List of ERDA Radioisotope Customers with Summary of Radioisotope Shipments FY 1976

by
J. L. Simmons

MARCH 1977

Prepared for the Energy Research
and Development Administration
under Contract E(45-1)-1830

Battelle
Pacific Northwest Laboratories

MASTER

BNWL-2147

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency Thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

DISCLAIMER

Portions of this document may be illegible in electronic image products. Images are produced from the best available original document.

LIST OF ERDA RADIOISOTOPE CUSTOMERS
WITH SUMMARY OF RADIOISOTOPE SHIPMENTS
FY 1976

Compiled by
Janice L. Simmons

Published for
The Office of Program Coordination,
Office of the Assistant Administrator
U.S. Energy Research and Development Administration
Washington, DC 20545

NOTICE
This report was prepared as an account of work sponsored by the United States Government. Neither the United States nor the United States Energy Research and Development Administration, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness or usefulness of any information, apparatus, product or process disclosed, or represents that its use would not infringe privately owned rights.

BATTELLE
Pacific Northwest Laboratories
Richland, Washington 99352

MASTER

This document is
PUBLICLY RELEASABLE

Larry E. Williams
Authorizing Official

Date: *06/13/2007*

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED

leg

ACKNOWLEDGMENTS

The author wishes to thank the following laboratories and ERDA Area Offices for their annual contributions from which this report is compiled.

Argonne National Laboratory
Battelle, Pacific Northwest Laboratories
Hanford Engineering Development Laboratory
Idaho Operations Office/Aerojet Nuclear Company
Los Alamos Scientific Laboratory
Mound Laboratory
Oak Ridge National Laboratory
Savannah River Plant/ERDA
United Nuclear Industries, Inc.

PREVIOUS REPORTS

Previous reports in this series are:

TID-2160 (FY 1964)	ORNL-IIC-17 (FY 1968)	BNWL-1744 (FY 1972)
ORNL-IIC-6 (FY 1965)	ORNL-IIC-27 (FY 1969)	BNWL-1824 (FY 1973)
ORNL-IIC-9 (FY 1966)	ORNL-IIC-32 (FY 1970)	BNWL-1902 (FY 1974)
ORNL-IIC-13 (FY 1967)	ORNL-IIC-38 (FY 1971)	BNWL-1993 (FY 1975)

Similar reports covering stable isotope distribution have also been prepared and are available from the National Technical Information Center, US Department of Commerce, 5285 Port Royal Rd, Springfield, VA 22161.

- "Stable Isotope Customer List and Summary of Shipments, FY 1976," Oak Ridge National Laboratory
- "Stable Isotope Sales: Mound Laboratory Customer and Shipment Summaries, FY 1976."

NOMENCLATURE

I. CLASSIFICATIONS

Cyclotron Service Irradiations	CSI	Normal Uranium	NJ
Depleted Uranium	DJ	Reactor Service Irradiations	RSI
Enriched Uranium	EU	Special Services	SS
Fission Products	FP	Targets	Tgs
Miscellaneous Compound Preparations	MCP		

NOMENCLATURE (contd)

II. ISOTOPE SUPPLIER AND CONTACT

Argonne National Laboratory	(A)	Los Alamos Scientific Laboratory	(L)
J. C. Haugen Special Materials Division Argonne National Laboratory 9700 S. Cass Ave. Argonne, IL 60439		C. Longmire Los Alamos Scientific Laboratory University of California P.O. Box 1663 Los Alamos, NM 87545	
FTS 388-3795 Commercial 312-739-7711 Extension 3795		FTS 843-4948 Commercial 505-667-4948	
Battelle, Pacific Northwest Laboratories	(P)	Mound Laboratory	(M)
J. V. Filsinger Safety and Nuclear Materials Management Battelle, Pacific Northwest Laboratories Richland, WA 99352		Dr. R. A. Schwind, Manager Isotope Separation Section Monsanto Research Corporation P.O. Box 32 Miamisburg, OH 45342	
FTS 444-2051 Commercial 509-946-2051		FTS 774-7147 Commercial 513-866-7444 Extension 7147	
Brookhaven National Laboratory	(B)	Oak Ridge National Laboratory	(O)
P. Colsmann Isotopes and Special Materials Group Brookhaven National Laboratory Upton, Long Island, NY 11973		J. E. Ratledge, Supervisor Isotope Sales/Isotope Development Ctr. Oak Ridge National Laboratory P.O. Box X Oak Ridge, TN 37830	
FTS 664-4058 Commercial 516-345-3441 Extension 4058		FTS 850-6661 Commercial 615-483-8611 Extension 6661	
Hanford Engineering Development Laboratory	(H)	Savannah River Plant	(S)
D. Engel, Manager Materials Management Richland, WA 99352		W. D. Sandberg, Director Technical and Production Division ERDA P.O. Box A Aiken, SC 29801	
FTS 444-3202 Commercial 509-942-3202		FTS 284-2217 Commercial 803-824-6331 Extension 2217	
Idaho Operations Office	(I)	United Nuclear Industries, Inc.	(U)
R. A. Hasse Idaho National Engineering Co. EG&G Idaho Inc. P. O. Box 1625 Idaho Falls, ID 83401		P. A. Carlson, Manager Reactor Technology Richland, WA 99352	
FTS 583-4266 Commercial 208-522-6640 Extension 4266		FTS 444-1631 Commercial 509-942-1631	

CONTENTS

ACKNOWLEDGMENTS	ii
PREVIOUS REPORTS	ii
NOMENCLATURE	ii
INTRODUCTION	1
I. ALPHABETICAL LIST OF CUSTOMERS, WITH ISOTOPES PURCHASED AND RESPECTIVE SUPPLIERS	2
A. DOMESTIC	2
B. FOREIGN	16
II. ALPHABETICAL LIST OF ISOTOPES CROSS-REFERENCED TO CUSTOMER NUMBERS.	20
A. DOMESTIC	20
B. FOREIGN	23
III. ALPHABETICAL LIST OF STATES AND COUNTRIES CROSS- REFERENCED TO CUSTOMER NUMBERS	25
A. DOMESTIC	25
B. FOREIGN	26
IV. RADIOISOTOPE SALES AND TRANSFERS - FY 1976	27

LIST OF ERDA RADIOISOTOPE CUSTOMERS
WITH SUMMARY OF RADIOISOTOPE SHIPMENTS

FY 1976

INTRODUCTION

The thirteenth edition of the ERDA radioisotope customer list has been prepared at the request of the Office of Program Coordination, Office of the Assistant Administrator. The purpose of this document is to list the FY 1976 commercial radioisotope production and distribution activities of ERDA facilities at Argonne National Laboratory, Battelle, Pacific Northwest Laboratories, Brookhaven National Laboratory, Hanford Engineering Development Laboratory, Idaho Operations Office, Los Alamos Scientific Laboratory, Mound Laboratory, Oak Ridge National Laboratory, Savannah River Laboratory, and United Nuclear Industries, Inc.

The information is divided into four sections. Section I is an alphabetical list of domestic and foreign customers, and their addresses. Each customer has been designated a number according to its alphabetical position which provides a means of cross-referencing in the following sections. The isotopes purchased are listed after the address of the customer and the laboratory supplying each isotope is indicated by a letter set off by parenthesis (see Page **iii**, Nomenclature, Part II).^(a) Section II is an alphabetical list of isotopes, cross-referenced to customer numbers, and again divided into the domestic and foreign categories. This section provides a quick idea of the amount of companies purchasing a particular isotope. If more information is needed, the reader can locate the customer by number and determine the laboratory supplying the isotope. The third section is an alphabetical list of states and countries, also cross-referenced to customer numbers, indicating geographical concentrations of isotope users. Section IV summarizes the FY 1976 radioisotope shipment activities of ERDA laboratories in a comprehensive table providing an alphabetical listing of the isotopes and their suppliers. The shipments, quantities, and dollars are broken down for each isotope under the Domestic, Foreign, and Project (ERDA facilities) categories, and the total figures for each isotope are also provided.

(a) All entries for Argonne, United Nuclear and Idaho are either reactor service irradiations, cyclotron service irradiations, or both, with no processed isotopes being sold, while the entries for Savannah River represent material for resale and loans.

I. ALPHABETICAL LIST OF CUSTOMERS WITH ISOTOPES
PURCHASED AND RESPECTIVE SUPPLIERS

A. DOMESTIC

<p>1 A.A.I. Corporation
P. O. Box 6767
Baltimore, MD 21204</p> <p>DU(P)</p> <p>2 Abbott Laboratories
1400 Sheridan Road
North Chicago, IL 60064</p> <p>$^{99}\text{Tc}(0)$</p> <p>3 Aerojet. Nuclear Company
550 Second Street
Idaho Falls, ID 83401</p> <p>$^{241}\text{Am}(0)$, $^{243}\text{Am}(0)$, $^{140}\text{Ba}(0)$, $^{244}\text{Cm}(0)$,
$^{60}\text{Co}(\text{I})$, $^{152}\text{Eu}(\text{I})$, $^{154}\text{Eu}(\text{I})$, $\text{EU}(P)$,
$^{99}\text{Mo}(\text{I})$, $^{101}\text{Mo}(\text{I})$, $^{65}\text{Ni}(\text{I})$, $^{236}\text{Pu}(0)$,
$^{244}\text{Pu}(0)$, $^{103}\text{Ru}(0)$, $^{106}\text{Ru}(0)$, $^{124}\text{Sb}(\text{I})$,
$\text{Tgs}(0)$, $^{232}\text{U}(0)$, $^{133}\text{Xe}(0)$, $^{95}\text{Zr}(0)$</p> <p>4 Airco, Inc.
Central Research Laboratories
Murray Hill, NJ 07974</p> <p>$^{85}\text{Kr}(0)$</p> <p>5 Alabama, University of
Medical Center
1919 Seventh Avenue, South
Birmingham, AL 35486</p> <p>$^{99}\text{Tc}(0)$, $^{133}\text{Xe}(0)$</p> <p>6 Albert Einstein College of Medicine
Eastchester Rd. and Morris Park Ave.
Room 1211-C, Ullmann Building
Bronx, NY 10461</p> <p>RSI(B)</p> <p>7 Allied-General Nuclear Services
BNFP-Osborn Road (P. O. Box 847)
Barnwell, SC 29812</p> <p>$^{239}\text{Pu}(0)$, $^{242}\text{Pu}(0)$, $^{233}\text{U}(0)$, $^{235}\text{U}(0)$,
$^{238}\text{U}(0)$</p> <p>8 American Atomics Corporation
425 South Plumer
Tucson, AZ 85719</p> <p>$^3\text{H}(0)$, $^{85}\text{Kr}(0)$</p> <p>9 Amersham-Searle Corporation
Arlington Heights, IL 60005</p> <p>$^{241}\text{Am}(0)$, $^{129}\text{I}(0)$, $\text{SS}(0)$</p> | <p>10 AMOCO Chemicals Corporation
Warrenville Rd. and Mill Street
Naperville, IL 60540</p> <p>RSI(A)</p> <p>1 Analog Devices Semiconductor
829 Woburn Street
Wilmington, MA 01887</p> <p>$^{85}\text{Kr}(0)$</p> <p>12 ARCO Nuclear Company
P. O. Box 546
Leechburg, PA 15656</p> <p>$^{238}\text{Pu}(0)$</p> <p>13 Argonne National Laboratory
9700 South Cass Avenue
Argonne, IL 60439</p> <p>$^{140}\text{Ba}(0)$, $^{249}\text{Bk}(0)$, $^{249}\text{Cf}(0)$, $^{250}\text{Cf}(0)$,
$^{252}\text{Cf}(S)$, $^{248}\text{Cm}(0)$, $\text{DU}(P)$, $^{253}\text{Es}(0)$,
$^{152+154}\text{Eu}(0)$, $\text{FP}(0)$, $^3\text{H}(0)$, $^3\text{H}(P)$,
$\text{MCP}(0)$, $^{95}\text{Nb}(0)$, $^{237}\text{Np}(0)$, $^{103}\text{Pd}(M)$,
$^{239}\text{Pu}(0)$, $^{244}\text{Pu}(0)$, $\text{RSI}(B)$, $^{151}\text{Sm}(0)$,
$\text{SS}(0)$, $\text{Tgs}(0)$, $^{230}\text{Th}(0)$, $^{233}\text{U}(0)$,
$^{234}\text{U}(0)$, $^{235}\text{U}(0)$, $^{236}\text{U}(0)$, $^{238}\text{U}(0)$,
$^{133}\text{Xe}(0)$</p> <p>14 Argonne National Laboratories
EBR II Site INEL
Scoville, ID</p> <p>$^{86}\text{Kr}(H)$</p> <p>15 Arizona, University of
Post Office Drawer 4100
Tucson, AZ 85721</p> <p>$^{67}\text{Cu}(0)$</p> <p>16 Arkansas, University of
Fayetteville, AR 72701</p> <p>$^{252}\text{Cf}(S)$</p> <p>17 Atlantic Richfield Hanford Company
P. O. Box 250
Richland, WA 99352</p> <p>$^{241}\text{Am}(P)$, $^{133}\text{Ba}(H)$, $^7\text{Be}(H)$, $^{45}\text{Ca}(H)$,
$^{139}\text{Ce}(H)$, $^{141}\text{Ce}(H)$, $^{144}\text{Ce}(H)$, $^{144}\text{CePr}(H)$,
$^{58}\text{Co}(H)$, $^{60}\text{Co}(H)$, $^{51}\text{Cr}(H)$, $^{137}\text{Cs}(H)$,
$\text{DU}(P)$, $^{152}\text{Eu}(H)$, $^{155}\text{Eu}(H)$, $^{153}\text{Gd}(H)$,
$^3\text{H}(H)$, $^{131}\text{I}(H)$, $^{22}\text{Na}(H)$, $^{237}\text{Np}(H)$, $\text{Np}(P)$,
$^{236}\text{Pu}(0)$, $^{239}\text{Pu}(M)$, $\text{Pu}(P)$, $^{103}\text{Ru}(H)$,
$^{106}\text{Ru}(H)$, $^{124}\text{Sb}(H)$, $^{125}\text{Sb}(H)$, $^{46}\text{Sc}(H)$,
$^{85}\text{Sr}(H)$, $^{90}\text{SrY}(H)$, $^{99}\text{Tc}(H)$, $^{233}\text{U}(H)$,
$^{88}\text{Y}(H)$</p> |
|---|---|

- 18 **Atomics International**
Desoto SNM Vault
8900 Desoto Street
Canoga Park, CA 91304
 $^{60}\text{Co}(\text{H})$, $^{54}\text{Mn}(\text{H})$
- 19 **Automation Industries, Inc.**
Sperry Division
P. O. Box 245
Phoenixville, PA 19460
 $^{60}\text{Co}(\text{H})$, $^{192}\text{Ir}(\text{H})$
- 20 **Babcock and Wilcox Company**
Research and Development Division
1562 Beeson Street
Alliance, OH 44601
 $^{237}\text{Np}(\text{O})$
- 21 **Battelle Memorial Institute**
505 King Highway
Columbus, OH 43201
 $^{85}\text{Kr}(\text{O})$, $\text{Pu}(\text{P})$, $^{238}\text{Pu}(\text{O})$, $\text{SS}(\text{O})$
- 22 **Battelle, Pacific Northwest Laboratories**
P. O. Box 999
Richland, WA 99352
 $^{241}\text{Am}(\text{H})$, $^{133}\text{Ba}(\text{H})$, $^{249}\text{Bk}(\text{O})$, $^{252}\text{Cf}(\text{S})$,
 $^{243}\text{Cm}(\text{O})$, $^{244}\text{Cm}(\text{O})$, $^{253}\text{Es}(\text{O})$, $^3\text{H}(\text{H})$,
 $^{85}\text{Kr}(\text{O})$, $^{147}\text{Pm}(\text{H})$, $^{210}\text{Po}(\text{H})$, $^{238}\text{Pu}(\text{O})$,
 $^{239}\text{Pu}(\text{H})$, $^{239}\text{Pu}(\text{O})$, $^{240}\text{Pu}(\text{O})$, $^{244}\text{Pu}(\text{O})$,
 $\text{RaDEF}(\text{H})$, $^{106}\text{Ru}(\text{O})$, $^{90}\text{SrY}(\text{H})$, $^{230}\text{Th}(\text{O})$,
 $^{170}\text{Tm}(\text{U})$, $^{233}\text{U}(\text{H})$, $^{238}\text{U}(\text{H})$
- 23 **Baylor University**
1200 M. D. Anderson Boulevard
Houston, TX 77025
 $^4\text{K}(\text{O})$
- 24 **Bell Telephone Laboratories**
Murray Hill, NJ 07971
 $\text{MCP}(\text{O})$, $\text{SS}(\text{O})$, $\text{Tgs}(\text{O})$
- 25 **Bendix Corporation, The**
Electrical Components Division
Sidney, NY 13838
 $^{137}\text{Cs}(\text{O})$
- 26 **Boston University**
100 Cunningham Street
Boston, MA 02215
 $^{89}\text{Sr}(\text{O})$
- 27 **Brigham Young University**
Provo, UT 84601
 $^{147}\text{Pm}(\text{O})$
- 28 **Brookhaven National Laboratory**
Upton, Long Island, NY 11973
 $^{47}\text{Ca}(\text{O})$, $^{252}\text{Cf}(\text{O})$, $^{252}\text{Cf}(\text{S})$, $^{137}\text{Cs}(\text{O})$,
 $^3\text{H}(\text{O})$, $^4\text{K}(\text{O})$, $^{244}\text{Pu}(\text{O})$, $\text{Tgs}(\text{O})$,
 $^{229}\text{Th}(\text{M})$, $^{234}\text{U}(\text{O})$
- 29 **Brooklyn College**
Chemistry Department
Brooklyn, NY 11210
 $\text{RSI}(\text{B})$
- 30 **Brown University**
Department of Chemistry
192 Thayer Street
Providence, RI 02912
 $^{28}\text{Mg}(\text{B})$
- 31 **Burroughs Corporation**
460 Sierra Madre Villa
Pasadena, CA 91109
 $^{85}\text{Kr}(\text{O})$
- 32 **California Institute of Technology**
1201 E. California Blvd.
Pasadena, CA 91106
 $^{252}\text{Cf}(\text{S})$
- 33 **California, University of**
Lawrence Berkeley Laboratory
Berkeley, CA 94701
 $^{249}\text{Bk}(\text{O})$, $^{249}\text{Cf}(\text{O})$, $^{248}\text{Cm}(\text{O})$, $^{253}\text{Es}(\text{O})$,
 $^{129}\text{I}(\text{O})$, $\text{MCP}(\text{O})$, $^{242}\text{Pu}(\text{O})$, $^{89}\text{Sr}(\text{O})$,
 $^{99}\text{Tc}(\text{O})$, $\text{Tgs}(\text{O})$
- 34 **California, University of**
Donner Laboratory
Lawrence Berkeley Laboratory
Berkeley, CA 94720
 $^{82}\text{Sr}(\text{L})$, $^{85}\text{Sr}(\text{L})$
- 35 **California, University of**
400 Sproul Hall
Berkeley, CA 94720
 $^{236}\text{Pu}(\text{O})$, $^{235}\text{U}(\text{O})$
- 36 **California, University of**
Lawrence Livermore Laboratory
Box 808
Livermore, CA 94550
 $^{241}\text{Am}(\text{O})$, $^{243}\text{Am}(\text{O})$, $^{244}\text{Cm}(\text{O})$, $^{248}\text{Cm}(\text{O})$,
 $\text{DU}(\text{P})$, $^{253}\text{Es}(\text{O})$, $\text{MCP}(\text{O})$, $^{103}\text{Pd}(\text{M})$,
 $^{238}\text{Pu}(\text{M})$, $^{239}\text{Pu}(\text{M})$, $\text{SS}(\text{O})$, $\text{Tgs}(\text{O})$,
 $^{236}\text{U}(\text{O})$, $^{238}\text{U}(\text{O})$

- 37 California, University of
Los Alamos Scientific Laboratory
P.O. Box 990
Los Alamos, NM 87544

 $^{103}\text{Pd}(\text{M})$, $^{238}\text{Pu}(\text{M})$, $^{239}\text{Pu}(\text{M})$, $\text{RSI}(\text{B})$,
 $\text{Th}(\text{M})$
- 38 California, University of
Los Alamos Scientific Laboratory
P.O. Box 1663
Los Alamos, NM 87544

 $^{47}\text{Ca}(\text{O})$, $^{250}\text{Cf}(\text{O})$, $^{252}\text{Cf}(\text{O})$, $^{252}\text{Cf}(\text{S})$,
 $^{244}\text{Cm}(\text{O})$, $^{253}\text{Es}(\text{O})$, $^{152+154}\text{Eu}(\text{O})$,
 $^{257}\text{Fm}(\text{O})$, $^3\text{H}(\text{O})$, $^{131}\text{I}(\text{O})$, $^{238}\text{Pu}(\text{O})$,
 $^{106}\text{Ru}(\text{O})$, $\text{SS}(\text{O})$, $\text{Tgs}(\text{O})$, $^{232}\text{U}(\text{O})$,
 $^{233}\text{U}(\text{O})$, $^{238}\text{U}(\text{O})$, $^{95}\text{Zr}(\text{O})$
- 39 California, University of
630 Circle Drive South
Los Angeles, CA 90405

 $^{28}\text{Mg}(\text{B})$
- 40 California, University of
405 Hilgard Avenue
Los Angeles, CA 90024

 $^{47}\text{Ca}(\text{O})$, $^{237}\text{Np}(\text{O})$, $^{242}\text{Pu}(\text{O})$, $^{106}\text{Ru}(\text{O})$,
 $^{133}\text{Xe}(\text{O})$
- 41 California, University of
San Francisco Medical Center
San Francisco, CA 94122

 $^{252}\text{Cf}(\text{S})$, $^{133}\text{Xe}(\text{O})$
- 42 California, University of
Santa Barbara, CA 93106

 $^{252}\text{Cf}(\text{O})$
- 43 California, University of
Purchasing Department
Santa Cruz, CA 95064

 $^{230}\text{Th}(\text{O})$
- 44 California-San Diego, University of
LaJolla, CA 92037

 $\text{RSI}(\text{A})$
- 45 Carnegie-Mellon University
5000 Forbes
Pittsburgh, PA 15213

 $^{181}\text{Hf}(\text{O})$
- 46 Chamberlain Manufacturing Co.
East 4th and Esther Streets
Waterloo, IA 50705

 $\text{DU}(\text{P})$
- 47 Chicago, University of
1160 East 55th Street
Chicago, IL 60615

 $^{89}\text{Sr}(\text{O})$, $^{234}\text{U}(\text{O})$
- 48 Chicago, University of
950 E. 59th Street
Chicago, IL 60637

 $^{252}\text{Cf}(\text{S})$, $^{82}\text{Sr}(\text{L})$, $^{85}\text{Sr}(\text{L})$
- 49 Chicago, University of
Dept. of Medicine
Chicago, IL 60637

 $^{28}\text{Mg}(\text{B})$
- 50 Chicago, University of
Enrico Fermi Institute
5630 South Ellis Avenue
Chicago, IL 60637

 $\text{RSI}(\text{A})$
- 51 Chicago, University of
Hinds Geophysical Department
5641 South Ingleside Avenue
Chicago, IL 60637

 $\text{RSI}(\text{A})$
- 52 Cincinnati General Hospital
3231 Burnet Avenue
Cincinnati, OH 45202

 $^{52}\text{Fe}(\text{B})$, $^{123}\text{I}(\text{B})$, $^{127}\text{Xe}(\text{B})$
- 53 Cincinnati, University of
Cincinnati, OH 45221

 $^{99}\text{Tc}(\text{O})$
- 54 Cleveland Metropolitan General Hospital
3395 Scranton Road
Cleveland, OH 44109

 $^{131}\text{I}(\text{O})$
- 55 Cleveland University Hospital
University Circle
Cleveland, OH 44106

 $^{43}\text{K}(\text{O})$
- 56 Colorado, University of
Boulder, CO 80302

 $^{155}\text{Eu}(\text{O})$, $\text{SS}(\text{O})$, $^{99}\text{Tc}(\text{O})$
- 57 Columbia University
Box 6, Low Library
New York, NY 10027

 $^{243}\text{Am}(\text{O})$, $^{236}\text{Pu}(\text{O})$

- 58 Connecticut, University of
Central Warehouse, U-114
Storrs, CT 06268

RSI(B)

 $^{133}\text{Xe}(0)$
- 59 Consumers Power Company
Palisades Nuclear Plant
Route 2, Box 154
Covert, MI 49043

 $^{133}\text{Xe}(0)$
- 60 Cook Electric Company
6201 Oakton Street
Morton Grove, IL 60053

 $^{85}\text{Kr}(0)$
- 61 Coratomic, Inc.
P.O. Box 434
Indiana, PA 15701

 $^{238}\text{Pu}(0)$
- 62 Cornell University
Division of Nutritional Sciences
29 Savage Hall
Ithaca, NY 14850

 $^{47}\text{Ca}(0)$, $^{252}\text{Cf}(0)$, $^{252}\text{Cf}(S)$, $^{28}\text{Mg}(B)$
- 63 Creighton University
2410 California
Omaha, NB 68131

 $^{47}\text{Ca}(0)$
- 64 Cryogenic Rare Gas Laboratories, Inc.
730 South 13th Street
Newark, NJ 07103

 $^{85}\text{Kr}(0)$
- 65 C. V. I.
Box 2138
Columbus, OH 43216

 $^{85}\text{Kr}(H)$
- 66 Delco Electronics
General Motors Corporation
Kokomo, IN 46901

 $^{85}\text{Kr}(0)$
- 67 Diagnostic Isotopes, Inc.
123 Pleasant Avenue
Upper Saddle River, NJ 07458

 $^{127}\text{Xe}(B)$
- 68 Duke University
Durham, NC 27706

 $\text{Tgs}(0)$, $^{133}\text{Xe}(0)$
- 69 DuPont de Nemours and Company, E. I.
Savannah River Plant
Aiken, SC 29801

 $^{252}\text{Cf}(0)$, $^{238}\text{Pu}(M)$, $^{242}\text{Pu}(0)$, $^{244}\text{Pu}(0)$
- 70 Eberline Instrument Corporation
P.O. Box 279
Santa Fe, NM 87501

 $^{232}\text{Th}(0)$
- 71 Edgerton, Germeshausen and Grier
6456 South Escondido Avenue
Las Vegas, NV 89101

 $^{60}\text{Co}(0)$, $\text{SS}(0)$
- 72 Edinboro State College
Edinboro, PA 16444

 $^{252}\text{Cf}(S)$
- 73 EMR Photo Electric
Division of Weston Instruments
P.O. Box 44
Princeton, NJ 08540

 $^3\text{H}(0)$
- 74 Fairchild Semiconductors
P.O. Box 790
Mountain View, CA 94040

 $^{85}\text{Kr}(0)$
- 75 Fairchild Semiconductors
333 Western Avenue
South Portland, ME 04106

 $^{85}\text{Kr}(0)$
- 76 Florida Power and Light Company
P. O. Box 950
Miami, FL 33101

 $^{89}\text{Sr}(0)$
- 77 Florida State University
Tallahassee, FL 32306

 $^{230}\text{Th}(0)$
- 78 Gamma Industries
9320 Travenor
P.O. Box 34526
Houston, TX 77034

 $^{241}\text{Am}(0)$
- 79 Gammatron, Inc.
P.O. Box 14023
Houston, TX 77021

 $^{238}\text{Pu}(0)$

- 80 General Electric Company
21800 Tungsten Road
Cleveland, OH 44117
 $^3\text{H}(0)$, $^{85}\text{Kr}(0)$
- 81 General Electric Company
Neutron Devices Department
Pinellas Peninsula Plant
St. Petersburg, FL 33733
 $^3\text{H}(M)$, $^{85}\text{Kr}(0)$, $^{239}\text{Pu}(M)$
- 82 General Electric Company
P.O. Box 254
San Jose, CA 95103
 $^{237}\text{Np}(0)$, $\text{SS}(0)$, $^{234}\text{U}(0)$, $^{235}\text{U}(0)$,
 $^{238}\text{U}(0)$
- 83 General Electric Research and
Development Center
P.O. Box 8
Schenectady, NY
 $\text{RSI}(B)$
- 84 General Electric Company
1 Progress Road
Shelbyville, IN 46176
 $^{85}\text{Kr}(0)$
- 85 General Electric Company
Space Division
Valley Forge, PA 19406
 $^{238}\text{Pu}(M)$, $\text{Th}(M)$
- 86 General Electric Company
General Electric Drive
Waynesboro, VA 22980
 $^{85}\text{Kr}(0)$
- 87 General Motors Corporation
Frigidaire Division
Dayton, OH 45501
 $^{85}\text{Kr}(0)$
- 88 General Nucleonics Division,
Tyco Laboratories
2811 Metropolitan Place
Pomona, CA 91767
 $^{85}\text{Kr}(0)$
- 89 George Washington University
Washington, DC 20006
 $\text{MCP}(0)$
- 90 Georgia Institute of Technology
225 North Avenue, N.W.
Atlanta, GA 30332
 $^{249}\text{Cf}(0)$, $^{85}\text{Kr}(0)$, $\text{MCP}(0)$, $^{90}\text{Sr}(0)$
- 91 Georgia, University of
Athens, GA 30601
 $^{89}\text{Sr}(0)$
- 92 Goodyear Atomic Corporation
P.O. Box 628
Piketon, OH 45661
 $\text{SS}(0)$, $^{99}\text{Tc}(0)$
- 93 Grumman Aerospace Corporation
P.O. Box 177
Bethpage, NY 11714
 $\text{RSI}(B)$
- 94 Gulf Energy and Environmental Systems
P.O. Box 608
San Diego, CA 92112
 $^{129}\text{I}(0)$, $^{89}\text{Sr}(0)$, $^{95}\text{Zr}(0)$
- 95 Hanford Engineering Development
Laboratory
P.O. Box 1970
Richland, WA 99352
 $^{110}\text{Ag}(H)$, $^{133}\text{Ba}(H)$, $^{141}\text{Ce}(H)$, $^{57}\text{Co}(H)$,
 $^{60}\text{Co}(H)$, $^{137}\text{Cs}(H)$, $\text{DU}(P)$, $\text{EU}(P)$,
 $^{59}\text{Fe}(H)$, $^{131}\text{I}(H)$, $^{22}\text{Na}(H)$, $^{237}\text{Np}(H)$,
 $^{147}\text{Pm}(H)$, $\text{Pu}(P)$, $^{239}\text{Pu}(H)$, $\text{RaDEF}(H)$,
 $^{75}\text{Se}(H)$, $^{90}\text{SrY}(H)$, $\text{Th}(P)$, $^{233}\text{U}(P)$
- 96 Harvard University
Cambridge, MA 02138
 $^{241}\text{Am}(0)$
- 97 Heckscher Art Museum
Prime Avenue
Huntington, NY 11743
 $\text{RSI}(B)$
- 98 Hughes Aircraft Company
P.O. Box 92907
Los Angeles, CA 90009
 $^{85}\text{Kr}(0)$
- 99 ICI America, Inc.
Atlas Aerospace Division
Valley Forge Industrial Park
Valley Forge, PA 19481
 $^{85}\text{Kr}(0)$
- 100 ICN-NBCo
26201 Miles Road
Cleveland, OH 44128
 $^{241}\text{Am}(0)$, $^{137}\text{Cs}(0)$, $\text{CSI}(0)$, $\text{FP}(0)$,
 $^3\text{H}(0)$, $^{129}\text{I}(0)$, $^{33}\text{P}(0)$, $^{239}\text{Pu}(0)$,
 $^{106}\text{Ru}(0)$, $^{151}\text{Sm}(0)$, $^{90}\text{Sr}(0)$, $\text{SS}(0)$

- 101 Illinois, University of
Nuclear Engineering Laboratory
Urbana, IL 61801
 $^3\text{H}(\text{P})$
- 102 Illinois, University of
203 Administration Building E
Urbana, IL 61803
 $^{239}\text{Pu}(\text{O})$
- 103 Indiana University
630 W. New York Street
Indianapolis, IN 46202
 $^{47}\text{Ca}(\text{O})$
- 104 Industrial Nucleonics Corporation
650 Ackerman Road
Columbus, OH 43202
 $^{85}\text{Kr}(\text{O})$
- 105 Inhalation Toxicology Institute
Lovelace Foundation for Medical
Education and Research
Building 9200, Area Y, Sandia Base
P.O. Box 5890
Albuquerque, NM 87115
 $^{103}\text{Pd}(\text{M})$
- 106 Intelcom Rad Tech
P.O. Box 80817
San Diego, CA 92138
 $^{235}\text{U}(\text{O})$
- 107 Interex Corporation
66 Woerd Avenue
Waltham, MA 02154
 $^{85}\text{Kr}(\text{O})$
- 108 International Nutronics, Inc.
1237 N. San Antonio Road
Palo Alto, CA 94303
 $^{252}\text{Cf}(\text{S})$
- 109 Isotope Products Laboratories
1800 North Keystone Street
Burbank, CA 91504
 $^{252}\text{Cf}(\text{O})$, $^{244}\text{Cm}(\text{O})$, $^{137}\text{Cs}(\text{O})$, $^{85}\text{Kr}(\text{O})$,
 $^{236}\text{Pu}(\text{O})$, $^{239}\text{Pu}(\text{O})$, $\text{Tgs}(\text{O})$, $^{235}\text{U}(\text{O})$,
 $^{95}\text{Zr}(\text{O})$
- 110 Isotopic Analysis, Inc.
P.O. Box 51385
Tulsa, OK 74151
 $^{233}\text{U}(\text{O})$
- 111 Isovac Engineering Company
6220 San Fernando Road
Glendale, CA 91204
 $^{85}\text{Kr}(\text{O})$
- 112 ITT Semiconductors
A Division of International Telephone
and Telegraph
3301 Electronics Way
W. Palm Beach, FL 33407
 $^{85}\text{Kr}(\text{O})$
- 113 Kansas, University of
Medical Center
Kansas City, KS 66103
 $^{133}\text{Xe}(\text{O})$
- 114 Kentucky, University of
Department of Chemistry
Lexington, KY 40506
 $^{252}\text{Cf}(\text{S})$, $\text{RSI}(\text{A})$
- 115 Knolls Atomic Power Laboratory
P.O. Box 1072
Schenectady, NY 12301
 $^{237}\text{Np}(\text{O})$, $^{238}\text{U}(\text{O})$
- 116 Lenoir-Rhyne College
Hickory, NC 28601
 $^{252}\text{Cf}(\text{S})$
- 117 LFE Environmental Analysis Laboratory
2030 Wright Avenue
Richmond, CA 94804
 $^3\text{H}(\text{M})$
- 118 L. I. Metal, Inc.
Garvies Point Road
Glen Cove, NY 11542
 $\text{RSI}(\text{B})$
- 119 Lockheed Aircraft Corporation
P.O. Box 504
Missiles and Space
Sunnyvale, CA 94088
 $^3\text{H}(\text{O})$, $^{85}\text{Kr}(\text{O})$, $\text{Tgs}(\text{O})$
- 120 Long Island Lighting Company
250 Old Country Road
Mineola, NY 11501
 $\text{RSI}(\text{B})$
- 121 Lovelace Clinic
4800 Gibson Boulevard, S.E.
Albuquerque, NM 87108
 $^{243}\text{Am}(\text{O})$, $^{243}\text{Cm}(\text{O})$, $\text{CSI}(\text{O})$, $\text{MCP}(\text{O})$,
 $^{147}\text{Pm}(\text{O})$, $^{90}\text{Sr}(\text{O})$

- 122 Mallinkrodt Institute of Radiology
Washington University School of
Medicine
510 South Kings Highway
St. Louis, MO 63110
 $^{252}\text{Cf}(\text{S})$
- 123 Marine Biological Laboratory
Whitman 419 - Radiation Laboratory
Woods Hole, MA 02543
 $^{28}\text{Mg}(\text{B})$
- 124 Maryland, University of
Baltimore County Campus
5401 Wilkins Drive
Baltimore, MO 21228
 $^{192}\text{Ir}(\text{O})$, $^{43}\text{K}(\text{O})$, $^{106}\text{Ru}(\text{O})$
- 125 Maryland, University of
Chemical Engineering Department
College Park, MD 20742
RSI(A)
- 126 Maryland, University of
College Park, MD 20742
 $^{43}\text{K}(\text{O})$
- 127 Massachusetts General Hospital
32 Fruit
Boston, MA 02114
 $^{82}\text{Sr}(\text{L})$, $^{85}\text{Sr}(\text{L})$
- 128 Massachusetts General Hospital
Isotope Laboratory
Boston, MA 02114
 $^{47}\text{Ca}(\text{O})$
- 129 Massachusetts General Hospital
Nuclear Medicine, Gray 2
Boston, MA 02114
 $^{127}\text{Xe}(\text{B})$
- 130 Massachusetts Institute of Technology
Room 6-017
Building #3 Rec. Room
Cambridge, MA 02139
RSI(B)
- 131 Mayo Clinic
Isotope Receiving
Rochester, MN 55901
 $^{28}\text{Mg}(\text{B})$
- 132 Mayo Foundation
Rochester, MN 55901
 $^{47}\text{Ca}(\text{O})$, $^{67}\text{Cu}(\text{O})$
- 133 Metropolitan Museum of Art
New York, NY
RSI(B)
- 134 Michael-Reese Hospital
29th Street and Ellis Avenue
Chicago, IL 60616
 $^{133}\text{Xe}(\text{O})$
- 135 Michigan, University of
Ann Arbor, MI 48104
 $^{252}\text{Cf}(\text{S})$, $^{133}\text{Xe}(\text{O})$
- 136 Mine Safety Appliance Company
201 North Braddock Avenue
Pittsburgh, PA 15208
 $^{131}\text{I}(\text{O})$
- 137 Minnesota Mining and Manufacturing Co.
P.O. Box 3121
St. Paul, MN 55101
 $^{85}\text{Kr}(\text{O})$, $\text{MCP}(\text{O})$, $^{95}\text{Nb}(\text{O})$, $^{147}\text{Pm}(\text{O})$,
 $^{99}\text{Tc}(\text{O})$
- 138 Mississippi, University of
Jackson, MS 39205
 $^{85}\text{Kr}(\text{O})$
- 139 Missouri, University of
Columbia, MO 65201
 $\text{Tgs}(\text{O})$, $^{235}\text{U}(\text{O})$
- 140 Monsanto Company
P.O. Box 1311
Texas City, TX 77591
 $^{133}\text{Xe}(\text{O})$
- 141 Monsanto Research Corporation
Dayton Laboratory
1515 Nicholas Road
Dayton, OH 45407
 $^{241}\text{Am}(\text{O})$, $^{252}\text{Cf}(\text{S})$, $^{238}\text{Pu}(\text{O})$, $\text{SS}(\text{O})$
- 142 Monsanto Research Corporation
Mound Laboratory
P.O. Box 32
Miamisburg, OH 45342
 $^{238}\text{Pu}(\text{S})$
- 143 Moravek Biochemicals
15302 E. Proctor Avenue
City of Industry, CA 91745
 $^3\text{H}(\text{O})$

- 144 Motorola, Inc.
3501 Ed Bluestein Boulevard
Austin, TX 78721
 $^{85}\text{Kr}(0)$
- 145 Motorola, Inc.
5005 East McDowell Road
Phoenix, AZ 85008
 $^{85}\text{Kr}(0)$
- 146 NASA - Lyndon B. Johnson Space Center
Transportation Officer, Bldg. 420
Houston, TX 77058
RSI(B)
- 147 National Animal Disease Center, USDA
Rural Route 2, Dayton Avenue
Ames, IA 50010
 $^{28}\text{Mg}(B)$
- 148 National Bureau of Standards
Quince Orchard Road
Gaithersburg, MD 20760
 $^{123}\text{I}(B)$, $^{127}\text{Xe}(B)$
- 149 National Bureau of Standards
Connecticut Avenue and Van Ness
Street, N.W.
Washington, DC 20234
 $^{252}\text{Cf}(0)$, $^{237}\text{Np}(0)$, $^{239}\text{Pu}(0)$, Tgs(0)
- 150 National Institute of Health
Building 21, Isotope Laboratory
Bethesda, MD 20014
 $^{127}\text{Xe}(B)$
- 151 National Semiconductor Corporation
2900 Semiconductor Drive
Santa Clara, CA 95051
 $^{85}\text{Kr}(0)$
- 152 Navy, Department of
Naval Air Development Center
Warminster, PA 18974
RSI(B)
- 153 Nevada, University of
Reno, NV 89507
 $^{144}\text{In}(0)$
- 154 New England Nuclear Corporation
575 Albany Street
Boston, MA 02118
 $^{137}\text{Cs}(0)$, $^{137}\text{CsI}(0)$, $^{153}\text{Gd}(0)$, $^3\text{H}(0)$,
 $^{129}\text{I}(0)$, $^{85}\text{Kr}(0)$, $^{60}\text{Co}(0)$, $^{32}\text{P}(0)$,
 $^{106}\text{Ru}(0)$, $^{151}\text{Sm}(0)$, $^{99}\text{Tc}(0)$, $^{95}\text{Zr}(0)$
- 155 New England Nuclear
549 Albany Street
Boston, MA 02118
 $^3\text{H}(P)$
- 156 New Mexico Institute of Mining and
Technology
Tera Group
Socorro, NM 87801
DU(P)
- 157 New York State Department of Health
30 Russell Road
Albany, NY 12201
RSI(B)
- 158 New York University
Washington Square
New York, NY 10016
 $^{252}\text{Cf}(0)$
- 159 New York University Medical Center
550 First Avenue
New York, NY 10016
 $^{243}\text{Cm}(0)$
- 160 New York, State University of
Dept. of Earth and Space Sciences
Stony Brook, NY 11790
RSI(B)
- 161 New York, State University of
Downstate Medical Center
450 Clarkson Avenue
Brooklyn, NY 11203
 $^{99}\text{Tc}(0)$
- 162 North Carolina Baptist Hospital
Nuclear Medicine
300 South Hawthorne
Winston Salem, NC 27103
 $^{127}\text{Xe}(B)$
- 163 North Carolina State University
P. O. Box 5935
Raleigh, NC 27607
 $^{137}\text{Cs}(0)$
- 164 Northwest Industries
125 E. 34th Avenue
Albany, OR 97321
DU(P)
- 165 Northwestern University
619 Clark Street
Evanston, IL 60201
 $^{129}\text{I}(0)$

- 166 Notre Dame, University of
Notre Dame, IN 46556
 $^{181}\text{Hf}(0)$
- 167 Nuclear Dynamics
2614 Seaman Avenue
El Monte, CA 91733
 $^3\text{H}(0)$
- 168 Nuclear Environmental Engineering, Inc.
P.O. Box 58866
Houston, TX 77058
 $^{241}\text{Am}(0)$, $^{137}\text{Cs}(0)$, $^3\text{H}(0)$, $^{85}\text{Kr}(0)$,
 $\text{MCP}(0)$, $^{90}\text{Sr}(0)$, $\text{SS}(0)$
- 169 Nuclear Medical Systems, Inc.
515 Superior Avenue
Newport Beach, CA 92660
 $^3\text{H}(0)$
- 170 Nuclear Pharmacy, Inc.
2101 North Oregon, Suite 1
El Paso, TX 79902
 $^{133}\text{Xe}(0)$
- 171 Nuclear Radiation Development, Inc.
2937 Alt Blvd.
Grand Island, NY 14072
 $^{241}\text{Am}(0)$, $\text{SS}(0)$
- 172 Nuclear Research Corporation
Street Road and Second Street Pike
Southampton, PA 18966
 $^{137}\text{Cs}(0)$, $\text{FP}(0)$
- 173 Nuclear Sources and Services
P. O. Box 14023
Houston, TX 77021
 $^{241}\text{Am}(0)$, $\text{SS}(0)$
- 174 Oak Ridge Associated Universities
P.O. Box 117
Oak Ridge, TN 37830
 $^{252}\text{Cf}(0)$, $\text{CSI}(0)$, $\text{MCP}(0)$
- 175 Oak Ridge Technical Enterprises Corp
102 Midland Road
Oak Ridge, TN 37830
 $^{239}\text{Pu}(0)$, $\text{Tgs}(0)$, $^{232}\text{Th}(0)$, $^{233}\text{U}(0)$,
 $^{235}\text{U}(0)$, $^{238}\text{U}(0)$
- 176 Occidental Oil Shale Company, Inc.
P.O. Box 2999
Grand Junction, CO 81501
 $^{85}\text{Kr}(0)$
- 177 Ohio State. University
Research Foundation
1314 Kinnear Road
Columbus, OH 43212
 $^{89}\text{Sr}(0)$
- 178 Orange, County of
P.O. Box 564
Room 362, Engineering Building
Santa Ana, CA
 $^{133}\text{Xe}(0)$
- 179 Oregon Medical School, University of
3181 S.W. Sam Jackson Park Road
Portland, OR 97201
 $^{133}\text{Xe}(0)$
- 180 Oregon State University
Corvallis, OR 97330
 $^{252}\text{Cf}(S)$
- 181 Pacific Lutheran University
Department of Biology
Tacoma, WA 98447
 $^{28}\text{Mg}(B)$
- 182 Palmdale General Hospital
Palmdale, CA 93550
 $^{133}\text{Xe}(0)$
- 183 Pennsylvania, Hospital of University of
Department of Radiology
3400 Spruce Street
Philadelphia, PA 19174
 $^{123}\text{I}(B)$, $^{127}\text{Xe}(B)$
- 184 Pennsylvania State University
University Park, PA 16802
 $\text{DU}(P)$
- 185 Pennsylvania, University of
Department of Radiology
3400 Spruce Street
Philadelphia, PA 19104
 $^{252}\text{Cf}(S)$
- 186 Pennsylvania, University of
3025 Walnut Street
Philadelphia, PA 19104
 $^{106}\text{Ru}(0)$, $^{133}\text{Xe}(0)$
- 187 Penrose Hospital
2215 North Cascade
Colorado Springs, CO 80907
 $^{133}\text{Xe}(0)$

- 188 Philadelphia General Hospital
Research Funds
700 Civic Center Boulevard
Philadelphia, PA 19104
 $^{133}\text{Xe}(\text{O})$
- 189 Picatinny Arsenal
Dover, NJ 07801
DU(P)
- 190 Pittsburgh, University of
LLRM Facility
Graduate School of Public Health
Pittsburgh, PA 15261
 $^{103}\text{Pd}(\text{M})$
- 191 Presbyterian-St. Luke's Hospital
1753 West Congress Street
Chicago, IL
CSI(A)
- 192 Purdue University
Lafayette, IN 47907
CSI(A), RSI(A)
- 193 Purdue University
Pharmacy Annex
Lafayette, IN 47907
 $^{95}\text{Zr}(\text{O})$
- 194 Radiation Management Corporation
Suite 30, 3508 Market Street
Philadelphia, PA 19104
 $^{236}\text{Pu}(\text{O})$
- 195 Radio Corporation of America (RCA)
Route 12, Fostoria Road
Findlay, OH 45840
 $^{85}\text{Kr}(\text{O})$
- 196 Radpharm, Inc.
2333 Buchanan Street, Rm 145
San Francisco, CA 94115
 $^{127}\text{Xe}(\text{B})$, $^{133}\text{Xe}(\text{O})$
- 197 Reactor Experiments, Inc.
963 Terminal Way
San Carlos, CA 94070
 $^{239}\text{Pu}(\text{O})$
- 198 Rensselaer Polytechnic Institute
110 8th Street
Troy, NY 12181
 $^{99}\text{Tc}(\text{O})$, $\text{Tgs}(\text{O})$, $^{238}\text{U}(\text{O})$
- 199 Rensselaer Polytechnic Institute
Nuclear Engineering Department
Troy, NY 12181
 $^{28}\text{Mg}(\text{B})$
- 200 Rensselaer Polytechnic Institute
Service Building
Troy, NY 12181
RSI(B)
- 201 Reuter-Stokes Electronics Components
18530 South Miles Parkway
Warrensville Heights
Cleveland, OH 44128
 $^{232}\text{Th}(\text{O})$
- 202 Rochester, University of
575 Elmwood Avenue
Rochester, NY 14627
 $^{131}\text{I}(\text{O})$
- 203 Rockwell International
Atomic International Division
Rocky Flats Plant
Rocky Flats, CO 80401
 $^{241}\text{Am}(\text{O})$, $\text{Np}(\text{P})$, $\text{Pu}(\text{P})$, $^{236}\text{Pu}(\text{O})$,
 $^{238}\text{Pu}(\text{M})$
- 204 Rush-Presbyterian St. Luke's Medical
Center
1753 West Congress Parkway
Chicago, IL 60612
 $^{52}\text{Fe}(\text{B})$, $^{89}\text{Sr}(\text{O})$
- 205 St. John's Hospital
333 North F Street
Oxnard, CA 93030
 $^{133}\text{Xe}(\text{O})$
- 206 St. Vincent Medical Center
3rd and Grandview
Los Angeles, CA 90057
 $^{133}\text{Xe}(\text{O})$
- 207 San Clemente General Hospital
Department of Nuclear Medicine
654 Camino de Los Mares
San Clemente, CA 92672
 $^{133}\text{Xe}(\text{O})$
- 208 Sandia Laboratories
Kirtland AFB (East)
Albuquerque, NM 87115
 $^{238}\text{Pu}(\text{M})$

- 209 Sandia Laboratories
Building 916
Livermore, CA 94550

U(M)
- 210 Sandia Laboratory
P.O. Box 969
Livermore, CA 94550

DU(P)
- 211 Sandia Corporation
P. O. Box 5800
Albuquerque, NM 87115

 $^{243}\text{Am}(0)$, $^{249}\text{Bk}(0)$, $^{249}\text{Cf}(0)$, $^{244}\text{Cm}(0)$,
DU(P), $^{129}\text{I}(0)$, MCP(0), $^{239}\text{Pu}(0)$,
SS(0)
- 212 Schlumberger Technology Corporation
Old Quarry Road
P.O. Box 307
Ridgefield, CT 06877

 $^{252}\text{Cf}(S)$, $^3\text{H}(0)$
- 213 Schwarz Bio-Research, Inc.
Mountain View Avenue
Orangeburg, NY 10962

 $^3\text{H}(0)$
- 214 Science Applications
3 Choke Cherry Road
Rockville, MD 20850

 $^{242}\text{Pu}(0)$, $^{233}\text{U}(0)$, $^{238}\text{U}(0)$
- 215 Scripps Clinic and Research Foundation
476 Prospect Street
La Jolla, CA 92037

 $^{133}\text{Xe}(0)$
- 216 Self-Powered Lighting, Ltd.
629 5th Avenue
Pelham, NY 10830

 $^3\text{H}(0)$
- 217 Shepherd and Associates, J. L.
1614 Victory Boulevard
Glendale, CA 91201

MCP(0)
- 218 Sloan-Kettering Institute
425 East 68th Street
New York, NY 10021

 $^{133}\text{Xe}(0)$
- 219 Southern California, University of
University Park
Los Angeles, CA 90007

MCP(0)
- 220 Southern California, University of
School of Pharmacy
1985 Zonal Avenue
Los Angeles, CA 90033

 $^{252}\text{Cf}(S)$
- 221 Southern Research Institute
2000 Ninth Avenue, South
Birmingham, AL 35205

RSI(B)
- 222 Stanford University
P.O. Box 4409
Stanford, CA 94305

 $^3\text{H}(0)$, Tgs(0)
- 223 Statek Corporation
1200 Alvarez Avenue
Orange, CA 92668

 $^{85}\text{Kr}(0)$
- 224 Swedish-American Hospital
1400 Charles Street
Rockford, IL 61101

 $^{133}\text{Xe}(0)$
- 225 Syntex Corporation
3401 Hillview Avenue
Palo Alto, CA 94304

 $^3\text{H}(0)$
- 226 Tempset, Inc.
1251 Grover Road
St. Louis, MO 63125

 $^{85}\text{Kr}(0)$
- 227 Tennessee, University of
Center for Health Services
Department of Medicinal Chemistry
Memphis, TN 38163

 $^{127}\text{Xe}(B)$
- 228 Tennessee, University of
Health Physics
Cherokee Trail
Knoxville, TN 37920

 $^{28}\text{Mg}(B)$
- 229 Texas A&M University
Department of Chemistry
College Station, TX 77843

RSI(B)

- 230 Texas at Dallas, University of
P.O. Box 30365
Dallas, TX 75230
 $^{47}\text{Ca}(0)$
- 231 Texas Instruments, Inc.
Science Services Division
P.O. Box 5621
Dallas, TX 75222
 $^{85}\text{Kr}(0)$
- 232 Texas State Technical Institute
James Connally Campus
Waco, TX 76705
 $^{239}\text{Pu}(M)$
- 233 Texas, University of
Nuclear Medicine Service
Galveston, TX 77550
 $^{47}\text{Ca}(0)$
- 234 Texatope Pharmacy
7342 Oak Manor
San Antonio, TX 78229
 $^{133}\text{Xe}(0)$
- 235 Transition Electronics Corporation
168 Albion Street
Wakefield, MA 01880
 $^{85}\text{Kr}(0)$
- 236 Trio-Tech Inc.
A Division of Tracer Flo
2435 N. Naomi
Burbank, CA 91504
 $^{85}\text{Kr}(0)$
- 237 Twin City Testing Corporation
533 South Niagara Street
Tonawanda, NY 14150
 $^{147}\text{Pm}(M)$
- 238 Union Carbide Corporation
Nuclear Division
Oak Ridge National Laboratory
P. O. Box X
Oak Ridge, TN 37830
 $^{241}\text{Am}(0)$, $^{241}\text{Am}(P)$, $^{243}\text{Am}(0)$, $^{243}\text{Am}(P)$,
 $^{144}\text{Ce}(0)$, $^{252}\text{Cf}(0)$, $^{244}\text{Cm}(0)$, $^{244}\text{Cm}(P)$,
 $\text{CSI}(0)$, $^{152+154}\text{Eu}(0)$, $^3\text{H}(0)$, $^{181}\text{Hf}(0)$,
 $^{85}\text{Kr}(0)$, $\text{MCP}(0)$, $^{95}\text{Nb}(0)$, $^{237}\text{Np}(0)$,
 $^{231}\text{Pa}(M)$, $^{231}\text{Pa}(0)$, $^{103}\text{Pd}(M)$, $^{238}\text{Pu}(M)$,
 $^{240}\text{Pu}(0)$, $^{242}\text{Pu}(0)$, $^{244}\text{Pu}(0)$, $^{106}\text{Ru}(0)$,
 $^{90}\text{Sr}(0)$, $\text{SS}(0)$, $^{99}\text{Tc}(0)$, $\text{Tgs}(0)$,
 $^{229}\text{Th}(M)$, $^{230}\text{Th}(M)$, $^{230}\text{Th}(0)$, $\text{U}(M)$,
 $\text{U}(0)$, $^{233}\text{U}(0)$, $^{234}\text{U}(M)$, $^{235}\text{U}(0)$,
 $^{236}\text{U}(0)$, $^{238}\text{U}(0)$, $^{133}\text{Xe}(0)$, $^{95}\text{Zr}(0)$
- 239 Union Carbide Corporation
Sterling Forest Research Center
P.O. Box 324
Tuxedo, NY 10987
 $\text{CSI}(0)$, $^{99}\text{Tc}(0)$, $^{133}\text{Xe}(0)$
- 240 Union Carbide Corporation, Nuclear
Division
Oak Ridge Gaseous Diffusion Plant
P.O. Box P
Oak Ridge, TN 37830
 $^{131}\text{I}(0)$, $^{85}\text{Kr}(0)$, $^{133}\text{Xe}(0)$
- 241 Union Carbide Corporation, Nuclear
Division
Paducah Gaseous Diffusion Plant
Paducah, KY 42002
 $\text{SS}(0)$, $^{99}\text{Tc}(0)$
- 242 Union Carbide Corporation. Nuclear
Division
Y-12 Plant
P.O. Box Y
Oak Ridge, TN 37830
 $\text{CSI}(0)$, $^{153}\text{Gd}(0)$, $^3\text{H}(0)$, $^{237}\text{Np}(0)$,
 $\text{SS}(0)$
- 243 United Nuclear Industries, Inc.
P.O. Box 490
Richland, WA 99352
 $^{137}\text{Cs}(H)$, $\text{EU}(P)$, $^{147}\text{Pm}(H)$, $\text{RaDEF}(H)$,
 $\text{U}(P)$
- 244 United States Army
Harry Diamond Laboratories
Connecticut Avenue and Van Ness Street,
N.W.
Washington, DC 20438
 $^{237}\text{Np}(0)$, $^{234}\text{U}(0)$, $^{236}\text{U}(0)$, $^{238}\text{U}(0)$
- 245 United States Army - Letterman
Medical Center
Presidio of San Francisco, CA 94129
 $^{133}\text{Xe}(0)$
- 246 United States Army Aberdeen Proving
Grounds
Ballistic Research Laboratory
Aberdeen Proving Ground, MD 21005
 $\text{DU}(P)$
- 247 United States ERDA
376 Hudson Street, Fifth Floor
New York, NY 10014
 $^{95}\text{Nb}(0)$, $^{244}\text{Pu}(0)$

- 248 United States Atomic Energy Commission
Schenectady Naval Reactors Office
P.O. Box 1069
Schenectady, NY 12301
 $^{252}\text{Cf}(0)$, $\text{MCP}(0)$
- 249 United States Department of Agriculture
Research Service
P.O. Box 53326
New Orleans, LA 70150
 $^{131}\text{I}(0)$
- 250 United States Department of Interior
Geological Survey
National Center
12201 Sunrise Valley Drive
Reston, VA 22092
 $^{252}\text{Cf}(S)$
- 251 United States Energy Research and
Development Administration
Cape Canaveral Air Force Station, FL
 $^{238}\text{Pu}(M)$
- 252 United States Energy Research and
Development Administration
550 Second Street
Idaho Falls, ID 83401
 $^{238}\text{Pu}(M)$, $^{233}\text{U}(M)$
- 253 United States Energy Research and
Development Administration
Laramie Energy Research Center
9th and Lewis
P.O. Box 3395, University Station
Laramie, WY 82071
 $^{85}\text{Kr}(0)$
- 254 United States Geological Survey
Isotope Geological Branch - Bldg. 15
Denver Federal Center
Denver, CO 80225
 $\text{RSI}(A)$
- 255 United States National Aeronautics
and Space Administration
Goddard Space Flight Center
Glendale Road
Greenbelt, MD 20771
 $^{85}\text{Kr}(0)$
- 256 United States National Aeronautics
and Space Administration
George C. Marshall Space Flight Center
Huntsville, AL 35812
 $^{232}\text{Th}(0)$
- 257 United States National Aeronautics
and Space Administration
Ames Research Center
Moffett Field, CA 94035
 $^{47}\text{Ca}(0)$
- 258 United States Navy
Naval Regional Medical Center
8750 Mountain Boulevard - Bldg. 505
Oakland, CA 94627
 $^{47}\text{Ca}(0)$
- 259 United States Public Health Environ-
mental Protection Agency
Accounting Operations Office, Durham
Research Triangle Park, NC 27711
 $^{85}\text{Kr}(0)$
- 260 United States Public Health Service
P.O. Box 684
4505 Maryland Parkway
Las Vegas, NV 89101
 $^{243}\text{Cm}(0)$, $\text{CSI}(0)$
- 261 United States Public Health Service
National Institutes of Health,
Isotope Laboratory
Building 21
Bethesda, MD 20014
 $^{47}\text{Ca}(0)$, $^{67}\text{Cu}(0)$, $^{91}\text{Y}(0)$
- 262 United States Radium Corporation
4150 Old Berwick Road
P.O. Box 380
Bloomsburg, PA 17815
 $^3\text{H}(0)$
- 263 United States Testing Company
2800 George Washington Way
Richland, WA 99352
 $^{210}\text{Po}(H)$
- 264 United Technologies Corporation
Silver Lane
East Hartford, CT 06108
 $^{153}\text{Gd}(0)$
- 265 Unit Process Assemblies, Inc.
53-15 37th Avenue
Woodside, NY 11377
 $^{147}\text{Pm}(0)$
- 266 Unitrode Corporation
580 Pleasant Street
Watertown, MA 01970
 $^{85}\text{Kr}(0)$

- 267 Comparative Animal Research
Laboratory
1299 Bethel Valley Road
Oak Ridge, TN 37830
 $^{144}\text{Ca}(0)$, $^{95}\text{Nb}(0)$
- 268 Utah, University of
Purchasing Department
Salt Lake City, UT 84112
 $^{244}\text{Pu}(0)$, $^{133}\text{Xe}(0)$
- 269 Vanderbilt University
Business Managers Office
Nashville, TN 37203
 $^{133}\text{Xe}(0)$
- 270 Veterans Administration Hospital
Chief, Supply Division
General Storeroom, Building 142
Hines, IL 60141
 $^{47}\text{Ca}(0)$, $^{252}\text{Cf}(S)$, $^{28}\text{Mg}(B)$
- 271 Veterans Administration Hospital
Wilshire and Sawtelle Boulevards
Los Angeles, CA 90073
 $^{47}\text{Ca}(0)$
- 272 Veterans Administration Hospital
Northport, NY 11768
 $^{123}\text{I}(B)$
- 273 Veterans Administration Hospital
Syracuse, NY 13210
 $^{133}\text{Xe}(0)$
- 274 Veterans Administration Hospital
1400 VFW Parkway
West **Roxbury**, MA 02132
 $^{123}\text{I}(B)$
- 275 Victoreen Instrument Division
10101 Woodland Avenue
Cleveland, OH 44104
 $^{133}\text{Xe}(0)$
- 276 Virginia Associated Research Campus
12070 Jefferson Avenue
Newport News, VA 23606
 $\text{CSI}(0)$
- 277 Virginia Hospital, University of
Charlottesville, VA 22901
 $^{133}\text{Xe}(0)$
- 278 Vought Corporation
P.O. Box 6144
Dallas, TX 75222
 $^{252}\text{Cf}(S)$
- 279 Washington State University
Nuclear Reactor Laboratory
Pullman, WA 99163
 $^{252}\text{Cf}(P)$, $\text{EU}(P)$
- 280 Washington University
Biology Department
St. Louis, MO 63130
 $^{28}\text{Mg}(B)$
- 281 Washington University
Lindell and Skinker
St. Louis, MO 63130
 $^{133}\text{Xe}(0)$
- 282 Washington, University of
400 Administration Building
Seattle, WA 98105
 $^{244}\text{Pu}(0)$
- 283 Western Electric Company
100 Central Avenue
Kearny, NJ 07032
 $^{137}\text{Cs}(0)$
- 284 Western Electric Company, Inc.
P.O. Box 1409
Lawrence, MA 01842
 $^{85}\text{Kr}(0)$
- 285 Western Electric Company, Inc.
555 Union Boulevard
Allentown, PA 18103
 $^{85}\text{Kr}(0)$
- 286 Westinghouse Electric Corporation
Bettis Atomic Power Laboratory
P.O. Box 79
West Mifflin, PA 15122
 $^{233}\text{U}(0)$
- 287 Westinghouse Hanford Company
P.O. Box 1970
Richland, WA 99352
 $^{244}\text{Cm}(0)$, $^3\text{H}(0)$, $^{85}\text{Kr}(0)$, $^{237}\text{Np}(0)$,
 $^{238}\text{Pu}(M)$, $^{239}\text{Pu}(0)$, $\text{Tgs}(0)$, $^{233}\text{U}(0)$,
 $^{235}\text{U}(0)$, $^{238}\text{U}(0)$, $^{133}\text{Xe}(0)$, $^{95}\text{Zr}(0)$

288 William Beaumont Hospital
3601 W. Thirteen Mile Road
Royal Oak, MI 48067

$^{133}\text{Xe}(0)$

289 Wisconsin, University of
750 University Avenue
Madison, WI 53706

$^{153}\text{Gd}(0)$, $^3\text{H}(0)$, $\text{SS}(0)$

290 Yale University
260 Whitney Avenue
New Haven, CT 06520

RSI(B)

291 York College
Department of Natural Sciences
Jamaica, NY 11451

RSI(B)

B. FOREIGN

AUSTRALIA

292 Australian Consulate General
636 Fifth Avenue
New York, NY 10020

$^{230}\text{Th}(0)$, $^{238}\text{U}(0)$

AUSTRIA

293 International Atomic Energy Agency
Kaerntnerring 11-13
A-1010 Vienna, Austria

$^{244}\text{Pu}(0)$

BELGIUM

294 EURATOM
51-53 Rue Belliard
Brussels, Belgium

$^{242}\text{Pu}(0)$, $^{233}\text{U}(0)$

295 European Atomic Energy Commission
Central Bureau for Nuclear Measurements
Geel, Belgium

$^{239}\text{Pu}(0)$, $\text{Tgs}(0)$

BRAZIL

296 Institute of Atomic Energy
Sao Paulo, Brazil

$^{252}\text{Cf}(S)$

CANADA

297 Alberta, University of
Edmonton, Alberta, Canada

$^{133}\text{Xe}(0)$

298 Atomic Energy of Canada Limited
P.O. Box 6300
Postal Station J
Ottawa, Canada

$^{153}\text{Gd}(0)$, $\text{MCP}(0)$

299 Atomic Energy of Canada Limited
Chalk River, Ontario, Canada

$^3\text{H}(0)$, $^{236}\text{Pu}(0)$, $\text{Tgs}(0)$, $^{233}\text{U}(0)$,
 $^{95}\text{Zr}(0)$

300 British Columbia, University of
Vancouver 8, B.C., Canada

$^{91}\text{Y}(0)$

301 L. C. Mercure Trust
Airport Industrial
Bromont, Quebec, Canada

$^{85}\text{Kr}(0)$

302 McGill University
Montreal 2, P.Q., Canada

$^{133}\text{Xe}(0)$

303 McMaster University
Hamilton, Ontario, Canada

$^{85}\text{Kr}(0)$, $^{127}\text{Xe}(B)$

304 National Research Council
Montreal Road Laboratories
Ottawa, Ontario, Canada

$^{244}\text{Cm}(0)$, $\text{Tgs}(0)$

305 Ottawa, University of
Ottawa, Ontario, Canada

$^{37}\text{Ar}(0)$

306 Toronto General Hospital
101 College Street
Toronto 2, Ontario, Canada

$^{133}\text{Xe}(0)$

307 University of Alberta
Edmonton, Alberta, Canada T6G2H1

$^3\text{H}(0)$

308 University Hospital
Nuclear Medicine Department
London, Ontario

$^{127}\text{Xe}(B)$

CHINA

- 309 Institute of Nuclear Energy Research
P.O. Box 3
Lang-Tan, Taiwan, China

$^{237}\text{Np}(0)$

- 310 National Cash Register Mfg. Co., Ltd.
No. 55 Wong Chuk Hang Road
Aberdeen, Hong Kong, China

$^{85}\text{Kr}(0)$

- 311 Semi-Conductor Devices, Ltd.
59-61 Wong Chuk Hang Road
Aberdeen, Hong Kong, China

$^{85}\text{Kr}(0)$

DENMARK

- 312 Isotope Pharmacy
378 Frederikssundsve
2700 Broenshoe, Denmark

$^{127}\text{Xe}(B)$

ENGLAND

- 313 Ministry of Defense
National Institute for Medical
Research
The Ridgeway, Mill Hill
London NW7 1AA, England

$^{28}\text{Mg}(B)$

- 314 Radiochemical Centre
White Lion Road
Amersham, Bucks, England
- $^{137}\text{Cs}(0)$, $^{153}\text{Gd}(0)$, $^{129}\text{I}(0)$, $^{85}\text{Kr}(0)$,
 $\text{MCP}(0)$, $^{147}\text{Pm}(0)$, $^{238}\text{Pu}(0)$, $^{151}\text{Sm}(0)$,
 $^{89}\text{Sr}(0)$, $^{99}\text{Tc}(0)$, $^{91}\text{Y}(0)$, $^{95}\text{Zr}(0)$

- 315 Saunders-Roe Developments, Ltd.
North Hyde Road
Hayes, Middlesex, England

$^3\text{H}(0)$

- 316 Southampton General Hospital
Nuclear Medicine
Southampton, England

$^{127}\text{Xe}(B)$

- 317 United Kingdom Treasury and Supply
Delegation
25 Broadway
New York, NY 10004

$^{244}\text{Cm}(0)$, $^{99}\text{Tc}(0)$, $\text{Tgs}(0)$

FINLAND

- 318 Helsinki, University of
Helsinki, Finland

$^{244}\text{Pu}(0)$

FRANCE

- 319 CEA
Department des Radioelements
B.P. No. 2
91190 Gif Sur Yvette, France

$^{37}\text{Ar}(0)$, $^{140}\text{Ba}(0)$

- 320 French Atomic Energy Commission
1730 Rhode Island Avenue, N.W.
Suite 1217
Washington, DC 20036

$^{238}\text{Pu}(0)$

- 321 Institut Max von Laue-Paul Langevin
Cedex 156
38 Grenoble-Gare, France

$^{234}\text{U}(0)$

- 322 Laboratoire de Physique Et Chimie
Marine
4 Place Jussieu, Tour 24/25
Paris, Cedex 05, France

$^{28}\text{Mg}(B)$

GERMANY

- 323 American Hoechst Corporation
P.O. Box 2500
Somerville, NJ 08876

$^{85}\text{Kr}(0)$

- 324 Buchler and Company
Frankfurter Str. 294
Braunschweig, Germany

$^{37}\text{Ar}(0)$, $^{129}\text{I}(0)$

- 325 GWK-Gesellschaft zur Wiederaufbereitung
von Kernb
D-7051 Leopoldshafen, West Germany

$^{237}\text{Np}(0)$

- 326 Gesellschaft fur Kernforschung mbH
Institute fuer Angewandte Reaktor
Physik
Weberstrasse 5
75 Karlsruhe, West Germany

$^{244}\text{Cm}(0)$, $^{237}\text{Np}(0)$, $\text{SS}(0)$, $^{99}\text{Tc}(0)$

327 Gesellschaft für Schwerionenforschung
mbH
Target Labor
Postfach 541
D-6100 Darmstadt, West Germany

$^{249}\text{Bk}(0)$

328 Hahn-Meitner-Institut
für Kernforschung Berlin,
Sektion Kernphysik
Berlin, Germany

$^{252}\text{Cf}(0)$

329 Institute für Nuclear Medizin
Karl Weichert Allee 9
Hannover, West Germany

$^{127}\text{Xe}(B)$

330 Kernforschung Sanlage
Postfach 365
517 Jülich, Germany

$^{99}\text{Tc}(0)$

331 Mainz/Rhein, Universität
Mainz am Rhein, Germany

$^{95}\text{Zr}(0)$

332 Marburg/Lahn, Universität
Marburg/Lahn, Germany

$^{133}\text{Xe}(0)$

333 Max Planck Institut für Kernphysik
Saupfercheckweg
Heidelberg, Germany

$^{241}\text{Am}(0)$

334 München, Technische Hochschule
Arcisstrasse 21
8 München 2
Germany

$^{151}\text{Sm}(0)$

335 NEN Chemicals GmbH
Main Airport
Frankfurt, Germany

$^{28}\text{Mg}(B)$

336 W. Maier Komm. Ges.
722 Schwenningen a. N.
Postfach (P.O.B.) 126
West Germany

$^{147}\text{Pm}(0)$

GREECE

337 Nuclear Research Center Democritos
Isotope Department
Evangelismos Hospital
Athens, Greece

$^{28}\text{Mg}(B)$

INDIA

338 Bhabha Atomic Research Centre
Government of India
3rd Floor Mhatra Building
Bombay 1, India

$^{137}\text{Cs}(0)$, $\text{MCP}(0)$, $^{237}\text{Np}(0)$, $^{147}\text{Pm}(0)$,
 $\text{SS}(0)$

ISRAEL

339 Embassy of Israel
1621-22nd Street, N.W.
Washington, DC 20008

$^{252}\text{Cf}(0)$, $\text{MCP}(0)$

340 Government of Israel
Ministry of Defense
850 Third Avenue
New York, NY 10022

$^{237}\text{Np}(0)$

JAPAN

341 Japan Radioisotope Association
Hon-Komagome 2 Chome 28
Bunkyo-Ku
Tokyo, Japan

$^{85}\text{Kr}(0)$

342 Keio University School of Medicine
Tokyo, Japan

$^{252}\text{Cf}(S)$

343 Marubeni America Corporation
14 Henderson Drive
West Caldwell, NJ 07006

$^{242}\text{Pu}(0)$, $^{233}\text{U}(0)$

344 Mitsui and Company (USA), Inc.
200 Park Avenue
New York, NY 10017

$^{234}\text{U}(0)$

NETHERLANDS

- 345 Nijmegen, Catholic University of
Nijmegen, Netherlands
 $^{28}\text{Mg}(\text{B})$
- 346 N.V. Philips-Duphar
P.O. Box 2
Weesp, The Netherlands
CSI(0)
- 347 Rijksinkoopbureau
(Netherlands Govt. Purchasing Office)
55 A Laan van Meerdervoort
The Hague, Netherlands
 $^{133}\text{Xe}(0)$

NORWAY

- 348 Institutt for Atom Energi
OECD Halden Reactor Project
Halden, Norway
Th(P)

POLAND

- 349 PHZ Metronex
Al. Jerozolimskie 44
Warszawa 1, Poland
 $^{90}\text{Sr}(0)$, $^{88}\text{Sr}(0)$, $^{99}\text{Tc}(0)$

PUERTO RICO

- 350 Puerto Rico, University of
Puerto Rico Nuclear Center
College Station
Mayaguez, Puerto Rico 00709
 $^{243}\text{Am}(0)$, $^{131}\text{I}(0)$, MCP(0)

SCOTLAND

- 351 MRC Brain Metabolism Unit
University of Pharmacology
1 George Square
Edinburgh, Scotland
 $^{28}\text{Mg}(\text{B})$
- 352 Smith, Kline, and French Ltd.
Mundel 1s, Welwyn Garden Court
Herts AL7 2EY, Scotland
 $^{28}\text{Mg}(\text{B})$

SWEDEN

- 353 Lund, University of
Radiofysika Centrallaboratoriet
Lasarettet
S-221 85 Lund, Sweden
 $^{127}\text{Xe}(\text{B})$
- 354 V/K Techsnabexport, G-200,
Smolenskaja+ Sennaja 32/34
Moscow, USSR (Russia)
Russia
Uppsala, University of
Uppsala, Sweden
 $^{192}\text{Ir}(0)$, $^{106}\text{Ru}(0)$

SWITZERLAND

- 355 Radium-Chemie
A. Zeller and Company
'9053 Teufen/Ar
Switzerland
 $^3\text{H}(0)$, MCP(0), $^{147}\text{Pm}(0)$
- 356 Swiss Federal Institute of Technology
Sonneggstrasse 5
Ch-8006 Zurich, Switzerland
 $^{89}\text{Sr}(0)$

11. ALPHABETICAL LIST OF ISOTOPES
CROSS-REFERENCED TO CUSTOMER NUMBERS

A. <u>DOMESTIC</u>	Cerium 141 (Ce)
Americium 241 (Am)	17, 95
3, 9, 17, 22, 36, 78, 96, 100, 141, 168, 171, 173, 203, 238	Cerium 144 (Ce)
Americium 243 (Am)	17, 238, 267
3, 36, 57, 121, 211, 238	Cerium 144 + Praseodymium (CePr)
Antimony 124 (Sb)	17
3, 17	Cesium 137 (Cs)
Antimony 125 (Sb)	17, 25, 28, 95, 100, 109, 154, 163, 168, 172, 243, 283
17	Chromium 51 (Cr)
Barium 133 (Ba)	17
17, 22, 95	Cobalt 57 (Co)
Barium 140 (Ba)	95
3, 13	Cobalt 58 (Co)
Berkelium 249 (8k)	17
13, 22, 33, 211	Cobalt 60 (Co)
Beryllium 7 (Be)	3, 17, 18, 19, 71, 95
17	Copper 67 (Cu)
Calcium 45 (Ca)	15, 132, 261
17	Curium 243 (Cm)
Calcium 47 (Ca)	22, 121, 159, 260
28, 38, 40, 62, 63, 103, 128, 132, 230, 233, 257, 258, 261, 270, 271	Curium 244 (Cm)
Californium 249 (Cf)	3, 22, 36, 38, 109, 211, 238, 287
13, 33, 90, 211	Curium 248 (Cm)
Californium 250 (Cf)	13, 33, 36
13, 38	Cyclotron Service Irradiations (CSI)
Californium 252 (Cf)	100, 121, 154, 174, 191, 192, 238, 239, 242, 260, 276
13, 16, 22, 28, 32, 38, 41, 42, 48, 62, 69, 72, 108, 109, 114, 116, 122, 135, 141, 149, 158, 174, 180, 185, 212, 220, 238, 248, 250, 270, 278, 279	Einsteinium 253 (Es)
Cerium 139 (Ce)	13, 22, 33, 36, 38
17	Europium 152 (Eu)
	3, 17

Europium 154 (Eu)	
3, 31	
Europium 152+154 (Eu)	
13, 38, 238	
Europium 155 (Eu)	
17, 56	
Fermium 257 (Fm)	
38	
Fission Products (FP)	
13, 100, 172	
Gadolinium 153 (Gd)	
17, 154, 242, 264, 289	
Hafnium 181 (Hf)	
45, 166, 238	
Hydrogen 3 (H)	
8, 13, 17, 22, 28, 38, 73, 80, 81, 100, 101, 117, 119, 143, 154, 155, 167, 168, 169, 212, 213, 216, 222, 225, 238, 242, 262, 287, 289	
Indium 114 (In)	
153	
Iodine 123 (I)	
52, 148, 183, 272, 274	
Iodine 129 (I)	
9, 33, 94, 100, 154, 165, 211	
Iodine 131 (I)	
17, 38, 54, 95, 136, 202, 240, 249	
Iron 52 (Fe)	
52, 204	
Iron 59 (Fe)	
95	
Iridium 192 (Ir)	
19, 124	
Krypton 85 (Kr)	
4, 8, 11, 14, 21, 22, 23, 31, 60, 64, 65, 66, 74, 75, 80, 81, 84, 86, 87, 88, 90, 98, 99, 104, 107, 109, 111, 112, 119, 137, 138, 144, 145, 151, 154, 168, 176, 195, 223, 226, 231, 235, 236, 238, 240, 253, 255, 259, 266, 284, 285, 287	
Krypton 86 (Kr)	
14	
Magnesium 28 (Mg)	
30, 39, 49, 62, 123, 131, 147, 181, 199, 228, 270, 280	
Manganese 54 (Mn)	
18	
Miscellaneous Compound Preparation (MCP)	
13, 24, 33, 36, 89, 90, 121, 137, 154, 168, 174, 211, 217, 219, 238, 248	
Molybdenum 99 (Mo)	
3	
Molybdenum 101 (Mo)	
3	
Neptunium (Np)	
17, 203	
Neptunium 237 (Np)	
13, 17, 20, 40, 82, 95, 115, 149, 238, 242, 244, 287	
Nickel 65 (Ni)	
3	
Niobium 95 (Nb)	
13, 137, 238, 247, 267	
Palladium 103 (Pd)	
13, 36, 37, 105, 190, 238	
Phosphorus 33 (P)	
100, 154	
Plutonium (Pu)	
17, 21, 95, 203	

Plutonium 236 (Pu)

3, 17, 35, 57, 109, 194, 203

Plutonium 238 (Pu)

12, 21, 22, 36, 37, 38, 61, 69, 79, 85, 141, 142, 203, 208, 238, 251, 252, 287

Plutonium 239 (Pu)

7, 13, 17, 22, 36, 37, 81, 95, 100, 102, 109, 149, 175, 197, 211, 232, 287

Plutonium 240 (Pu)

22, 238

Plutonium 242 (Pu)

7, 33, 40, 69, 214, 238

Plutonium 244 (Pu)

3, 13, 22, 28, 69, 238, 247, 268, 282

Polonium 210 (Po)

22, 263

Potassium 43 (K)

23, 28, 55, 124, 126

Promethium 147 (Pm)

22, 27, 95, 121, 137, 237, 243, 265

Protactinium 231 (Pa)

238

Radium DEF (Pb, Bi, Po) (RaDEF)

22, 95, 243

Reactor Service Irradiations (RSI)

6, 10, 13, 29, 37, 44, 50, 51, 58, 83, 93, 97, 114, 118, 120, 125, 130, 133, 146, 152, 157, 160, 192, 200, 221, 229, 254, 290, 291

Ruthenium 103 (Ru)

3, 17

Ruthenium 106 (Ru)

3, 17, 22, 38, 40, 100, 124, 154, 186, 238

Samarium 151 (Sm)

13, 100, 154

Scandium 46 (Sc)

17

Selenium 75 (Se)

95

Silver 110 (Ag)

95

Sodium 22 (Na)

17, 95

Special Services (SS)

9, 13, 21, 24, 36, 38, 56, 71, 82, 92, 100, 141, 168, 171, 173, 211, 238, 241, 242, 289

Strontium 82 (Sr)

34, 48, 127

Strontium 85 (Sr)

17, 34, 48, 127

Strontium 89 (Sr)

26, 33, 47, 76, 91, 94, 177, 204

Strontium 90 (Sr)

90, 100, 121, 168, 238

Strontium 90 - Yttrium (SrY)

17, 22, 95

Target Preparation, Radioisotope (Tgs)

3, 13, 24, 28, 33, 36, 38, 68, 109, 119, 139, 149, 175, 198, 222, 238, 287

Technetium 99 (Tc)

2, 5, 17, 33, 53, 56, 92, 137, 154, 161, 198, 238, 239, 241

Thorium (Th)

37, 85, 95

Thorium 229 (Th)	Xenon 133 (Xe)
28, 238	3, 5, 13, 40, 41, 59, 68, 113, 134,
Thorium 230 (Th)	135, 140, 150, 170, 178, 179, 182,
13, 22, 43, 77, 238, 292	186, 187, 188, 196, 205, 206, 207,
Thorium 232 (Th)	215, 218, 224, 234, 238, 239, 240,
70, 175, 201, 256	245, 268, 269, 273, 275, 277, 281,
Thulium 170 (Tm)	287, 288
22	Yttrium 88 (Y)
Uranium (U)	17
209, 238, 243	Yttrium 91 (Y)
Uranium-Depleted (DU)	261
1, 13, 17, 36, 46, 95, 156, 164,	Zirconium 95 (Zr)
184, 189, 210, 211, 246	3, 38, 94, 109, 154, 193, 238, 287
Uranium-Enriched (EU)	
3, 95, 243, 279	B. <u>FOREIGN</u>
Uranium 232 (U)	Americium 241 (Am)
3, 38	333
Uranium 233 (U)	Americium 243 (Am)
7, 13, 17, 22, 38, 95, 110, 175, 214,	350
238, 252, 286, 287	Argon 37 (Ar)
Uranium 234 (U)	305, 319, 324
13, 28, 47, 82, 238, 244	Barium 140 (Ba)
Uranium 235 (U)	319
7, 13, 35, 82, 106, 109, 139, 175,	Berkelium 249 (Bk)
238, 287	327
Uranium 236 (U)	Californium 252 (Cf)
13, 36, 238, 244	296, 328, 339, 342
Uranium 238 (U)	Cesium 137 (Cs)
7, 13, 22, 36, 38, 82, 115, 175, 198,	314, 338
214, 238, 244, 287	Curium 244 (Cm)
Xenon 127 (Xe)	304, 317, 326
52, 67, 129, 148, 150, 162, 183,	Cyclotron Service Irradiations (CSI)
196, 227	346
	Gadolinium 153 (Gd)
	298, 314

Hydrogen 3 (H)	Special Services (SS)
299, 307, 315, 355	326, 338, 349
Iodine 129 (I)	Strontium 89 (Sr)
314, 324	314, 356
Iodine 131 (I)	Strontium 90 (Sr)
350	349
Iridium 192 (Ir)	Target Preparation, Radioisotope (Tgs)
354	295, 299, 304, 317
Krypton 85 (Kr)	Technetium 99 (Tc)
301, 303, 310, 311, 314, 323, 341	314, 317, 326, 330, 349
Magnesium 28 (Mg)	Thorium (Th)
313, 322, 335, 337, 345, 351, 352	348
Miscellaneous Compound Preparation (MCP)	Thorium 230 (Th)
298, 314, 326, 338, 339, 348, 350, 355	292
Neptunium 237 (Np)	Uranium 233 (U)
309, 325, 326, 338, 340	294, 299, 343
Plutonium 236 (Pu)	Uranium 234 (U)
299	321, 344,
Plutonium 238 (Pu)	Uranium 238 (U)
314, 320	292
Plutonium 239 (Pu)	Xenon 127 (Xe)
295	303, 308, 312, 316, 329, 353, 356
Plutonium 242 (Pu)	Xenon 133 (Xe)
294, 243	297, 302, 306, 332, 347
Plutonium 244 (Pu)	Yttrium 91 (Y)
293, 318	300, 314
Promethium 147 (Pm)	Zirconium 95 (Zr)
314, 336, 338, 355	299, 314, 331
Ruthenium 106 (Ru)	
354	
Samarium 151 (Sm)	
314, 334,	

111. ALPHABETICAL LIST OF STATES AND COUNTRIES
CROSS-REFERENCED TO CUSTOMER NUMBERS

A. <u>DOMESTIC</u>	Kansas
Alabama	113
5, 221, 256	Kentucky
Arizona	114, 241
8, 15, 145	Louisiana
Arkansas	249
16	Maine
California	75
18, 31, 32, 33, 34, 35, 36, 39, 40, 41, 42, 43, 44, 74, 82, 88, 90, 94, 98, 106, 108, 109, 111, 117, 119, 143, 151, 167, 169, 178, 182, 196, 197, 205, 206, 207, 209, 210, 215, 217, 219, 220, 222, 223, 225, 236, 245, 257, 258, 271	Maryland
Colorado	1, 124, 125, 126, 148, 150, 214, 246, 255, 261
56, 176, 187, 203, 254	Massachusetts
Connecticut	11, 26, 96, 107, 123, 127, 128, 129, 130, 154, 155, 235, 266, 274, 284
58, 212, 264, 290	Michigan
District of Columbia	59, 135, 288
89, 149, 244	Minnesota
Florida	131, 132, 137
76, 77, 81, 112, 251	Mississippi
Georgia	138
90, 91	Missouri
Idaho	122, 139, 226, 280, 281
3, 14, 252	Nebraska
Illinois	63
2, 9, 10, 13, 47, 48, 49, 50, 51, 60, 101, 102, 134, 165, 191, 204, 224, 270	Nevada
Indiana	71, 153, 260
66, 84, 103, 166, 192, 193	New Jersey
Iowa	4, 24, 64, 67, 73, 189, 283
46, 147	New Mexico
	37, 38, 70, 105, 121, 156, 208, 211

New York

6, 25, 28, 29, 57, 62, 83, 93, 97,
115, 118, 120, 133, 157, 158, 159,
160, 161, 171, 198, 199, 200, 202,
213, 216, 218, 237, 239, 247, 248,
265, 272, 273, 291

North Carolina

68, 116, 162, 163, 259

Oregon

164, 179, 180

Ohio

20, 21, 52, 53, 54, 55, 65, 80, 87,
92, 100, 104, 141, 142, 177, 195,
201, 275

Oklahoma

110

Pennsylvania

12, 19, 45, 61, 72, 85, 99, 136, 152,
172, 183, 184, 185, 186, 188, 190,
194, 262, 285, 286

Rhode Island

30

South Carolina

7, 69

Tennessee

174, 175, 227, 228, 238, 240, 242,
267, 269

Texas

23, 78, 79, 140, 144, 146, 168, 170,
173, 229, 230, 231, 232, 233, 234,
278

Utah

27, 268

Virginia

86, 250, 276, 277

Washington

17, 22, 95, 181, 243, 263, 279, 282,
287

Wisconsin

289

Wyoming

253

B. FOREIGN

Australia

292

Austria

293

Belgium

294, 295

Brazil

296

Canada

297, 298, 299, 300, 301, 302, 303,
304, 305, 306, 307, 308

China

309, 310, 311

Denmark

312

England

313, 314, 315, 316, 317

Finland

318

France

319, 320, 321, 322

Germany

323, 324, 325, 326, 327, 328, 329,
330, 331, 332, 333, 334, 335, 336

Greece

337

India

338

Israel

339, 340

Japan

341, 342, 343, 344

Netherlands

345, 346, 347

Norway

348

Pol and

349

Puerto Rico

350

Scotland

351, 352

Sweden

353, 354

Switzerland

355, 356

IV. RADIOISOTOPE SALES AND TRANSFERS - FY 1976

A = Argonne National Laboratory
P = Battelle, Pacific Northwest Laboratories
B = Brookhaven National Laboratory
H = Hanford Engineering Development Laboratory
I = Idaho Operations Office
L = Los Alamos Scientific Laboratory
M = Mound Laboratory
O = Oak Ridge National Laboratory (Holifield)
S = Savannah River Plant
U = United Nuclear Industries, inc.

Isotope	Domestic			Foreign			project (a)			Total		
	Ship- ments	Millicuries, unless noted	Dollars	Ship- ments	Millicuries, unless noted	Dollars	Ship- ments	Millicuries, unless noted	Dollars	Ship- ments	Millicuries, unless noted	Total Dollars
Americium-241 (H)				-			1	12.6 pCi		1	12.6 pCi	0
Americium-241 (O)	27	896,860.0 mg	188,365	1	100 mg	21	3	34,000.0 mg	5,908	31	930,960.0 mg	194,294
Americium-241 (P)				-			3	1,319 g	170,000	3	1,319 g	170,000
Americium-243(O)	1	100 mg	100	-			9	2,010.1 mg	200	10	2,101 mg	300
Americium-243(P)				-			1	6 g	7,000	1	6 g	7,000
Antimony-124(H)				-			2	2		2	2	
Antimony-124(T)				-			1	9,400,000		1	9,400,000	
Antimony-125(H)				-			2	4.6		2	4.6	
Argon-37(O)				4	3.2	235				4	3.2	235
Barium-133(H)				-			4	5.46		4		
Barium-140(O)				1	10.0	75	2	7.0	55	3	17.0	130
Berkelium-249(O)				2		100	10	6.7 µg		12	6.7	100
Beryllium-7(H)				-			2	1.8		2	1.8	
Calcium-45(H)				-			3	43.9		3	43.9	
Calcium-47(O)	73	56.6	16,712	-			2	1.2	500	75	57.8	17,212
Californium-249(O)				-			11	2.8 µg		11	2.8 µg	
Californium-250(O)				-			2	589 µg		2	589 µg	
Californium-252(O)	6	2.6 µg	30	3		130	10	101.3 µg		19	103.9 µg	160
Californium-252(S)	8	14.55 mg	169,591	3	6.75 mg	77,510				11	21.3 mg	247,101
Cerium-139(H)				-			1	0.4		1	0.4	
Cerium-141(H)				-			2	2.0		2	2.0	
Cerium-144(H)				-			1	63.8		1	63.8	
Cerium-144(O)				-			2	110.0	150	2	110.0	150
Cerium-144+Praseodymium(H)				-			1	6.1		1	6.1	
Cesium-137(H)				-			12	382.3		12	382.3	

Isotope	Domestic			Foreign			Project ^(a)			Total		
	Ship- ments	Millicuries, unless noted	Dollars	Ship- ments	Millicuries, unless noted	Dollars	Ship- ments	Millicuries, unless noted	Dollars	Ship- ments	Millicuries, unless noted	Total Dollars
Cesium-137(0)	25	565,826.0	2,832	2	5,000,000	2,500	1	25.0		28	10,658,645.0	5,332
Chromium-51(H)				-			2	4.44		2	4.44	
Cobalt-57(H)				-			1	25.0 μ Ci		1	25.0 μ Ci	
Cobalt-58(H)				-			2	1.28		2	1.28	
Cobalt-60(H)				-			6	60,045.6		6	60,045.6	
Cobalt-60(I)				-			1	900		1	900	
Cobalt-60(0)				-			1	27,000,000.0	8,129	1	27,000,000.0	8,129
Copper-67(0)	5	31.6	4,445	-			5	31.6		5	31.6	4,445
Curium-243(0)	2	43.0 mg		-			3	5.0 mg		5	48.0 mg	
Curium-244(0)	2	2.4 mg	220	3	11.0 mg	1,200	14	160.4 mg	500	19	173.8 mg	1,920
Curium-244(P)				-			1	2 g	1,800	1	2 g	1,800
Curium-248(0)				-			7	46.6 mg		7	46.6 mg	
Cyclotron Service Irradiations(A) ^(b)	2		270	-			105	-		107	-	270
Cyclotron Service Irradiations(0)	36	35.0	136,608	12	6.0	23,205	23	28.0	18,043	71	69	177,856
Einsteinium-253(0)				-			17	39.7 mg		17	39.7	
Europium-152(I)				-			2	4.0		2	4.0	
Europium-152(H)				-			1	17,900		1	17,900	
Europium-154(I)				-			1	380		1	380	
Europium-152+154(0)				-			4	5	115	4	5	115
Europium-155(H)				-			2	0.98		2	0.98	
Fermium-257(0)				-			1	-		1	-	
Fission Products(0)			13,086	-		50			55,390			68,526
Gadolinium-153(0)	3	4,004	2,600	3	700	1,100	7	9,003	5,500	13	13,707	9,200
Gadolinium-153(H)				-			2	3.8		2	3.8	
Hafnium-181(0)	2	20	70	-			1	10	30	3	30	100
Hydrogen-3(H)				-			3	0.16		3	0.16	
Hydrogen-3(M)				-			5	negligible		5	negligible	
Hydrogen-3(0)	187	174,180,623.9	152,890	9	40,950,000	32,140	24	2,239,500	3,317	220	217,370,123.9	188,347
Hydrogen-3(P)	5	9.72 Ci	1,975	-			5	9.72 Ci		5	9.72 Ci	1,975
Indium-114(0)	2	5	50	-			2	5		2	5	50
Iodine-123(B)	7	285		-			7	285		7	285	
Iodine-129(0)	9	5,388 mg	4,575	2	1,201 mg	951	4	10 mg	25	15	6,599 mg	5,551
Iodine-131(H)				-			5	124.1		5	124.1	

Isotope	Domestic			Foreign			Project ^(a)			Total		
	Ship- ments	Millicuries, unless noted	Dollars	Ship- ments	Millicuries, unless noted	Dollars	Ship- ments	Millicuries, unless noted	Dollars	Ship- ments	Millicuries, unless noted	Total Dollars
Iodine-131(0)	28	1670	1685				5	55	115	33	1,725	1,800
Iron-52(B)	7	109								7	109	
Iron-59(H)							1	0.5		1	0.5	
Iridium-192(H)	5	90 Ci								5	90 Ci	
Iridium-192(0)	1	0.2	25	1	50	50		-		2	50.2	75
Krypton-85(H)	1	2.8 Ci								1	2.8 Ci	
Krypton-85(0)	126	3,856,400.7	83,909	10	296,200	6,837	19	252,560	3,820	155	4,405,160.7	94,566
Krypton-86(H)	1	0.01						-		1	0.01	
Magnesium-28(B)	36	5.15	7,210	27	4.15	5,740		-		63	9.30	12.950
Manganese-54(H)	1	2.8 Ci						-		1	2.8 ci	
Miscellaneous Compound Preparation(0)			396									396
Molybdenum-99(I)								0.1			0.1	
Molybdenum-101(I)								0.3			0.3	
Neptunium(P)	1	1 g	95					-		1	1 g	95
Neptunium-237(H)	1	0.7								1	0.7	
Neptunium-237(0)	3	8,171 mg	2,353	6	58,065 mg	13,280	15	28,259 mg	4,532	24	94,495 mg	20,165
Nickel-65(I)								3.0			3.0	
Niobium-95(0)	11	225	5,625				9	63	1,575	20	286	7,200
Palladium-103(M)							8	Negligible		8	negligible	
Phosphorus-33(0)	21	2,400	24,000							21	2,400	24,000
Plutonium(P)	2	5.028 g	235,720				19	15,328 g	580,100	21	20.355	815,820
Plutonium-236(0)	4		1,649	1		560	3	-	1,240	8		3,449
Plutonium-237(0)	3		3,275	3		11,500	12		14,350	18		29,125
Plutonium-238(M)							25	41,377 g		25	41,377 g	
Plutonium-238(0)	9	160.900 mg	166,481	5	60.220 mg	69,654	8	6,000 mg		22	227.1 20 mg	236,135
Plutonium-238(S)							18	32,330 kg		18	32,330 kg	
Plutonium-239(H)							2	20 nCi		2	20 nCi	
Plutonium-239(M)							5	983 g		5	983 g	
Plutonium-239(0)	6	371.1 mg	328		100.000 mg		7	8,556.8 mg		14	108,928 mg	328
Plutonium-240(0)							2	3,000 mg		2	3,000 mg	
Plutonium-242(0)	2	20 mg	317	3	750 mg	11,917	4	9,762 mg		9	10,532 mg	12,234
Plutonium-244(0)							3	1,000,001 mg		3	1,000,001 mg	
Polonium-210(H)							2	0.3390 μ Ci		2	0.3390 μ Ci	
Potassium-43(0)	12	28.5	2,850				2	2	200	14	30.5	3,050

Isotope	Domestic			Foreign			Project ^(a)			Total		
	Ship- ments	Millicuries, unless noted	Dollars	Ship- ments	Millicuries, unless noted	Dollars	Ship- ments	Millicuries, unless noted	Dollars	Ship- ments	Millicuries, unless noted	Total Dollars
Promethium-147(H)	-	-		-	-	-	3	1.9 μ Ci		3	1.9 μ Ci	
Promethium-147(M)	-	-					1	negligible	-	1	negligible	-
Promethium-147(O)	8	571,500	1,271	23	3,877,440	4,477	1	606,000	612	32	5,054,940	6,360
Protactinium-231(H)	-	-					2	1.1 g		2	1.1 g	
Protactinium-231(O)	-	-					1	-		1	-	
Radium DEF(H) ^(c)	-	-	-				3	1.386 μ Ci		3	1.386 μ Ci	
Reactor Service Irradiation(A)	86	-	10,116	-	-	-	900	-		986	-	10,116
Reactor Service Irradiation(B)	94	-	16,236	-	-	-	662	-	54,454	756	-	70,690
Reactor Service Irradiation(O)	36	35	136,608	12	6	23,205	23	28	18,043	71	69	177,856
Ruthenium-103(H)				-	-		1	0.5		1	0.5	
Ruthenium-103(O)	-			-	-		1	10	250	1	10	250
Ruthenium-106(H)							2	4.8		2	4.8	
Ruthenium-106(O)	9	73.2	1,850	1	2	50	13	271	6,775	23	346.2	8,675
Samarium-151(O)	4	65 mg	1,976	3	1.870 mg	591	1	20 mg	460	8	1,955 mg	3,027
Scandium-46(H)							2	10		2	10	
Selenium-75(H)							1	2.5 μ Ci		1	2.5 μ Ci	
Silver-110(H)	-	-					1	2.8 μ Ci		1	2.8 μ Ci	
Sodium-22(H)	-	-					3	6.08		3	6.08	
Special Services(O) ^(d)			26,450			28,825	-	-	58,970			114,245
Strontium-82(L)	3	32.5								3	32.5	
Strontium-85(H)							9	55.01		9	55.01	-
Strontium-85(L)	3	200		-			-			3	200	
Strontium-89(O)	19	154	2,113	7	145	1,982	4	100	1,350	30	399	5,446
Strontium-90(O)	8	214,050	147	1	19,000	9	2	370,000.2	195	11	603,050.2	351
Strontium-90 Yttrium(H)				-			6	219.3		6	219.3	
Target Preparation(O)	-		1,975	-		1,900	-		11,950			15,825
Technetium-99(H)				-			2	6		12	6	
Technetium-99(O)	14	62,750 mg	4,312	10	67,207 mg	3,823	6	17,006 mg	1,027	30	146,963 mg	9,162
Thorium-230				1	24 g		-			1	24 g	
Thorium-229(M)		-		-			3	0.02316 g	-	3	0.2316 g	-
Thorium-230(M)				-			1	62 g	-	1	62	

Isotope	Domestic			Foreign			Project ^(a)			Total		
	Ship- ments	Millicuries, unless noted	Dollars	Ship- ments	Millicuries, unless noted	Dollars	Ship- ments	Millicuries, unless noted	Dollars	Ship- ments	Millicuries, unless noted	Total Dollars
Thorium-230(O)	2	2 mg	120	1	30 mg	2,912	4	181 mg	4	7	213 mg	3,036
Thorium-232(M)	-	-	-	-	-	-	9	11.475 g	-	9	11,475 g	-
Thorium-232(O)	3	3,112 mg	515	-	-	-	-	-	-	3	3,112 mg	515
Thulium-170(U)	-	-	-	-	-	-	6	85,000	1,000	6	85,000	1,000
Uranium(M)	-	-	-	-	-	-	5	negligible	-	5	negligible	-
Uranium(O)	-	-	-	-	-	-	2	-	-	2	-	-
Uranium(P)	-	-	-	-	-	-	1	-	-	1	-	-
Uranium-Depleted(P)	28	1,098 kg	800	-	-	-	16	794 kg	500	44	1,892 kg	13,000
Uranium-Enriched(P)	1	5 g	-	-	-	-	18	67,398 g	63,500	19	67,403 g	63,500
Uranium-232(O)	-	-	-	-	-	-	5	2.1 mg	-	5	2.1 mg	-
Uranium-233(H)	-	-	-	-	-	-	2	1.1	-	2	1.1	-
Uranium-233(M)	-	-	-	-	-	-	1	negligible	-	1	negligible	-
Uranium-233(O)	3	1,485 mg	3,831	3	1,650 mg	3,817	5	7,108 mg	-	11	10,243 mg	7,648
Uranium-234(M)	-	-	-	-	-	-	1	20.1 g	-	1	20.1 g	-
Uranium-234(O)	3	25 mg	208	2	300 mg	2,496	3	18,575 mg	90,502	8	189,000 mg	93,206
Uranium-235(O)	9	9,399 mg	629	-	-	-	8	41,434 mg	-	17	50,833 mg	629
Uranium-236(O)	1	0.1 mg	-	-	-	-	4	54,320 mg	-	5	54,320.1 mg	-
Uranium-238(H)	-	-	-	-	-	-	1	0.81 nCi	-	1	0.81 nCi	-
Uranium-238(O)	6	7,894 mg	745	1	200,666 mg	3,165	6	189,037.7 mg	-	13	397,597.7 mg	3,910
Zenon-127(B)	38	4,525	10,392	24	2,150	5,629	-	-	-	62	6,675	16,021
Zenon-133(O)	483	508,804	29,570	98	166,500	8,090	21	18,400	2,400	602	693,704	40,060
Yttrium-88(H)	-	-	-	-	-	-	2	1	-	2	1	-
Yttrium-91(O)	4	17	187	2	13	143	-	-	-	6	30	330
Zirconium-95(O)	18	265	1,457	16	276	1,518	5	37	242	39	578	3,218
	1,566		1,481,845	306		351,387	2,281		1,194,828	4,153		3,039,762

(a) Materials are sometimes transferred between ERDA sites without dollars or at costs other than normal.

(b) Radioisotopes produced by cyclotron service irradiations: ¹³³Ba, ^{105,206,207}Bi, ¹¹C, ^{129,134}Cs, ^{56,57,61}Co, ⁶⁴Cu, ^{145,150,153}Eu, ¹⁸F, ^{67,69,70}Ga, ^{67,68}Ge, ¹⁹⁷Au, ¹⁷²Hf, ¹¹¹In, ¹²³I, ¹⁷³Lu, ¹⁴³Pm, ¹⁸⁹Re, ¹⁸⁹Re, ⁹⁵Rh, ^{83,84}Rb, ^{95m,99}Tc, ¹⁶⁸Tm, ^{87,88}Y, ¹⁰⁵Ag, ¹⁶Al, ¹⁰⁹Cd.

(c) Consists of radium daughters--Lead-210, Bismuth-210 and Polonium-210.

(d) Includes such items as target fabrication, source encapsulation, and preparation of special chemical forms.

DISTRIBUTION

<u>No. of Copies</u>		<u>No. of Copies</u>	
	<u>OFFSITE</u>		<u>OFFSITE</u>
1	<u>Argonne National Laboratory</u> 9700 South Cass Avenue Argonne, IL 60439 J. C. Haugen	5	<u>ERDA Division of Nuclear Research and Applications (MS-A22000)</u> Washington, DC 20545 R. T. Carpenter G. P. Dix N. Goldenberg A. P. Litman W. C. Remini
3	<u>Brookhaven National Laboratory</u> <u>Associated Universities, Inc.</u> Upton, NY 11973 P. Colsmann P. Richards L. G. Stang, Jr.	1	<u>ERDA Division of Environmental Control Technology (MS-E201)</u> Washington, DC 20545 W. A. Brobst
1	<u>ERDA Rocky Flats Area Office</u> Rocky Flats Division P. O. Box 928 Golden, CO 80401 C. V. Peterson	3	<u>ERDA Oak Ridge Operations Office</u> P. O. Box E Oak Ridge, TN 37830 D. C. Davis, Jr. D. E. Large J. W. Nehls
2	<u>ERDA Albuquerque Operations Office</u> P. O. Box 5400 Albuquerque, NM 87115 J. A. Morley D. C. Graves	5	<u>ERDA Office of Program Coordina- tion (MS-E201)</u> Office of the Assistant Administrator for Environment and Safety Washington, DC 20545 J. N. Maddox (5)
1	<u>ERDA Dayton Area Office</u> P. O. Box 66 Miamisburg, OH 45342 B. C. Blanke	1	<u>ERDA Idaho Operations Office</u> 550 Second Street Idaho Falls, ID 83401 P. B. Brimhall
1	<u>ERDA Division of Biomedical and Environmental Research (MS-E201)</u> Washington, DC 20545 W. W. Weyzen	1	<u>ERDA Division of International Security Affairs (MS-E171)</u> Washington, DC 20545 W. K. Benson
2	<u>ERDA Division of Physical Research (MS-J309)</u> Washington, DC 20545 J. L. Burnett W. J. Haubach	3	<u>ERDA Office of Controller</u> Washington, DC 20545 C. C. Gaffney (MS-C377) J. E. Reid (MS-C217) R. H. Schoonmaker (MS-D212)
2	<u>ERDA Office of the Assistant Admin- istrator of International Affairs (MS-7220C)</u> Washington, DC 20545 W. Ellgen J. A. Garrett	1	<u>ERDA Office of Industry Relations</u> Washington, DC 20545 E. L. Sillcox (MS-5110)
1	<u>ERDA Division of Waste Management, Production and Processing (MS-B107)</u> Washington, DC 20545 R. K. Heusser	1	<u>ERDA Savannah River Operations Office</u> P. O. Box A Aiken, SC 29801 W. D. Sandberg

No. of
Copies

OFFSITE

27 ERDA Technical Information Center
P. O. Box 62
Oak Ridge, TN 37830

1 Idaho National Engineering Company
EG&G Idaho Inc.
P. O. Box 1625
Idaho Falls, ID 83401
R. A. Hasse

1 Lawrence Berkeley Laboratory
University of California
Berkeley, CA 94720
E. W. Yeats

1 Lawrence Livermore Laboratory
University of California
P. O. Box 808
Livermore, CA 94550
J. W. Meadows

2 Los Alamos Scientific Laboratory
University of California
P. O. Box 1663
Los Alamos, NM 87544
N. A. Matwiyoff
H. A. O'Brien

3 Mound Laboratory
Monsanto Research Corporation
P. O. Box 32
Miamisburg, OH 45342
V. L. Avona
R. A. Schwind
R. E. Vallee

10 Oak Ridge National Laboratory
Union Carbide Corporation
P. O. Box X
Oak Ridge, TN 37830
P. S. Baker
H. R. Gwinn
E. H. Kobisk
E. E. Lamb
E. Newman
J. E. Ratledge (5)

1 Rockwell International
Atomics International Division
Rocky Flats Plant
P. O. Box 464
Golden, CO 80401
E. Vejvoda

No. of
Copies

OFFSITE

2 Savannah River Laboratory
E. I. duPont de Nemours & Company
Aiken, SC 29801
K. W. MacMurdo
D. H. Turno

1 U.S. Department of Transportation
Washington, DC 20555
A. F. Grella

5 U.S. Nuclear Regulatory Commission
Washington, DC 20555
R. F. Barker
D. R. Hopkins
E. P. Resner
B. Singer
A. N. Tse

ONSITE

4 ERDA Richland Operations Office
O. J. Elgert
W. J. Pohlid
H. E. Ransom
M. J. Wicks

2 Atlantic Richfield Hanford Company
H. P. Shaw
ARHCO Files

1 Hanford Engineering Development
Laboratory
D. Engel

1 United Nuclear Industries
P. A. Carlson

34 Battelle-Northwest
W. J. Bair
H. T. Fullam
J. J. Fuquay
J. H. Jarrett
R. W. McKee
R. W. Perkins
D. B. Shipler
J. L. Simmons (20)
E. J. Wheelwright
Technical Information Files (5)
Technical Publications