPARTMENT OF ENERGY**

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Operations Division

RADIOISOTOPE DISTRIBUTION PROGRAM
PROGRESS REPORT FOR SEPTEMBER 1979

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RADIOISOTOPE DISTRIBUTION PROGRAM
PROGRESS REPORT FOR SEPTEMBER 1979

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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	15

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

Five customer irradiation units and ten ORNL HFIR units (RB) containing 114,000 Ci of ^{192}Ir at HFIR discharge date were processed during the month of September, 1979. Seventeen shipments containing 90,000 Ci of ^{192}Ir were made during this period.

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

During September, 1979, the ORNL 86-Inch Cyclotron operated 5:35 hours for ORNL and Oak Ridge DOE Programs for total charges of \$846. Isotope Sales Inventory irradiations were 46 hours for total charges of \$9,037. Non-ORNL irradiations were 253:15 hours for total charges of \$49,463.

A cobalt-57 run on September 4 was interrupted due to the failure of a high-current electrical cable in the high-voltage supply of the oscillator circuit. On September 11 the startup of a germanium-68 irradiation was delayed due to the failure of the refrigeration system on the diffusion pump baffles. A gallium-67 run was interrupted for a routine check and exchange of the building electrical breaker. On September 25 a gold-195 irradiation was interrupted due to the shorting of the filament in the ion source.

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

Processing of two WESF containers of $^{137}\text{CsCl}$ (130,000 Ci) for AECL is in progress. Twenty-one teletherapy units (37,700 Ci) were fabricated for AECL for shipment in September. The $^{137}\text{CsCl}$ product inventory follows:

Product Inventory

(Decay calculated through August 31, 1979)

<u>Inventory Material</u>	<u>Amount (Ci)</u>
Cesium-137 chloride powder	8,350
Total Inventory Material	8,350
 <u>Non-Inventory Material</u>	
Reject Pellets and Sources	9,050
Special Form Cans	3,900
Material returned or stored for customer	
J. L. Shepherd	60,700
New England Nuclear Corporation	1,500
Puerto Rico Sources	7,500
Lockheed	18,800
AECL powder	6,600
Radiation Resources	12,300
Gamma Industries	8,000
Minn. Mining & Mfg. Company	9,900
Isomedix	50,000
Total Non-Inventory Material	188,250
TOTAL INVENTORY AND NON-INVENTORY MATERIAL	196,600

Fabrication Summary

	<u>Sept 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	21	37,700	50	82,980	50	82,980
Shipped	1	2,000	30	47,280	46	62,540
Special Form Cans						
Fabricated	0	0	0	0	0	0
Shipped	1	100	10	2,810	12	4,810

Strontium-90 Production (R. W. Schaich)The status of ⁹⁰Sr is given in the table which follows.

Product Inventory

(Decay calculated through August 31, 1979)

<u>Inventory Material</u>	<u>Amount (Ci)</u>
⁹⁰ Sr titanate powder ($\pm 5\%$)	0
Stock powder cans	2,850
Stock solution	170
Total Inventory Material	3,020
<u>Non-Inventory Material</u>	
⁹⁰ Sr Fluoride	68,500
New England Nuclear Corporation	170
Calorimeter Standards	3,800
Weather Bureau Source	10,800
SNAP-7B	148,800
SNAP-7C	23,400
SNAP-7D	136,100
SNAP material purchase	123,600
Total Non-Inventory Material	515,170
TOTAL INVENTORY AND NON-INVENTORY MATERIAL	518,190

Fabrication Summary

	<u>Sept. 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	2	30	2	30

Short-Lived Fission Production (H. Bailey)

The Short-Lived Fission Product Facility operated normally during the report period. The following products were made available for shipment:

<u>Isotope</u>	<u>Number of Batches</u>	<u>Amount (Ci)</u>
Xenon-133	3	2,000
Yttrium-91	1	13
Niobium-95	1	3
Strontium-89	1	17
Barium-140	1	20
Ruthenium-103	1	10
Ruthenium-106	1	1

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

The north bank of ^{85}Kr Thermal Diffusion Columns remains shut down as an energy conservation measure. During this report period, leak testing and repairs were continued on the north bank to place it in operation if additional capacity is required in the future.

Analysis results were received on the enriched ^{85}Kr removed from the columns last month.

<u>Cylinder No.</u>	<u>% Krypton</u>	<u>% ^{85}Kr</u>	<u>Curies</u>
HoKr-1000-19	99.61	48.89	482
HoKr-1000-17	99.70	31.75	361
HoKr-1000-21	99.17	30.72	294
Total			1137

The remainder of the material was tails analyzing <3% ^{85}Kr . The above three cylinders represent the best material obtained to date and contain 60% of the total C column loading. The balance of the krypton on CD and D columns was unloaded but has not been sampled. Unloading is ~80% complete and should be completed in October.

Design of the enriched ^{85}Kr storage and sampling system is approximately 98% complete. Removal of the old ^{85}Kr storage equipment has been completed. Installation of a new storage and sampling system is scheduled to start in October, 1979.

Tritium Operations (*J. R. DeVore*)

The piping and instrumentation portions of the tritium handling system have not been completed. Processing piping is the primary holdup. The instrumentation is essentially complete with the exception of one flowmeter which is waiting for process piping to specify the flow range. Fabrication of the hoods has been initiated and a capital work order issued to purchase instrumentation.

Eleven gas cylinders and 10 non-returnable containers were loaded with 126,000 Ci of tritium for shipment to customers.

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

Fourteen gas cylinders were loaded with 720 Ci of ^{85}Kr for shipment to customers.

Packing and Shipping (R. D. Johnston)

One hundred and eighty-three packages were processed and shipped during the reporting period. The total weight shipped was 88,000 pounds.

<u>Radioactive Solid Shipments</u>	<u>Radioactive Gas Shipments</u>	<u>Radioactive Liquid Shipments</u>	<u>Empty Containers</u>	<u>Total</u>
72	57	38	16	183

Alpha Handling Facility (R. D. Johnston)

Four packages of alpha-emitting material were prepared for shipment--one 0.10 g shipment of ^{243}Am , one 2.24 g package of ^{238}Pu , and two packages totaling 17.0 g of ^{237}Np .

Miscellaneous (R. W. Schaich)

The fabrication of 23 new containers for use in the ^{85}Kr and tritium business is ~75% complete. Delivery is now scheduled for December, 1979.

Fabrication of a new tritium cylinder decontamination station was completed in the Plant and Equipment shops. Installation of this station is scheduled for October, 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>		
Battelle Northwest	Krypton-85	100 Ci
Japan Radioisotope Association	Krypton-85	100 Ci
Trio Tech International	Krypton-85	250 Ci
Georgetown Univ. Medical Center	Cesium-137	2,000 Ci
The Radiochemical Centre Ltd.	Promethium-147	10,450 Ci
Brandhurst Company, Ltd.	Tritium	30,000 Ci
Univ. of California, LLL	Tritium	3,694 Ci
ICN Pharmaceuticals	Tritium	2,000 Ci
New England Nuclear	Tritium	8,000 Ci
Radium Chemie	Tritium	10,000 Ci
Saunders Roe Dev. Ltd.	Tritium	30,000 Ci
Self-Powered Lighting Ltd.	Tritium	8,000 Ci
TII Ind. Inc.	Tritium	1,500 Ci
United States Radium Corp.	Tritium	15,000 Ci

<u>Customer</u>	<u>Isotope</u>	<u>Amount</u>
<u>Withdrawn Items</u>		
Mallinckrodt Nuclear	Selenium-75	2,500 mCi
ORNL, Dept. of Quality Assurance and Inspection	Iodine-131	60 mCi
ORNL, Chemical Technology	Iodine-131	8 mCi
<u>Items Used in Cooperative Programs</u>		
University of Kentucky	Platinum-195m	10 mCi

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

Table 1. Radioisotope Sales and Shipments

<u>Item</u>	<u>10/1/77 through 9/30/78</u>	<u>10/1/78 through 9/30/79</u>
Inventory Items	\$ 128,592	\$ 284,191
Tritium	1,732,537	1,831,471
Major Products	574,351	472,271
Iridium-192	1,120,639	1,540,204
Radioisotope Services	295,007	391,527
Cyclotron Irradiations	369,847	477,923
Miscellaneous Processed Materials	237,417	69,273
Packing and Shipping	222,730	180,395
	<u>\$4,681,120</u>	<u>\$5,247,255</u>
Number of Shipments	2,647	2,079

PUBLICATIONS

Reports

E. Lamb, *Radioisotope Distribution Program Progress Report for August, 1979*, ORNL/TM-7088 (October, 1979).

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