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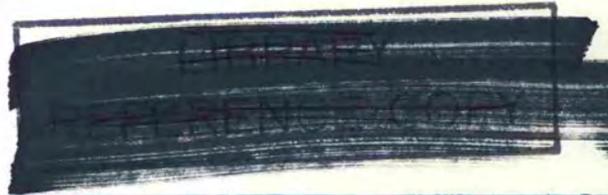


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RADIOISOTOPE DISTRIBUTION PROGRAM PROGRESS REPORT FOR SEPTEMBER 1973

J. H. Gillette



OAK RIDGE NATIONAL LABORATORY

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ISOTOPES DEVELOPMENT CENTER

RADIOISOTOPE DISTRIBUTION PROGRAM
PROGRESS REPORT FOR SEPTEMBER 1973

J. H. Gillette

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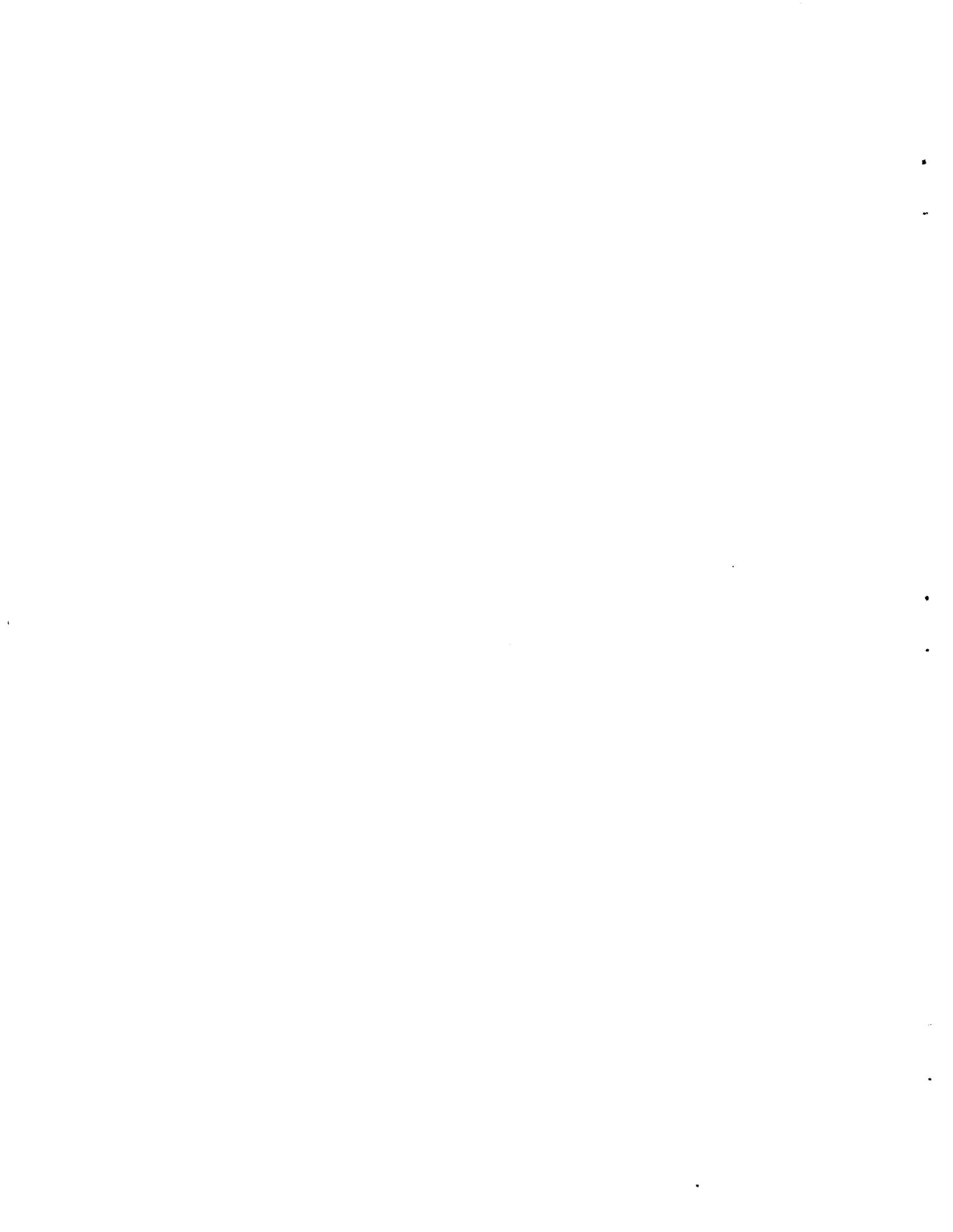
OCTOBER 1973

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OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee 37830
operated by
UNION CARBIDE CORPORATION
for the
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RADIOISOTOPE DISTRIBUTION PROGRAM
PROGRESS REPORT FOR SEPTEMBER 1973

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RADIOISOTOPE PRODUCTION AND MATERIALS DEVELOPMENT

REACTOR-PRODUCED RADIOISOTOPES

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

| <u>Processed Units</u> | |
|------------------------|---------------------|
| <u>Radioisotope</u> | <u>Amount (mCi)</u> |
| Calcium-47 | 19.95 |
| Copper-67 | 22.31 |
| Zinc-69m | 233.1 |

ACCELERATOR-PRODUCED ISOTOPES

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

September 1973 ORNL 86-Inch Cyclotron runs for ORNL and non-ORNL programs are given in Table 1.

Table 1. Cyclotron Irradiations and Runs for September 1973

| <u>Date</u> | <u>Customer</u> | <u>Product</u> | <u>Target</u> | <u>Total Time (hr:min)</u> | <u>Total Charges</u> |
|-----------------------------------|---|----------------|---------------|--------------------------------|--------------------------|
| <u>ORNL Programs</u> | | | | | |
| 8-24-73 | Y-12 Plant | Cobalt-56 | Iron | 6:15 | \$ 726 |
| 9-6-73 | ORAU and Others | Gallium-67 | Zinc-68 | 8:50 | 846 |
| 9-21-73 | ORAU and Others | Gallium-67 | Zinc-68 | <u>5:15</u> | <u>506</u> |
| | | | | 20:20 | \$2078 |
| <u>Non-ORNL Programs</u> | | | | | |
| 9-10-73 | International Chemical and Nuclear Corporation | Cobalt-56 | Iron | 5:15 | \$ 926 |
| <u>Sales Department Inventory</u> | | | | | |
| 9-14-73 | Isotopes Division | Cobalt-57 | Nickel | 41:15 | \$6012 |

FISSION PRODUCTS

Krypton-85 Enrichment (*L. L. Leavell*)

The renovation of the krypton facility is ~20% complete. The rebuilding of the diffusion columns has been delayed until the first of December when delivery of the inconel tubing is expected. The heating elements have been purchased and are on hand for inspection. Seventy-five percent of the miscellaneous parts have been fabricated or purchased. Three of the six column shells have been stripped and are ready for assembly.

The design for the installation of a water chiller is complete, and negotiations with the contractor for installation are in progress. The water chiller has been ordered and should be delivered in October.

Design concepts for a new control system are being evaluated, and if there are problems in this area, they are not defined. The facility should be ready by March 1974, barring such things as defective materials.

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

1. Process Status

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

2. Operational Summary

| <u>Product Inventory</u> | <u>Amount (Ci)</u> |
|--|--------------------|
| <u>Inventory Material</u> | |
| Cesium-137 chloride products | 558,159 |
| Sources in fabrication | 317 |
| Completed sources | <u>6,400</u> |
| <u>Total Inventory Material</u> | <u>564,876</u> |
| <u>Non-Inventory Material</u> | |
| Material returned or stored for customer | |
| Puerto Rico sources | 8,760 |
| Lockheed | 29,050 |
| AECL powder | 86,360 |
| Radiation resources | <u>37,450</u> |
| <u>Total Non-Inventory Material</u> | <u>161,620</u> |
| Total Inventory and Non-Inventory Material | 726,496 |

Fabrication Summary

| | <u>September 1973</u> | | <u>CY 1973</u> | | <u>FY 1974</u> | |
|-------------------|-----------------------|-----------|----------------|-----------|----------------|-----------|
| | <u>No.</u> | <u>Ci</u> | <u>No.</u> | <u>Ci</u> | <u>No.</u> | <u>Ci</u> |
| Sources | | | | | | |
| Fabricated | 26 | 14,541 | 36 | 37,341 | 26 | 14,541 |
| Shipped | 6 | 14,224 | 16 | 37,024 | 6 | 14,224 |
| Special Form Cans | | | | | | |
| Fabricated | 0 | 0 | 45 | 26,000 | 2 | 800 |
| Shipped | 0 | 0 | 42 | 23,900 | 2 | 800 |

3. Current Orders

Current orders for ^{137}Cs as sources or bulk powder are as follows:

| <u>Customer</u> | <u>Amount (Ci)</u> | <u>Estimated Shipping Date</u> |
|----------------------------|------------------------|------------------------------------|
| J. L. Shepherd | 7,614 | October 1973 |
| White Sands Missile Base | 14,221 | October 1973 |
| 3M Company | 300 | a |
| Technical Operations, Inc. | 290 | October 1973 |

^aHolding for request for shipment.

Strontium-90 Pilot Production (*R. W. Schaich*)
(Production and Inventory Accounts)

1. Process Status

The ^{90}Sr heat source (45,700 Ci) for Messerschmitt-Bolkow-Blohm was shipped in September 1973.

Decontamination efforts were continued on the powder handling cells at the FPD. The main thrust during September was the removal of excess equipment from Cell 14 (3 sections) and the initial flushing of the cell walls.

A decision was made to decontaminate the cesium and rare-earth process cells to provide manipulator cells for pressurized oxygen combustion (POC) equipment. The present schedule calls for decontamination of Cells 7, 8, 9, and 19 by December 1, 1973, and removal of process vessels and lines by January 1, 1974. This schedule would allow the construction phase and the installation of the POC to be completed by July 1, 1974. During this latter period, decontamination effort would continue on the powder handling cells in order to meet ^{90}Sr production requirements in FY 1975.

Product Inventory

| <u>Inventory Material</u> | <u>Amount (Ci)</u> |
|---|--------------------|
| Feed solution ($\pm 25\%$) ^a | 690,800 |
| ⁹⁰ Sr titanate products ($\pm 10\%$) | 87,200 |
| "AGN" liners | 145,500 |
| SNAP-7F sources | 115,200 |
| RCA source | 62,400 |
| ⁹⁰ Sr silicate powder | 30,500 |
| Recovery material | 25,400 |
| Stock powder cans | 6,700 |
| | <hr/> |
| Total | 1,163,700 |
| Less SNAP material purchase ^b | 277,400 |
| | <hr/> |
| <u>Total Inventory Material</u> | <u>886,300</u> |
| | |
| <u>Non-Inventory Material</u> | |
| Quehanna Recovery Material | 47,800 |
| Weather Bureau Source | 12,700 |
| SNAP-7B | 173,800 |
| SNAP-7C | 27,300 |
| SNAP-7D | 159,000 |
| URIPS (Billed @ 221,000 Ci) | 216,000 |
| SNAP material purchase | 277,400 |
| | <hr/> |
| <u>Total Non-Inventory Material</u> | <u>914,000</u> |
| | |
| Total Inventory and Non-Inventory Material | 1,800,300 |

^aIncludes 200,000 Ci having power density sufficiently high for heat sources.

^bStrontium-90 purchased under DRDT program and retained in solution form.

Fabrication Summary

| | <u>September 1973</u> | | <u>CY 1974</u> | | <u>FY 1974</u> | |
|-------------------|-----------------------|-----------|----------------|-----------|----------------|-----------|
| | <u>No.</u> | <u>Ci</u> | <u>No.</u> | <u>Ci</u> | <u>No.</u> | <u>Ci</u> |
| Sources | | | | | | |
| Fabricated | 0 | 0 | 1 | 45,700 | 1 | 45,700 |
| Shipped | 0 | 45,700 | 1 | 45,700 | 1 | 45,700 |
| Special Form Cans | | | | | | |
| Fabricated | 0 | 0 | 71 | 1,700 | 0 | 0 |
| Shipped | 0 | 0 | 72 | 1,700 | 0 | 0 |

3. Current Orders

Current orders for ^{90}Sr as sources or bulk powder are as follows:

| <u>Customer</u> | <u>Amount (Ci)</u> | <u>Estimated Shipping Date</u> |
|---------------------------------|------------------------|------------------------------------|
| U. S. Navy | 221,000 | a |
| New England Nuclear Corporation | 9 | a |

^aAll items are complete and awaiting receipt of further shipping instructions.

Short-Lived Fission Production (*R. W. Schaich*)
(Production and Inventory Accounts)

| <u>Isotope</u> | <u>Number of Batches</u> | <u>Amount (Ci)</u> |
|----------------------|--------------------------|--------------------|
| Xenon-133 | 1 | 350 |
| Iodine-131 | 1 | 12.5 |
| Yttrium-91 | 1 | 14.6 |
| Zirconium-niobium-95 | 1 | 5 |
| | | <u>382.1</u> |

Promethium-147 Shipments and Current Orders

| <u>Customer</u> | <u>Amount (Ci)</u> | <u>Estimated Shipping Date</u> |
|--------------------------------|------------------------|------------------------------------|
| Donald W. Douglas Laboratories | 50,000 | October 1973 ^a |
| Donald W. Douglas Laboratories | 50,000 | December 1973 ^a |

^aTo be shipped from Richland, Washington.

RADIOISOTOPE SALES

J. E. Ratledge

A request for quotation was received from Otis Engineering Corporation for a 150-W (~22 kCi) ^{90}Sr source. Orders were received for ^{33}P from International Atomic Energy Agency, 200 mCi, and from New England Nuclear Corporation, 300 mCi. Orders were received for ^{85}Kr from General Motors Corporation, 200 Ci; Western Electric Corporation, 100 Ci; Radiochemical Centre, 200 Ci; and Sumitomo Shoji America, Inc., 100 Ci.

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> | | |
| Radiochemical Centre | Krypton-85 | 200 Ci |
| General Motors Corporation | Krypton-85 | 200 Ci |
| Western Electric Corporation | Krypton-85 | 100 Ci |
| Sumitomo Shoji America, Inc. | Krypton-85 | 100 Ci |
| U. S. Radium Corporation | Tritium | 10,000 Ci |
| New England Nuclear Corporation | Tritium | 6,000 Ci |
| Messerschmitt-Bolkow-Blohm | Strontium-90 | 45,739 Ci |
| <u>Withdrawn Items</u> | | |
| George Washington University, Medical Center | Copper-67 | 6.5 mCi |
| Mayo Clinic | Copper-67 | 6.5 mCi |
| Cleveland Metropolitan General Hospital | Iodine-131 | 50 mCi |
| <u>Items Used in Cooperative Programs</u> | | |
| Oak Ridge Associated Universities | Gallium-67 | 390 mCi |
| Oak Ridge Associated Universities | Gold-199 | 6 mCi |
| ORNL (on loan) | Gadolinium-153 | 20 Ci |

The radioisotope sales proceeds and shipments for the first two months of FY 1973 and FY 1974 are given in Table 2.

Table 2. Radioisotope Sales and Shipments

| <u>Item</u> | <u>7-1-72 thru</u> <u>8-31-72</u> | <u>7-1-73 thru</u> <u>8-31-73</u> |
|----------------------------------|--------------------------------------|--------------------------------------|
| Inventory items | \$ 73,917 | \$ 53,817 |
| Major products | 10,002 | 22,710 |
| Radioisotope services | 21,258 | 24,165 |
| Cyclotron irradiations | 20,074 | 12,583 |
| Miscellaneous processed material | 12,203 | 6,721 |
| Packing and shipping | <u>11,590</u> | <u>9,822</u> |
| Total | \$149,044 | \$129,818 |
| Number of Shipments | 362 | 303 |

PUBLICATIONS

REPORTS

J. H. Gillette, *Radioisotope Program Progress Report for August 1973*, ORNL-TM-4362, Oak Ridge National Laboratory.

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