

1195

REPOSITORY Oak Ridge Operations
 COLLECTION Records Holding Area
Documents 1944-94
 BOX No. A-12-9 Bldg. 2714-H
Personnel -1 FOIA
 FOLDER Amersham Corp.

717254

JAN 23 1981

Mr. David G. Hunt
 Technical Manager
 Radiation Sources
 Amersham Corporation
 2636 South Clearbrook Drive
 Arlington Heights, Illinois 60005

Dear Mr. Hunt:

YOUR FREEDOM OF INFORMATION ACT REQUEST OF JANUARY 12, 1981

This letter is in response to your Freedom of Information Act (FOIA) request of January 12, 1981. Your request was received by the Oak Ridge Operations' (ORO) Freedom of Information Officer on January 16, 1981.

Please be advised that no record exists which contains the information you desire. In order to honor your request, ORO would have to extract the data you desire from the voluminous sets of records it has for each institution. The FOIA clearly states that there is no obligation on the part of any agency to compile or create a record solely for the purpose of satisfying a request for information.

I, as the Authorizing Official, ORO, am the person responsible for making the above determination. My position title within the DOE is Acting Assistant Manager for Administration.

DOE's regulations provide that a determination that there are no documents responsive to a request may be appealed to DOE's Office of Hearings and Appeals by writing the Director, Office of Hearings and Appeals, Department of Energy, 2000 M Street, N. W., Washington, D. C. 20461, within thirty (30) days from your receipt of this letter. Both the envelope and letter must be clearly marked "Freedom of Information Appeal." Additional requirements of an appeal are set forth

CERTIFIED MAIL:
RETURN RECEIPT REQUESTED

PERSONNEL -1
 FOIA
 565

1113588

Mr. David G. Hunt

- 2 -

JAN 23 1981

in 10 CFR Part 1004.8(b). Judicial review will be available after the appeal determination either in the district in which you reside or have a principal place of business, or in which the records are situated, or in the District of Columbia.

Thank you for your interest in DOE programs.

Sincerely,

ORIGINAL SIGNED BY
H. S. OSTER, JR.

H. Stanton Oster, Jr.
Acting Assistant Manager
for Administration
Authorizing Official

CC-10:ACM

bcc: W. Range, PIO
J. L. Foutch, OCC

CC-10:ACMoseley:klc:6-1212:1/22/81

CONCURRENCES
RTG. SYMBOL
CC-10
INITIALS/SIG.
Moseley
DATE
1/22/81
RTG. SYMBOL
CC-10
INITIALS/SIG.
[Signature]
DATE
1/22/81
RTG. SYMBOL
M-3
INITIALS/SIG.
[Signature]
DATE
1/22/81
RTG. SYMBOL
INITIALS/SIG.
DATE
RTG. SYMBOL
INITIALS/SIG.
DATE
RTG. SYMBOL
INITIALS/SIG.
DATE
RTG. SYMBOL
INITIALS/SIG.
DATE

OFFICE OF CHIEF COUNSEL
FILE
 No papers will be removed herefrom
 without special authority

P15 8768080

RECEIPT FOR CERTIFIED MAIL

NO INSURANCE COVERAGE PROVIDED—
 NOT FOR INTERNATIONAL MAIL
 (See Reverse)

1. SENDER: Complete Items 1, 2, and 3.
 Add your address in the "RETURN TO" space on reverse.

1. The following service is requested (check one.)

☐ Show to whom and date delivered.....

☐ Show to whom, date and address of delivery.....

☐ **RESTRICTED DELIVERY**
 Show to whom and date delivered.....

☐ **RESTRICTED DELIVERY**
 Show to whom, date, and address of delivery.....

(CONSULT POSTMASTER FOR FEES)

2. ARTICLE ADDRESSED TO:
Mr. David G. Hunt, Technical Mgr.
Radiation Sources, Amersham Corp.
2636 S. Clearbrook Drive
Arlington Heights, Illinois 60005

REGISTERED NO. CERTIFIED NO. INSURED NO.
 8768080

(Always obtain signature of addressee or agent)

I have received the article described above.
 SIGNATURE ☐ Addressee ☐ Authorized agent

DATE OF DELIVERY

3. ADDRESS (Complete only if requested)

4. UNABLE TO DELIVER BECAUSE:

CLERK'S INITIALS

Mr. David G. Hunt
 Technical Manager
 Radiation Sources
 Amersham Corporation
 2636 S. Clearbrook Drive
 Arlington Heights, ILL 60005

CONSULT POSTMASTER FOR FEES	OPTIONAL SERVICES	CERTIFIED FEE	
		SPECIAL DELIVERY	
		RESTRICTED DELIVERY	
		SHOW TO WHOM AND DATE DELIVERED	
		SHOW TO WHOM, DATE, AND ADDRESS OF DELIVERY	
RETURN RECEIPT SERVICE	SHOW TO WHOM AND DATE DELIVERED WITH RESTRICTED DELIVERY		
	SHOW TO WHOM, DATE AND ADDRESS OF DELIVERY WITH RESTRICTED DELIVERY		
	TOTAL POSTAGE AND FEES	\$	
POSTMARK OR DATE			

PERSONNEL

FOIA

Amersham Corp.

1113590



2636 S. Clearbrook Dr., Arlington Heights, IL 60005 312 593-6300

January 12, 1981

Wayne Range
FOI Officer
Oak Ridge Operations
Department of Energy
Oak Ridge, Tennessee 37830

FOI Request

Dear Sir:

This is a request for information under the Freedom of Information Act. The Department of Energy has published the document PNL-3274, UC-23 "List of DOE Radioisotope Customers with Summary of Radioisotope shipments FY 1979" compiled by J.C. Burlison. This publication lists what institutions received certain radioisotopes from the DOE. Please send to me the quantities of each radioisotope listed below that were shipped to the institutions shown during fiscal '79.

<u>Radioisotope</u>	<u>Institution</u>	<u># mCi's</u>
241 Am	# 64 Gamma Industries	
192 Ir	# 65 Gamma Industries	
241 Am	# 80 Gulf Nuclear	
153 Gd	# 80 Gulf Nuclear	
137 Ir	# 80 Gulf Nuclear	
241 Am	# 95 Isotope Products Labs	
109 Cd	# 95 Isotope Products Labs	
137 Cs	# 95 Isotope Products Labs	
137 Cs	# 127 Minnesota Mining & Manufacturing Company	
241 Am	# 130 Monsanto Research Corp.	
252 Cf	# 130 Monsanto Research Corp.	
241 Am	# 140 New England Nuclear	
153 Gd	# 140 New England Nuclear	
109 Cd	# 140 New England Nuclear	
3H	# 140 New England Nuclear	
85 Kr	# 140 New England Nuclear	
CSI-	# 140 New England Nuclear	

401 1 14 81 NWP 10.

1113591

PERSONNEL - 1

FOIA 347

Wayne Range
FOI Officer
January 12, 1981
Page 2

<u>Radioisotope</u>	<u>Institution</u>	<u># mCi's</u>
How many cyclotron service irradiations were performed and for what targets?		
²⁴¹ Am	# 151 Nuclear Sources & Services	
¹⁹² Ir	# 211 Technical Operations	
CSI	# 202 Spire Corporation	

How many CSI irradiations
were performed?

Sincerely,


David G. Hunt
Technical Manager
Radiation Sources

DGH/nf

40 : 1 11 9 1 2 1

1113592

List of DOE Radioisotope Customers with Radioisotope Shipments FY 1979

J. S. Burlison

Prepared for:
Office of Health and Environmental Research
Office of the Assistant Secretary for
Environment
U.S. Department of Energy
Washington, D. C. 20545
Contract DE-AC06-76RLO 1830

Pacific Northwest Laboratory
Contracted for the U.S. Department of Energy
by Battelle Memorial Institute



LIST OF DOE RADIOISOTOPE CUSTOMERS WITH
SUMMARY OF RADIOISOTOPE SHIPMENTS

Compiled by
J. S. Burlison

June 1980

Prepared for
Office of Health and Environmental Research
Office of the Assistant Secretary for Environment
U.S. Department of Energy
Washington, D.C. 20545
Contract DE-AC06-76RLO 1830

Pacific Northwest Laboratory
Richland, Washington

1113594A

ACKNOWLEDGMENTS

The compiler thanks the following laboratories and DOE Area Offices for their annual contributions from which this report is compiled.

Argonne National Laboratory
Brookhaven National Laboratory
Hanford Engineering Development Laboratory
Idaho Operations Office/EG&G Idaho, Inc.
Los Alamos Scientific Laboratory
Mound Facility
Oak Ridge National Laboratory
Pacific Northwest Laboratory
Rocky Flats Area Office
Savannah River Plant/DOE
UNC Nuclear Industries, Inc.

PREVIOUS REPORTS

Previous reports in this series are:

TID-2160 (FY 1964)	ORNL-IIC-17 (FY 1968)	BNWL-1774 (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)
BNWL-2147 (FY 1976)	PNL-2572 (FY 1977)	PNL-2930 (FY 1978)

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

- "Stable Isotope Customer List and Summary of Shipments, FY 1978," Oak Ridge National Laboratory, ORNL/TM-6710, May 1979 (\$4.50 printed; \$3.00 microfiche).
- "Stable Isotope Sales: Mound Facility Customer and Shipment Summaries, FY 1978." MLM-2594, March 16, 1979 (\$4.00 printed; \$3.00 microfiche).
- "Stable Isotope Sales: Mound Facility Customer and Shipment Summaries, FY 1977." MLM-2504, April 27, 1978 (\$4.00 printed; \$3.00 microfiche).
- "Stable Isotope Sales: Mound Facility Customer and Shipment Summaries, FY 1976 and 1976 A." MLM-2403, June 6, 1977 (\$4.00 printed; \$3.00 microfiche).
- "Stable Isotope Sales: Mound Facility Customer and Shipment Summaries, FY 1975." MLM-2295, April 30, 1976 (\$4.00 printed; \$3.00 microfiche).

CONTENTS

ACKNOWLEDGMENTS	ii
PREVIOUS REPORTS	ii
INTRODUCTION	1
1. ISOTOPE SUPPLIER, FACILITY CONTACT, AND ISOTOPES OR SERVICES SUPPLIED	3
2. ALPHABETICAL LIST OF CUSTOMERS, AND ISOTOPES PURCHASED	5
3. ALPHABETICAL LIST OF ISOTOPES CROSS-REFERENCED TO CUSTOMER NUMBERS	31
4. GEOGRAPHICAL LOCATION OF RADIOISOTOPE CUSTOMERS	37
5. RADIOISOTOPE SALES AND TRANSFERS - FY 1979	41

LIST OF DOE RADIOISOTOPE CUSTOMERS WITH
SUMMARY OF RADIOISOTOPE SHIPMENTS FY 1979

INTRODUCTION

The fifteenth edition of the radioisotope customer list was prepared at the request of the Division of Financial Services, Office of the Assistant Secretary for Environment, Department of Energy (DOE). This document lists DOE's radioisotope production and distribution activities by its facilities at Argonne National Laboratory; Pacific Northwest Laboratory; Brookhaven National Laboratory; Hanford Engineering Development Laboratory; Idaho Operations Office; Los Alamos Scientific Laboratory; Mound Facility; Oak Ridge National Laboratory; Rocky Flats Area Office; Savannah River Laboratory; and UNC Nuclear Industries, Inc.

The information is divided into five sections:

1. Isotope Suppliers, Facility, Contracts and Isotopes or Services Supplied. Section 1 lists suppliers of isotopes, the isotopes supplied, and the contact person for each DOE facility. If a reader needs more specific information that is not supplied in this report about isotope sales or shipments for a particular facility, he or she should contact the person listed for that facility.
2. Alphabetical List of Customers, and Isotopes Purchased. Section 2 is an alphabetical list of domestic and foreign customers and their addresses. Each customer has a customer number. This number is used to cross-reference data in the other sections of the report. Isotope purchases are listed after each customer's address, and the laboratory supplying each isotope is indicated by a letter abbreviation set off by parentheses.
3. Alphabetical List of Isotopes Cross-Referenced to Customer Numbers. Section 3 alphabetically lists isotopes and cross-references them to customer numbers. This section provides a quick idea of the number of companies purchasing a particular isotope. If the reader needs more information he or she can refer to the customer list in Section 2 to determine the laboratory supplying the isotope.
4. Geographical Location of Radioisotope Customers. Section 4 is an alphabetical list of states and foreign countries that is cross-referenced to customer numbers and indicates the geographical concentration of isotope users.
5. Radioisotope Sales and Transfers-FY 1979. Section 5 summarizes the FY-1979 radioisotope shipment activities of the DOE laboratory facilities listed in Section 1. A table alphabetically lists the isotopes and their suppliers. Data on shipments, quantities, and dollar values of each isotope are listed under domestic, foreign, and project (DOE facilities) categories.

1. ISOTOPE SUPPLIER(a), FACILITY CONTACT, AND ISOTOPES OR SERVICES SUPPLIED

<u>Facility</u>	<u>Abbreviation</u>	<u>Facility</u>	<u>Abbreviation</u>
Argonne National Laboratory	(A)	Idaho Operations Office	(I)
J. C. Haugen Special Materials Division Argonne National Laboratory 9700 S. Cass Ave Argonne, IL 60439		R. E. Tiller, Director Department of Energy EG&G Idaho, Inc. 550 Second Street Idaho Falls, ID 83401	
FTS 972-6778 Commercial (312)972-6778		FTS 583-1439 Commercial (208)526-1439	
<u>Isotopes or Services:</u> CSI, RSI		^{28}Al , ^{139}Ba , ^{80}Br , ^{82}Br , ^{38}Cl , ^{165}Dy , ^{166}Ho , ^{56}Mn , ^{99}Mo , ^{24}Na , ^{147}Nd , ^{186}Re , ^{188}Re , RSI, ^{182}Ta	
Brookhaven National Laboratory	(B)	Los Alamos Scientific Laboratory	(L)
P. Colman Isotopes and Special Materials Group Brookhaven National Laboratory Upton, Long Island, NY 11973		C. Longmire Los Alamos Scientific Laboratory University of California P.O. Box 1663 Los Alamos, NM 87545	
FTS 664-4058 Commercial (516)345-3441 Extension 4058		FTS 843-4948 Commercial (505)667-4948	
<u>Isotopes or Services:</u> ^{211}At , ^{77}Br , ^{109}Cd , ^{18}F , ^{52}Fe , ^{123}I , ^{28}Mg , ^{191}Os , ^{81}Rb , RSI, ^{103}Ru , ^{178}W , ^{123}Xe , ^{127}Xe		^{77}Br , ^{52}Fe , ^{82}Sr , ^{85}Sr	
Hanford Engineering Development Laboratory	(H)	Mound Facility	(M)
D. Engel, Manager Materials Department Richland, WA 99352		L. P. Thomas Sales/Marketing Manager Stable Isotope Sales Monsanto Research Corporation P.O. Box 32 Miamisburg, OH 45342	
FTS 444-3548 Commercial (509)942-3548		FTS 774-3896 Commercial (513)865-3896 Extension 7147	
^{241}Am , ^{133}Ba , $^{144}\text{CePr}$, ^{252}Cf , ^{57}Co , ^{60}Co , ^{134}Cs , ^{137}Cs , ^3H , ^{203}Hg , ^{192}Ir , ^{54}Mn , ^{92}Nb , ^{239}Np , ^{147}Pm , ^{210}Po , ^{238}Pu , ^{239}Pu , ^{240}Pu , RaDEF , ^{106}Ru , ^{90}Sr , ^{90}SrY , ^{182}Ta , ^{232}Th , U(N) , ^{238}U , ^{95}Zr		^{227}Ac , ^{252}Cf , ^3H , ^{231}Pa , ^{210}Po , ^{238}Pu , ^{239}Pu , ^{240}Pu , ^{242}Pu , ^{229}Th , ^{230}Th , ^{234}U , ^{238}U , ^{133}Xe	

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

Oak Ridge National Laboratory (O)

J. E. Ratledge, Supervisor
Isotope Sales
Oak Ridge National Laboratory
P.O. Box X
Oak Ridge, TN 37830

FTS 624-6984
Commercial (615)574-6984
Extension 6661

^{241}Am , ^{243}Am , ^{37}Ar , ^{249}Bk , ^{47}Ca , Cap,
 ^{249}Cf , ^{250}Cf , ^{252}Cf , ^{144}Ce , ^{60}Co ,
 ^{137}Cs , CSI, ^{243}Cu , ^{244}Cu , ^{245}Cu ,
 ^{248}Cu , ^{253}Es , ^{152}Eu , ^{153}Gd , ^3H ,
 ^{181}Hf , ^{129}I , ^{131}I , ^{192}Ir , ^{43}K ,
 ^{85}Kr , MCP, ^{95}Nb , ^{237}Np -high purity,
 ^{237}Np -metal, ^{237}Np -oxide, NU, ^{33}P ,
 ^{231}Pa , ^{147}Pm , ^{236}Pu , ^{237}Pu , ^{238}Pu ,
 ^{239}Pu , ^{240}Pu , ^{241}Pu , ^{242}Pu , ^{244}Pu ,
RW, ^{103}Ru , ^{106}Ru , ^{151}Sm , SS, ^{89}Sr ,
 ^{90}Sr , Tgs, ^{99}Tc , ^{229}Th , ^{230}Th , ^{232}Th ,
 ^{232}U , ^{233}U , ^{234}U , ^{235}U , ^{236}U , ^{238}U ,
 ^{133}Xe , ^{91}Yb , ^{95}Zr

Pacific Northwest Laboratory (P)

J. V. Filsinger
Safety and Materials Management
Pacific Northwest Laboratory
PO Box 999
Richland, WA 99352

FTS 444-2051
Commercial (509)375-2051

^{241}Am , Cm, D_2O , DU, EU, ^3H , Np, Nu, Pu,
 ^{238}Pu , ^{242}Pu , Th, ^{233}U

Rocky Flats Area Office (R)

G. T. Echert
Manufacturing Branch
Rocky Flats Area Office
P.O. Box 928
Golden, CO 80401

FTS 332-2646
Commercial (303)497-2646

Am shipped as AmO_2 to the
Oak Ridge Laboratory Isotope
Pool

Savannah River Plant (S)

M. J. Sires, Acting Director
Technical and Production Division
Department of Energy
P.O. Box A
Aiken, SC 29801

FTS 239-2217
Commercial (803)-725-6211
Extension 2217

^{241}Am , ^{252}Cf , ^{238}Pu

UNC Nuclear Industries, Inc. (U)

P. A. Carlson, Manager
Reactor Technology
Richland, WA 99352

FTS 444-1631
Commercial (509)942-1631

^{170}Tm , ^{147}Nd , ^{149}Nd , ^{60}Co
All produced from reactor service
irradiations

2. ALPHABETICAL LIST OF CUSTOMERS, SUPPLIERS, AND ISOTOPES PURCHASED

The following abbreviations are used in this customer listing:

Cyclotron Service Irradiations	CSI	Natural Uranium	NU
Depleted Uranium	DU	Reactor Service Irradiations	RSI
Encapsulation	Cap	Withdrawn radioisotopes prepared under special approval	RW
Enriched Uranium	EU	Special Services	SS
Fission Products	FP	Targets	Tgs
Miscellaneous Compound Preparations	MCP		

The letter following each isotope or service entry is the supplier abbreviation listed in Section 1.

DOMESTIC CUSTOMERS

- | | |
|--|--|
| <p>1 AAI Corporation
PO Box 6767
Baltimore, MD 21204

DU(P)</p> <p>2 Airco, Inc.
Central Research Laboratories
Murray Hill, NJ 07974

85Kr(O)</p> <p>3 Albert Einstein Hospital
Newport and Morris Avenue
Bronx, NY 10461

81Rb(B)</p> <p>4 America Atomics Corporation
425 South Plumer
Tucson, AZ 85719

3H(O), 85Kr(O), SS(O)</p> <p>5 Amersham Corporation
2636 S. Clearbrook Drive
Arlington Heights, IL 60005

241Am(O), 109Cd(B*), CSI(O), 153Gd(O),
129I(O), 106Ru(O), RW(O)</p> <p>6 Amoco Oil Co.
Naperville, IL 60540

RSI(A)</p> | <p>7 ARCO Nuclear Company
PO Box 546
Leechburg, PA 15656

238Pu(O)</p> <p>8 Argonne National Laboratory
9700 South Cass Avenue
Argonne, IL 60439

241Am(O), 241Am(P), 249Bk(O), Cap(O),
249Cf(O), 252Cf(S), 243Cm(O), 60Co(O),
137Cs(O), DU(P), 253Es(O), 95Nb(O),
Np(P), 237Np(O), Pu(P), 241Pu(O),
242Pu(O), RSI(B), 103Ru(O), 90Sr(O),
99Tc(O), Tgs(O), 230Th(O)</p> <p>9 Automation Industries, Inc.
Instruments Division
Route #113, Kimberton Road
Phoenixville, PA 19460

192Ir(H), 192Ir(O)</p> <p>10 Babcock and Wilcox Company
20 South Van Buren Avenue
Barberton, OH 44203

SS(O)</p> <p>11 Babcock Electronics Corporation
PO Box 1499
Costa Mesa, CA 92626

85Kr(O)</p> |
|--|--|

• Oak Ridge billed.

1113598 A

- 12 Battelle Memorial Institute
Columbus Laboratory
505 King Ave.
Columbus, OH 43201

DU(P)

Battelle, Pacific Northwest Laboratories
see Pacific Northwest Laboratory
- 13 Bell Telephone Laboratories
Murray Hill, NJ 07971

CSI(0), MCP(0), SS(0)
- 14 Bendix Corporation
2000 East Bannister Road
Kansas City, MO 64131

147Pm(0), SS(0)
- 15 Best Industries, Inc.
PO Box 681
Washington, DC 20044

137Cs(0), MCP(0)
- 16 Boston University
100 Cunningham Street
Boston, MA 02215

89Sr(0)
- 17 Bowman Gray School of Medicine
Winston-Salem, NC 27103

133Xe(0)
- 18 Brookhaven National Laboratory
Upton, NY 11973

77Br(0), 252Cf(S), 3H(0), 103Ru(0),
99Tc(0)
- 19 Brooklyn College
Chemistry Department
Brooklyn, NY 11210

RSI(B)
- 20 Burroughs Corporation
PO Box 203
Paoli, PA 19301

85Kr(0)
- 21 Campbell Pacific Nuclear Corporation
130 Buchanan
Pareco, CA 94553

241Am(P)
- 22 Carnegie-Mellon University
5000 Forbes
Pittsburgh, PA 15213

181Hf(0)
- 23 Case-Western Reserve University
2220 Circle Drive
Cleveland, OH 44106

CSI(0), 28Mg(B*)
- 24 Centronic
1101 Bristol Road
Mountainside, NJ 07092

238U(H)
- 25 Chamberlain Manufacturing Corporation
East 4th and Esther St.
Waterloo, IA 50705

DU(P)
- 26 Chevron Research Company
555 Market Street
San Francisco, CA 94120

3H(0), 106Ru(0), 133Xe(0)
- 27 Children's Hospital
Howard Medical School
300 Longwood Ave.
Boston, MA 02115

43K(0), 191Os(B), 81Rb(B), 178W(B)
- 28 Colorado School of Mines
PO Box 112
Golden, CO 80402

230Th(0)
- 29 Colorado State Department of
Occupational Health
4210 East 11th Avenue
Denver, CO 80220

236Pu(0), SS(0), 229Th(0)

- 30 Columbia Presbyterian Hospital
622 W 168th Street
New York, NY 10032

81Rb(B)
- 31 Columbia University
630 West 168th Street
New York, NY 10032

28Mg(B*)
- 32 Continental Oil Company
PO Box 1267
Ponca City, OK 74601

89Sr(0)
- 33 Cook Electric Company
6201 Oakton Street
Morton Grove, IL 60053

85Kr(0)
- 34 Cooper Medical Center
6th and Stevens Street
Camden, NJ 08103

127Xe(B*)
- 35 Cornell University
Division of Nutritional Sciences
Ithaca, NY 14853

47Ca(0), 28Mg(B*)
- 36 Creighton University
2410 California
Omaha, NB 68131

47Ca(0)
- 37 Cryogenic Rare Gas Laboratories, Inc.
730 S. 13th Street
Newark, NJ 07103

85Kr(0)
- 38 DCA Reliability Laboratory
975 Bernicia Avenue
Sunnyvale, CA 94086

85Kr(0)
- 39 Delco Electronics
General Motors Corporation
Kokomo, IN 46901

85Kr(0)
- 40 Department of Energy-ID
Health Services Laboratory
550 2nd Street
Idaho Falls, ID 83401

147Nd(I), 186Re(I), 188Re(I)
- 41 Department of Law Enforcement
Bureau of Scientific Studies
515 E. Woodruff Road
Joliet, IL 60432

RSI(A)
- 42 Diagnostic Isotopes
225 Belleville Avenue
Bloomfield, NJ 07003

127Xe(B*)
- 43 Diagnostic Radiopharmacy
6980 Aragon Circle
Suite 5
Buena Park, CA 90620

133Xe(0)
- 44 Downstate Medical Center
450 Clarkson Avenue
Brooklyn, NY 11203

28Mg(B*)
- 45 Dresser Atlas
Division of Dresser Industries, Inc.
PO Box 1407
Houston, TX 77001

3H(0), Tgs(0)
- 46 Duke University
Durham, NC 27706

Tgs(0), 238U(0), 133Xe(0)

duPont
see, E.I. duPont de Nemours Co., Inc.
- 47 EAD Metallurgical, Inc.
71 Pearce Avenue
Tonawanda, NY 14150

241Am(0), Cap(0)

- 48 East Carolina University
Purchasing Department
Greenville, NC 27834
 $^{89}\text{Sr}(0)$
- 49 Eberline Instrument Corporation
PO Box 279
Santa Fe, NM 87501
 $\text{Tgs}(0)$, $^{230}\text{Th}(0)$
- 50 Edinboro State College
Edinboro, PA 16444
 $^{252}\text{Cf}(S)$
- 51 Edsel B. Ford Institute for
Medical Research
Department of Physics and Biophysics
Henry Ford Hospital
2799 West Grand Boulevard
Detroit, MI 48202
 $^{252}\text{Cf}(S)$
- 52 EG&G Idaho, Inc.
550 Second Street
PO Box 1845
Idaho Fall, ID 83401
 $^{243}\text{Am}(0)$, $\text{Cap}(0)$, $^{249}\text{Cf}(0)$, $^{252}\text{Cf}(0)$,
 $^{244}\text{Cm}(0)$, $^{95}\text{Nb}(0)$, $^{236}\text{Pu}(0)$, $^{239}\text{Pu}(0)$,
 $^{241}\text{Pu}(0)$, $\text{SS}(0)$, $^{229}\text{Th}(0)$, $^{233}\text{U}(0)$,
 $^{235}\text{U}(0)$, $^{236}\text{U}(0)$, $^{133}\text{Xe}(0)$, $^{95}\text{Zr}(0)$
- 53 EG&G Idaho, Inc.
TRA/PO Box 1625
Idaho Falls, ID 84301
 $^{28}\text{Al}(I)$, $^{139}\text{Ba}(I)$, $^{80}\text{Br}(I)$, $^{82}\text{Br}(I)$,
 $^{38}\text{Cl}(I)$, $^{165}\text{Dy}(I)$, $\text{EU}(P)$, $^{166}\text{Ho}(I)$,
 $^{56}\text{Mn}(I)$, $^{99}\text{Mo}(I)$, $^{24}\text{Na}(I)$, $^{147}\text{Nd}(I)$,
 $^{231}\text{Pa}(M)$, $^{109}\text{Pd}(I)$, $\text{RSI}(I)$, $^{182}\text{Ta}(I)$
- 54 E. I. du Pont de Nemours Co., Inc.
Savannah River Plant
Aiken, SC 29801
 $^{243}\text{Am}(0)$, $\text{Cap}(0)$, $^{252}\text{Cf}(0)$, $^{244}\text{Cm}(0)$,
 $\text{D}_2\text{O}(P)$, $\text{DU}(P)$, $^3\text{H}(M)$, $^{238}\text{Pu}(M)$, $^{238}\text{Pu}(0)$,
 $^{242}\text{Pu}(0)$, $^{106}\text{Ru}(0)$, $\text{SS}(0)$, $\text{Th}(P)$, $^{233}\text{U}(0)$,
 $^{95}\text{Zr}(0)$
- 55 EMR Photo Electric
Division of Weston Instruments
PO Box 44
Princeton, NJ 08540
 $^3\text{H}(0)$
- 56 Environmental Protection Agency
Division of Financial Management
Accounting Operations Office
Washington, DC 20460
 $^{99}\text{Tc}(0)$
- 57 Esso Research and Engineering Company
PO Box 642
Linden, NJ 07036
 $^{99}\text{Tc}(0)$
- 58 Exxon Nuclear Co., Inc.
2101 Horn Rapids Road
Richland, WA 99352
 $\text{EU}(P)$
- 59 Exxon Nuclear Idaho Company, Inc.
Idaho Chemical Processing Plant
550 Second St.
Idaho Falls, ID 83401
 $\text{EU}(P)$
- 60 Exxon Nuclear Idaho Company, Inc.
1955 Fremont Avenue
Idaho Falls, ID 83401
 $\text{RSI}(I)$
- 61 Fairchild Semiconductor
PO Box 790
Mountain View, CA 94040
 $^{85}\text{Kr}(0)$
- 62 Flinchbaugh Products, Inc.
315 Richard Mine Road
Wharton, NJ 07885
 $\text{DU}(P)$
- 63 Florida State University
Tallahassee, FL 32306
 ^{230}Th

- 64 Gamma Industries
9320 Travenor
PO Box 34526
Houston, TX 77034
 $^{241}\text{Am}(0)$, $\text{Cap}(0)$
- 65 Gamma Industries, Inc.
PO Box 2543
Baton Rouge, LA 70821
 $^{192}\text{Ir}(0)$
- 66 Gammie Nuclear Company, Inc.
11941 Waveland Avenue
Franklin Park, IL 60131
RSI(A)
- 67 General Electric Company
Lynchburg, VA 24502
 $^{85}\text{Kr}(0)$
- 68 General Electric Company
PO Box 254
San Jose, CA 95103
 $^{239}\text{Pu}(0)$, $^{240}\text{Pu}(0)$, $^{241}\text{Pu}(0)$, $\text{RW}(0)$, $\text{SS}(0)$,
 $\text{Tgs}(0)$, $^{234}\text{U}(0)$, $^{238}\text{U}(0)$
- 69 General Electric Company
General Electric Drive
Waynesboro, VA 22980
 $^{85}\text{Kr}(0)$
- 70 General Electric Company
Neutron Services Department
Pinellas Peninsula Plant
St. Petersburg, FL 33733
 $^{238}\text{Pu}(M)$, $^{239}\text{Pu}(M)$
- 71 General Electric Research and
Development
PO Box 8
Schenectady, NY 12301
 $^{239}\text{Pu}(0)$, RSI(B), $\text{Tgs}(0)$
- 72 General Nucleonics Division
Tyco Laboratories
2811 Metropolitan Place
Pomona, CA 91767
 $^{85}\text{Kr}(0)$
- 73 George Washington University
23rd and Eye St. N.W.
Washington, DC 20037
 $^{77}\text{Br}(L)$
- 74 George Washington University
25th and H Streets N.W.
Washington, DC 20037
 $^{77}\text{Br}(B)$
- 75 Georgia Institute of Technology
225 North Avenue, N.W.
Atlanta, GA 30332
 $^{85}\text{Kr}(0)$, $\text{MCP}(0)$, $^{90}\text{Sr}(0)$
- 76 Gollob Analytical Service Corporation
47 Industrial Road
Berkeley Heights, NY 07922
 $^3\text{H}(0)$
- 77 Goodyear Atomic Corp.
PO Box 628
Piketon, OH 45661
 $\text{EU}(P)$, $^{99}\text{Tc}(0)$
- 78 Grumman Aerospace Corporation
PO Box 177
Bethpage, NY 11714
RSI(B)
- 79 Gulf Energy and Environmental Systems
PO Box 608
San Diego, CA 92112
 $^{103}\text{Ru}(0)$, $^{95}\text{Zr}(0)$
- 80 Gulf Nuclear, Inc.
202 Medical Center
Webster, TX 77598
 $^{241}\text{Am}(0)$, $\text{Cap}(0)$, $^{137}\text{Cs}(0)$, $^{153}\text{Gd}(0)$,
 $^3\text{H}(0)$, $^{192}\text{Ir}(0)$, $\text{MCP}(0)$, $\text{Tgs}(0)$

Hanford Development Engineering
Laboratory
See
Westinghouse Hanford Company

- 81 Harvard Medical School
50 Binney Street
Boston, MA 02115
 $^{211}\text{At}(\text{B})$
- 82 Hazen Research, Inc.
4601 Indiana Street
Golden, CO 80401
 $\text{SS}(\text{O})$, $^{229}\text{Th}(\text{O})$
- 83 Henry Ford Hospital
2799 West Grand Boulevard
Detroit, MI 48202
 $^{47}\text{Ca}(\text{O})$
- 84 Holy Family Hospital
N 5633 Lidgerwood Street
Spokane, WA 99207
 $^{133}\text{Xe}(\text{O})$
- 85 Hughes Aircraft Company
PO Box 11337
Tucson, AZ 85706
 $^{85}\text{Kr}(\text{O})$
- 86 Hughes Aircraft Company
PO Box 92907
Los Angeles, CA 90009
 $^{85}\text{Kr}(\text{O})$
- 87 ICI America, Inc.
Atlas Aerospace Division
Valley Forge Industrial Park
Valley Forge, PA 19481
 $^{85}\text{Kr}(\text{O})$
- 88 ICI-NBCo.
26201 Miles Road
Cleveland, OH 44128
 $^{137}\text{Cs}(\text{O})$, $\text{CSI}(\text{O})$, $^3\text{H}(\text{O})$, $^{33}\text{P}(\text{O})$,
 $^{106}\text{Ru}(\text{O})$, $^{90}\text{Sr}(\text{O})$, $^{99}\text{Tc}(\text{O})$
- 89 Industrial Nuclear Company
1124 Chess Drive
Foster City, CA 94404
 $^{192}\text{Ir}(\text{O})$
- 90 INTEL Corporation
3065 Bowers Avenue
Santa Clara, CA 95051
 $^{85}\text{Kr}(\text{O})$
- 91 Intelcom Rad Tech
PO Box 80817
San Diego, CA 92138
 $^{237}\text{Np}(\text{O})$, $\text{Tgs}(\text{O})$, $^{235}\text{U}(\text{O})$, $^{238}\text{U}(\text{O})$
- 92 International Nutronics, Incorporated
1237 N. San Antonio Road
Palo Alto, CA 94303
 $^{252}\text{Cf}(\text{S})$
- 93 Iowa State University
Ames, IA 50010
 $^{238}\text{U}(\text{O})$
- 94 Isomedix, Inc.
PO Box 177
25 Eastmans Road
Parsippany, NJ 09054
 $^{137}\text{Cs}(\text{O})$
- 95 Isotope Products Laboratories
404 S Luke Street
Burbank, CA 91502
 $^{241}\text{Am}(\text{O})$, $^{109}\text{Cd}(\text{B}^*)$, $^{252}\text{Cf}(\text{O})$, $^{137}\text{Cs}(\text{O})$,
 $\text{CSI}(\text{O})$, $^{129}\text{I}(\text{O})$, $^{236}\text{Pu}(\text{O})$, $^{106}\text{Ru}(\text{O})$,
 $^{90}\text{Sr}(\text{O})$, $\text{SS}(\text{O})$, $^{230}\text{Th}(\text{O})$, $^{95}\text{Zr}(\text{O})$
- 96 Isovac Engineering Company
6220 San Fernando Road
Glendale, CA 91204
 $^{85}\text{Kr}(\text{O})$
- 97 Jewish Hospital of St. Louis
216 S. Kingshighway Blvd.
St. Louis, MO 63110
 $^{133}\text{Xe}(\text{O})$
- 98 John Hopkins Hospital
650 North Wolfe Street
Baltimore, MD 21205
 $^{127}\text{Xe}(\text{B}^*)$, $^{47}\text{Ca}(\text{O})$

99 K & K Laboratories
121 Express Street
Plainview, NY 11803
238U(M)

Los Alamos Scientific Laboratory
See
University of California
Los Alamos Scientific Laboratory

100 Kaman Nuclear
1700 Garden of the Gods Road
Colorado Springs, CO 80907
3H(O), Tgs(O)

108 Los Angeles County USC Medical Center
1200 N. State Street, Box 112 GH
Los Angeles, CA 90033
47Ca(O)

101 Kaman Scientists Corp.
195 W 2950 South
Salt Lake City, UT 84115
90Sr(H)

109 Lovelace Clinic
4800 Gibson Boulevard S.E.
Albuquerque, NM 87108
243Cm(O), SS(O)

102 KMS Fusion, Inc.
3941 S. Research Park Drive
PO Box 1567
Ann Arbor, MI 48106
3H(O)

110 Loyola University
Medical Center
2106 S. First Avenue
Maywood, IL 60153
CSI(A)

103 Kalle Atomic Power Laboratory

111 Mallinckrodt Chemical Works

- 116 Measurex Corporation
10475 Imperial Avenue
Cupertino, CA 95014
85Kr(0)
- 117 Medical College of Wisconsin
8700 W. Wisconsin Avenue
Milwaukee, WI 53226
43K(0)
- 118 Medi-Physics, Inc.
5855 Christie Avenue
Emeryville, CA 94608
99Tc(0)
- 119 Memorial Hospital
Department of Nuclear Medicine
1400 E. Boulder
Colorado Springs, CO 80909
133Xe(0)
- 120 Methodist Hospital
1604 N. Capitol
Indianapolis, IN 46202
127Xe(8*)
- 121 Michael-Reese Hospital
29th St. and Ellis Ave.
Chicago, IL 60616
133Xe(0)
- 122 Micro-Rel, Inc.
2340 W 10 Place
Tempe, AZ 85281
85Kr(0)
- 123 Microtest Systems, Inc.
1188 Bordeaux Drive
Sunnyvale, CA 94086
85Kr(0)
- 124 Mine Safety Appliance Company
201 N. Braddock Ave.
Pittsburgh, PA 15208
131I(0)
- 125 Mine Safety Appliances Company
RD 2
Evans City, PA 16033
131I(0)
- 126 Minnesota Mining and Manufacturing
Company
Bldg 590
Twin Cities Army Ammunition Plant
New Brighton, MN 55112
210Po(H), 210Po(M)
- 127 Minnesota Mining and Manufacturing
Company
PO Box 3121
St. Paul, MN 55101
137Cs(0), MCP(0), 95Nb(0), 147Pm(0),
127Xe(8*)
- 128 Monolithic Memories, Inc.
1165 E. Arques Ave.
Sunnyvale, CA 94086
85Kr(0)
- 129 Monsanto Company
PO Box 1311
Texas City, TX 77591
133Xe(0)
- 130 Monsanto Research Corporation
Dayton Laboratory
1515 Nicholas Road
Dayton, OH 45407
241Am(0), Cap(0), 252Cf(S), 238Pu(0)
- 131 Moravsek Biochemicals
15302 E. Proctor Avenue
City of Industry, CA 91745
3H(0)
- 132 Motorola, Inc.
5005 E. McDowell Road
Phoenix, Az 85008
85Kr(0)

- 133 Mount Sinai Medical Center
4300 Alton Road
Miami Beach, FL 33139
CSI(O)
- 134 Nassau County Medical Center
Meadowbrook Hospital
2201 Hempstead Turnpike
East Meadow, NY 11554
 $^{47}\text{Ca}(\text{O})$
- 135 National Bureau of Standards
Route 270 and Quince Orchard Road
Gaithersburg, MD 20760
 $^{242}\text{Pu}(\text{M})$, $^{127}\text{Xe}(\text{B})$
- 136 National Bureau of Standards
Connecticut Ave. and Van Ness St., N.W.
Washington, DC 20234
 $^{252}\text{Cf}(\text{O})$, $^{241}\text{Pu}(\text{O})$, SS(O), Tgs(O),
 $^{133}\text{Xe}(\text{O})$
- 137 National Lead Co of Ohio
PO Box 39158
Cincinnati, OH 45239
DU(P)
- 138 National Semiconductor Corporation
2900 Semiconductor Drive
Santa Clara, CA 95051
 $^{85}\text{Kr}(\text{O})$
- 139 New Brunswick Laboratory
9800 S. Cass Avenue
Argonne, IL 60439
RSI(A)
- 140 New England Nuclear Corporation
575 Albany St
Boston, MA 02118
 $^{241}\text{Am}(\text{O})$, Cap(O), $^{109}\text{Cd}(\text{B}^*)$, $^{144}\text{Ce}(\text{O})$,
 $^{137}\text{Cs}(\text{O})$, CSI(O), $^{152+154}\text{Eu}(\text{O})$, $^{153}\text{Gd}(\text{O})$,
 $^3\text{H}(\text{O})$, $^{129}\text{I}(\text{O})$, $^{85}\text{Kr}(\text{O})$, MCP(O), $^{33}\text{P}(\text{O})$,
 $^{147}\text{Pm}(\text{O})$, $^{103}\text{Ru}(\text{O})$, RW(O), $^{90}\text{Sr}(\text{O})$, SS(O),
 $^{99}\text{Tc}(\text{O})$, $^{127}\text{Xe}(\text{B}^*)$, $^{133}\text{Xe}(\text{O})$, $^{178}\text{W}(\text{B}^*)$,
 $^{95}\text{Zr}(\text{O})$
- 141 New York Hospital
525 East 68th Street
New York, NY 10021
 $^{81}\text{Rb}(\text{B})$
- 142 New York State Department of Health
Office of Fiscal Management
84 Holland Avenue
Albany, NY 12208
 $^{244}\text{Cm}(\text{O})$, SS(O), $^{229}\text{Th}(\text{O})$
- 143 New York University Medical Center
550 First Avenue
New York, NY 10016
 $^{244}\text{Pu}(\text{O})$
- 144 North Carolina Baptist Hospital
300 S. Hawthorne
Winston-Salem, NC 27103
 $^{127}\text{Xe}(\text{B}^*)$
- 145 North Carolina Memorial Hospital
Division of Nuclear Medicine
Chapel Hill, NC 27514
 $^{99}\text{Tc}(\text{O})$, $^{127}\text{Xe}(\text{B}^*)$
- 146 Northwestern Memorial Hospital
239 E. Chicago Avenue
Chicago, IL 60611
 $^{127}\text{Xe}(\text{B}^*)$
- 147 Northwestern University
619 Clark Street
Evanston, IL 60201
SS(O)
- 148 Nuclear Metals, Inc.
2229 Main Street
Concord, MA 01742
DU(P)
- 149 Nuclear Radiation Development, Inc.
2937 Alt Blvd.
Grand Island, NY 14072
 $^{241}\text{Am}(\text{O})$, Cap(O)

150 Nuclear Research Corporation
Street Road and Second Street Pike
Southampton, PA 18966

$^{137}\text{Cs}(\text{O})$, MCP(O)

151 Nuclear Sources and Services
PO Box 14023
Houston, TX 77021

$^{241}\text{Am}(\text{O})$, Cap(O), Tgs(O)

152 Oak Ridge Associated Universities
PO Box 117
Oak Ridge, TN 37830

CSI(O), SS(O), $^{99}\text{Tc}(\text{O})$

Oak Ridge National Laboratory
See
Union Carbide Corporation
Oak Ridge National Laboratory

153 Occidental Oil Shale Company, Inc.
PO Box 2999
Grand Junction, CO 81501

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

154 Ohio State University
190 North Oval Drive
Columbus, OH 43210

$^3\text{H}(\text{O})$, Tgs(O)

155 Ohio State University
Research Foundation
1314 Kinnear Road
Columbus, OH 43212

$^{89}\text{Sr}(\text{O})$

156 Ohio University
Athens, OH 45701

$^3\text{H}(\text{O})$, Tgs(O)

157 Orlando Laboratories, Inc.
PO Box 8025A
Orlando, FL 32806

$^{243}\text{Am}(\text{O})$

158 Oregon State University
Corvallis, OR 97330

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

159 Pacific Northwest Laboratory
999 Battelle Blvd.
Richland, WA 99352

$^{241}\text{Am}(\text{H})$, $^{241}\text{Am}(\text{O})$, $^{37}\text{Ar}(\text{O})$, $^{252}\text{Cf}(\text{H})$,
 $^{60}\text{Co}(\text{H})$, $^{60}\text{Co}(\text{O})$, $^{134}\text{Cs}(\text{H})$, $^{137}\text{Cs}(\text{H})$,
CSI(O), $^3\text{H}(\text{H})$, $^{85}\text{Kr}(\text{O})$, MCP(O), $^{95}\text{Nb}(\text{O})$,
 $^{147}\text{Nd}(\text{U})$, $^{149}\text{Nd}(\text{U})$, $^{237}\text{Np}(\text{O})$, Nu(H),
 $^{238}\text{Pu}(\text{H})$, $^{239}\text{Pu}(\text{H})$, $^{240}\text{Pu}(\text{H})$, $^{238}\text{Pu}(\text{O})$,
 $^{239}\text{Pu}(\text{O})$, $^{240}\text{Pu}(\text{O})$, $^{241}\text{Pu}(\text{O})$, $^{242}\text{Pu}(\text{O})$,
 $^{244}\text{Pu}(\text{O})$, RaDEF(H), RSI(A), $^{106}\text{Ru}(\text{H})$,
 $^{90}\text{Sr}(\text{Y}(\text{H}))$, $^{90}\text{Sr}(\text{O})$, SS(O), $^{99}\text{Tc}(\text{O})$, Tgs(O),
 $^{230}\text{Th}(\text{O})$, $^{170}\text{Tm}(\text{U})$, $^{95}\text{Zr}(\text{O})$

160 Pacific Radiopharmacy
347 N. Kuakini St.
Honolulu, HI 96817

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

161 Palmdale General Hospital
Palmdale, CA 93550

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

162 Pennsylvania State University
University Park, PA 16802

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

163 Penrose Hospital
2215 N. Cascade
Colorado Springs, CO 80907

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

164 Pharmatopes
2944 Corvin Drive
Santa Clara, CA 95051

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

165 Pleasant Valley Hospital
2309 Antonio Ave.
Camarillo, CA 93010

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

- 166 Potter and Brumfield
Princeton, IN 47570
 $^{85}\text{Kr}(0)$
- 167 Princeton University
James Forrestal Campus
Princeton, NJ 08540
 $\text{CSI}(0)$, $^{237}\text{Np}(0)$
- 168 Princeton University
Box 451
Princeton, NJ 08544
 $\text{RSI}(B)$
- 169 Proctor and Gamble Company
PO Box 175
Groesbeck Station
Cincinnati, OH 45239
 $^{95}\text{Zr}(0)$
- 170 Radiation Resources, Inc.
24 Kulick Road
Fairfield, NJ 07006
 $^{137}\text{Cs}(0)$, $\text{MCP}(0)$
- 171 Raytheon Company
350 Ellis Street
Mountain View, CA 94042
 $^{133}\text{Xe}(0)$
- 172 Raytheon Company
350 Lowell St.
West Andover, MA 01810
 $^{85}\text{Kr}(0)$
- 173 RCA
Route 12, Fostoria Road
Findlay, OH 45840
 $^{85}\text{Kr}(0)$
- 174 RCA
Raritan, NJ 08869
 $^{85}\text{Kr}(0)$
- 175 Reactor Experiments, Inc.
963 Terminal Way
San Carlos, CA 94070
 $\text{NU}(0)$, $^{239}\text{Pu}(0)$, $\text{Tgs}(0)$, $^{235}\text{U}(0)$, $^{238}\text{U}(0)$
- 176 Reluxtrol
333 Victory Avenue
South San Francisco
CA 94080
 $\text{DU}(P)$
- 177 Rensselaer Polytechnic Institute
Troy, NY 12181
 $^{28}\text{Mg}(B^*)$, $\text{RSI}(B)$, $^{230}\text{Th}(0)$
- 178 Research Triangle Institute
PO Box 12086
Research Triangle Park, NC 27709
 $^{106}\text{Ru}(0)$, $\text{SS}(0)$
- 179 Reuter-Stokes Electronics Components
18530 South Miles Parkway
Warrensville Heights
Cleveland, OH 44128
 $^{28}\text{Mg}(B^*)$, $^{234}\text{U}(0)$, $^{238}\text{U}(0)$
- 180 Richland Memorial Hospital
3301 Harden Street
Columbia, SC 29203
 $^{127}\text{Xe}(B^*)$
- 181 Rockwell Hanford Operations
PO Box 800
Richland, WA 99352
 $\text{DU}(P)$, $^3\text{H}(H)$
- 182 Rockwell International
8900 Desoto Avenue
Canoga Park, CA 91304
 $^{182}\text{Ta}(H)$
- 183 Rockwell International
Rocky Flats Plant
Golden, CO 80401
 $\text{DU}(P)$, $^{238}\text{Pu}(M)$

- 184 Rush Presbyterian-St. Luke's Medical Center 192 Schlumberger Technology Corporation
1753 W Congress Parkway Old Quarry Road
Chicago, IL 60612 PO Box 307
Ridgefield, CT 06877
 $^{52}\text{Fe}(\text{B})$, $^{89}\text{Sr}(\text{O})$
 $^{252}\text{Cf}(\text{S})$
- 185 Rutgers University 193 Schwarz Bio-Research, Inc.
School of Chemistry Mountain View Avenue
Busch Campus Orangeburg, NY 10962
Piscataway, NY 08854
 $^3\text{H}(\text{O})$
RSI(B)
- 186 Rutgers University 194 Self-Powered Lighting, Ltd.
New Brunswick, NY 08903 8 Westchester Plaza
Elmsford, NY 10523
Tgs(O), $^{235}\text{U}(\text{O})$
 $^3\text{H}(\text{O})$
- 187 Sacred Heart Medical Center 195 Shell Development Company
Nuclear Medicine 1410 45th Street
West 101 8th Avenue Emeryville, CA 94608
Spokane, WA 99204
 $^{85}\text{Kr}(\text{O})$
 $^{133}\text{Xe}(\text{O})$
- 188 Sandia Corporation 196 Shepherd and Associates, J.L.
PO Box 5800 1614 Victory Blvd.
Albuquerque, NM 87115 Glendale, CA 91201
 $^{85}\text{Kr}(\text{O})$, $^{237}\text{Np}(\text{O})$, Tgs(O), $^{235}\text{U}(\text{O})$,
 $^{238}\text{U}(\text{O})$
 $^{137}\text{Cs}(\text{O})$, MCP(O)
- 189 Sandia Laboratories 197 Signetics, Inc.
Kirtland Air Force Base (East) 811 East Arques Ave.
Receiving Section, Building 894 Sunnyvale, CA 94086
Albuquerque, NM 87115
 $^{85}\text{Kr}(\text{O})$
 $^{238}\text{Pu}(\text{M})$, $^{239}\text{Pu}(\text{M})$
- 190 Sandia Laboratories 198 Silicon General, Inc.
Livermore Laboratory 11651 Monarch St.
PO Box 969 Garden Grove, CA 92641
Livermore, CA 94550
 $^{85}\text{Kr}(\text{O})$
 $^3\text{H}(\text{P})$
- 191 San Jose State College 199 Sloan-Kettering Institute
Health/Physics Committee 425 E. 68th St
125 South Seventh St. New York, NY 10021
San Jose, CA 95114
 $^{133}\text{Xe}(\text{O})$
DU(P)
- 200 Solid State Testing
56 Middlesex Turnpike
Burlington, MA 01803
 $^{133}\text{Xe}(\text{O})$

- | | |
|---|--|
| <p>201 Source Production and
Equipment Co., Inc.
625 Oxley St.
Kenner, LA 70062

192Ir(0)</p> <p>202 Spire Corporation
Patriots Park
Bedford, MA 01730

CSI(0), RW(0), 151Sm(0), SS(0)</p> <p>203 St. John's Hospital
333 N. F St.
Oxnard, CA 93030

133Xe(0)</p> <p>204 St. Patrick Hospital
524 S. Ryan St.
Lake Charles, LA 70601

133Xe(0)</p> <p>205 St. Vincent Medical Center
3rd and Grandview
Los Angeles, CA 90057

133Xe(0)</p> <p>206 State University of New York
Downstate Medical Center
450 Clarkson Ave.
Brooklyn, NY 11203

28Mg(B*), 99Tc(0)</p> <p>207 State University of New York
Department of Earth and Space Sciences
Stony Brook, NY 11790

RSI(B)</p> <p>208 Swedish-American Hospital
1400 Charles St.
Rockford, IL 61101

133Xe(0)</p> <p>209 Statek Corporation
1200 Alvarez Ave.
Orange, CA 92668

85Kr(0)</p> | <p>210 Syntex Corporation
3401 Hillview Ave.
Palo Alto, CA 94304

3H(0)</p> <p>211 Technical Operations
South Avenue
Burlington, MA 01803

192Ir(0)</p> <p>212 Teledyne Isotopes
Nuclear Systems Division
110 W. Timonium Road
Timonium, MD 21093

MCP(0), 90Sr(0)</p> <p>213 Texas Instruments, Inc.
Science Services Division
PO Box 5012, Mail Stop 6
Dallas, TX 75222

85Kr(0)</p> <p>214 Texas Instruments, Inc.
PO Box 66027, Mail Stop 615
Houston, TX 77006

85Kr(0)</p> <p>215 TII Corporation
100 N. Strong Ave.
Lindenhurst, NY 11757

3H(0)</p> <p>216 TII Industries, Inc.
PO Box 433
Toa Alta, PR 00758

3H(0)</p> <p>217 Touro Infirmary Research Department
1401 Foucher St.
New Orleans, LA 70115

28Mg(B*)</p> <p>218 Trio-Tech, Inc.
2435 N. Naomi
Burbank, CA 91504

85Kr(0)</p> |
|---|--|

- 219 TRW Systems Group
One Space Park
Redondo Beach, CA 90277
 $^{85}\text{Kr}(\text{O})$
- 220 UNC Nuclear Industries
PO Box 490
Richland, WA 99352
 $^{60}\text{Co}(\text{U})$, $\text{DU}(\text{P})$, $\text{EU}(\text{P})$
- 221 Union Carbide Corporation
Nuclear Division
Oak Ridge Gaseous Diffusion Plant
PO Box P
Oak Ridge, TN 37830
 $^{85}\text{Kr}(\text{O})$, $^{238}\text{U}(\text{M})$
- 222 Union Carbide Corporation
Oak Ridge National Laboratory
Isotope Pool
Oak Ridge National Laboratory
Box X
Oak Ridge, TN 37830
 $\text{Am}(\text{R})$
- 223 Union Carbide Corporation
Oak Ridge National Laboratory
PO Box X
Oak Ridge, TN 37830
 $^{227}\text{Ac}(\text{M})$, $^{241}\text{Am}(\text{O})$, $^{243}\text{Am}(\text{O})$, $^{47}\text{Ca}(\text{O})$,
 $\text{Cap}(\text{O})$, $^{252}\text{Cf}(\text{M})$, $^{252}\text{Cf}(\text{O})$, $\text{Cm}(\text{P})$,
 $^{137}\text{Cs}(\text{O})$, $\text{CSI}(\text{O})$, $^3\text{H}(\text{O})$, $^{131}\text{I}(\text{O})$,
 $^{192}\text{Ir}(\text{O})$, $^{85}\text{Kr}(\text{O})$, $\text{MCP}(\text{O})$, $^{95}\text{Nb}(\text{O})$,
 $^{237}\text{Np}(\text{O})$, $^{231}\text{Pa}(\text{M})$, $^{231}\text{Pa}(\text{O})$, $\text{Pu}(\text{P})$,
 $^{239}\text{Pu}(\text{O})$, $^{242}\text{Pu}(\text{P})$, $\text{RW}(\text{O})$, $\text{SS}(\text{O})$,
 $^{99}\text{Tc}(\text{O})$, $\text{Tgs}(\text{O})$, $^{229}\text{Th}(\text{M})$, $^{230}\text{Th}(\text{M})$,
 $^{232}\text{U}(\text{O})$, $^{233}\text{U}(\text{O})$, $^{234}\text{U}(\text{M})$, $^{235}\text{U}(\text{O})$,
 $^{236}\text{U}(\text{O})$, $^{238}\text{U}(\text{O})$, $^{133}\text{Xe}(\text{O})$, $^{95}\text{Zr}(\text{O})$
- 224 Union Carbide Corporation
Oak Ridge National Laboratory
Nuclear Division, Y-12 Plant
PO Box Y
Oak Ridge, TN 37930
 $\text{CSI}(\text{O})$, $\text{DU}(\text{P})$, $\text{EU}(\text{P})$, $^{153}\text{Gd}(\text{O})$, $^{192}\text{Ir}(\text{O})$,
 $\text{MCP}(\text{O})$, $^{236}\text{Pu}(\text{O})$, $^{242}\text{Pu}(\text{O})$, $^{244}\text{Pu}(\text{O})$,
 $\text{SS}(\text{O})$, $^{233}\text{U}(\text{O})$
- 225 Union Carbide Corporation
Sterling Forest Research Center
PO Box 324
Tuxedo, NY 10987
 $\text{MCP}(\text{O})$, $^{90}\text{Sr}(\text{O})$, $^{99}\text{Tc}(\text{O})$
- 226 Unit Process Assemblies, Inc.
53-15 37th Ave.
Woodside, NY 11377
 $^{147}\text{Pm}(\text{O})$, $^{90}\text{Sr}(\text{O})$
- 227 United Nuclear Corporation
Fuel Recovery Operations
Woodriver Junction, RI 02894
 $\text{EU}(\text{P})$
- 228 United States Air Force Academy
USAF Academy, CO 80840
 $^{252}\text{Cf}(\text{S})$
- 229 United States Army
Armament Research and Development
Aberdeen Proving Ground
Aberdeen Proving Ground, MD 21005
 $\text{DU}(\text{P})$
- 230 United States Army
Letterman Medical Center
Finance and Accounting Division
Building 102
Presidio of San Francisco, CA 94129
 $^{47}\text{Ca}(\text{O})$
- 231 United States Army
Materials and Mechanics Research Center
Watertown Arsenal
Watertown, MA 02172
 $\text{DU}(\text{P})$
- 232 United States Army
Picatinny Arsenal
Ordnance Corps
Dover, NJ 07801
 $\text{DU}(\text{P})$
- 233 United States Army
Aberdeen Proving Ground
Aberdeen Proving Ground, MD 21005
 $\text{DU}(\text{P})$

- 234 United States Department of Agriculture
Building 307, Room 215
Beltsville, MD 20502
 $^{28}\text{Mg}(\text{B}^*)$
- 235 United States Department of Energy
Chicago Operations Office
Finance Division
9800 S. Cass Ave
Argonne, IL 60439
 $^{242}\text{Pu}(\text{O})$, $^{233}\text{U}(\text{O})$, $^{234}\text{U}(\text{O})$, $^{236}\text{U}(\text{O})$
- 236 United States Department of Energy
376 Hudson St. 5th Fl.
New York, NY 10014
 $^{236}\text{Pu}(\text{O})$, $\text{SS}(\text{O})$, $^{229}\text{Th}(\text{O})$
- 237 United States Department of Energy
Richland Operations Office
PO Box 550
Richland, WA 99352
 $^{244}\text{Cm}(\text{O})$, $^{236}\text{Pu}(\text{O})$, $^{238}\text{Pu}(\text{O})$, $^{240}\text{Pu}(\text{O})$,
 $^{244}\text{Pu}(\text{O})$, $^{106}\text{Ru}(\text{O})$, $\text{SS}(\text{O})$, $^{95}\text{Zr}(\text{O})$
- 238 United States Department of Interior
Geological Survey
National Center
12201 Sunrise Valley Drive
Reston, VA 22092
 $^{243}\text{Am}(\text{O})$, $^{252}\text{Cf}(\text{S})$, $^{244}\text{Cm}(\text{O})$, $^{237}\text{Np}(\text{O})$,
 $^{236}\text{Pu}(\text{O})$
- 239 United States National Aeronautics and
Space
Ames Research Center
Moffett Field, CA 94035
 $^{47}\text{Ca}(\text{O})$
- 240 United States National Aeronautics and
Space
Lyndon B. Johnson Space Center
Transportation Officer, Building 420
Houston, TX 77058
 $\text{RSI}(\text{B})$
- 241 United States National Aeronautics and
Space Administration
George C. Marshall Flight Center
Huntsville, AL 35812
 $\text{MCP}(\text{O})$
- 242 United States Navy
Naval Electronics Lab Center
271 Catalina Blvd.
San Diego, CA 92152
 $^{95}\text{Zr}(\text{O})$
- 243 United States Navy
National Naval Medical Center
Building #144
Bethesda, MD 20014
 $^{127}\text{Xe}(\text{B}^*)$
- 244 United States Navy
Naval Regional Medical Center
8750 Mountain Boulevard
Oakland, CA 94627
 $^{47}\text{Ca}(\text{O})$, $^{127}\text{Xe}(\text{B}^*)$
- 245 United States Environmental Protection
Agency
Accounting Operations Office, Durham
Research Triangle Park, NC 27711
 $\text{CSI}(\text{O})$
- 246 United States Public Health Service
National Institutes of Health
Isotope Laboratory
Building 21
Bethesda, MD 20014
 $^{47}\text{Ca}(\text{O})$, $^{43}\text{K}(\text{O})$, $^{127}\text{Xe}(\text{B}^*)$
- 247 United States Public Health Service
Hospital
15th Avenue and Lake St.
San Francisco, CA 94118
 $^{47}\text{Ca}(\text{O})$
- 248 United States Radium Corporation
4150 Old Berwick Road
PO Box 380
Bloomsbury, PA 17815
 $^3\text{H}(\text{O})$

- 249 Unitrode Corporation
580 Pleasant St
Watertown, MA 01970
 $^{85}\text{Kr}(0)$
- 250 University of Alabama
Medical Center
1919 Seventh Avenue, South
Birmingham, AL 35486
 $^{133}\text{Xe}(0)$
- 251 University of Arizona
Post Office Drawer 4100
Tucson, AZ 85724
 $^{127}\text{Xe}(\text{B}^*)$
- 252 University of Arkansas
Fayetteville, AR 72701
 $^{252}\text{Cf}(\text{S}), ^{238}\text{U}(\text{H})$
- 253 University of California
Davis, CA 95616
 $\text{DU}(\text{P}), ^{129}\text{I}(0)$
- 254 University of California
Ernest O. Lawrence Laboratory
PO Box 808
Livermore, CA 94551
 $^{241}\text{Am}(\text{P}), \text{Nu}(\text{P}), \text{Pu}(\text{P}), ^{238}\text{Pu}(\text{P})$
- 255 University of California at La Jolla
3175 Miramar Road
La Jolla, CA 92093
 $^{82}\text{Sr}(\text{L}), ^{85}\text{Sr}(\text{L}), ^{127}\text{Xe}(\text{B}^*)$
- 256 University of California
Lawrence Berkeley Laboratory
Berkeley, CA 94701
 $^{249}\text{Bk}(0), ^{249}\text{Cf}(0), ^{250}\text{Cf}(0), ^{82}\text{Sr}(\text{L}), ^{85}\text{Sr}(\text{L}), \text{SS}(0)$
- 257 University of California
Lawrence Livermore Laboratory
Livermore, CA 94550
 $^{227}\text{Ac}(\text{M}), ^{241}\text{Am}(0), ^{243}\text{Am}(0), ^{249}\text{Bk}(0), ^{249}\text{Cf}(0), ^{244}\text{Cm}(0), ^{245}\text{Cm}(0), ^3\text{H}(0), \text{MCP}(0), ^{92}\text{Nb}(\text{H}), \text{Tgs}(0), ^{230}\text{Th}(0), ^{232}\text{Th}(0), ^{235}\text{U}(0), ^{238}\text{U}(0)$
- 258 University of California
Los Alamos Scientific Laboratory
PO Box 1663
Los Alamos, NM 87545
 $^{241}\text{Am}(0), ^{211}\text{At}(\text{B}), ^{249}\text{Bk}(0), \text{Cap}(0), ^{249}\text{Cf}(0), ^{252}\text{Cf}(\text{S}), ^{243}\text{Cm}(0), ^{137}\text{Cs}(0), \text{DU}(\text{P}), ^{131}\text{I}(0), \text{Pu}(\text{P}), ^{236}\text{Pu}(0), ^{238}\text{Pu}(\text{M}), ^{240}\text{Pu}(\text{M}), \text{SS}(0), \text{Tgs}(0), ^{230}\text{Th}(0), ^{232}\text{Th}(0), ^{234}\text{U}(0), ^{235}\text{U}(0), ^{238}\text{U}(\text{M}), ^{238}\text{U}(0), ^{95}\text{Zr}(0)$
- 259 University of California
Los Angeles, CA 90024
 $^{241}\text{Am}(0), ^{47}\text{Ca}(0), ^{52}\text{Fe}(\text{L}), \text{MCP}(0), ^{239}\text{Pu}(0), ^{242}\text{Pu}(0), \text{SS}(0), ^{133}\text{Xe}(0)$
- 260 University of California
San Francisco Medical Center
San Francisco, CA 94122
 $^{133}\text{Xe}(0)$
- 261 University of Chicago
5641 S. Ingleside Ave.
Chicago, IL 60637
 $\text{CSI}(\text{A}), \text{RSI}(\text{A})$
- 262 University of Chicago
950 E 59th Street
Chicago, IL 60637
 $^{252}\text{Cf}(\text{S})$
- 263 University of Chicago
Office of the Comptroller
1525 E. Hyde Park Blvd.
Chicago, IL 60615
 $^{47}\text{Ca}(0), ^{28}\text{Mg}(\text{B}^*), ^{89}\text{Sr}(0)$

- 264 University of Cincinnati
Cincinnati, OH 45221
 $^{99}\text{Tc}(0)$
- 265 University of Connecticut
Health Center
Farmington, CT 06032
 $^{43}\text{K}(0)$
- 266 University of Florida
Gainesville, FL 32601
 $^{28}\text{Mg}(\text{B}^*)$, $^{147}\text{Pm}(0)$
- 267 University of Georgia
Athens, GA 30601
 $\text{Tgs}(0)$, $^{238}\text{U}(0)$
- 268 University of Illinois
203 Administration Building E
Urbana, IL 61803
 $^{239}\text{Pu}(0)$, $\text{Tgs}(0)$, $^{233}\text{U}(0)$
- 269 University of Illinois
College of Veterinary Medicine
Urbana, IL 61801
 $^{81}\text{Rb}(\text{B})$
- 270 University of Illinois
Physics Department
Urbana, IL 61801
 $\text{RSI}(\text{A})$
- 271 University of Iowa Hospitals
Nuclear Medicine
Iowa City, IA 52242
 $^{127}\text{Xe}(\text{B}^*)$
- 272 University of Kansas
Kansas City, KS 66103
 $^{77}\text{Br}(\text{L})$, $^{47}\text{Ca}(0)$
- 273 University of Kentucky
800 Rose Street
Lexington, KY 40506
 $^{252}\text{Cf}(\text{S})$, $\text{MCP}(0)$, $^{28}\text{Mg}(\text{B}^*)$
- 274 University of Mississippi
Jackson, MS 39216
 $^{43}\text{K}(0)$
- 275 University of Missouri
Columbia, MO 65201
 $\text{Nu}(\text{P})$, $^{233}\text{U}(0)$
- 276 University of New Mexico
Radiopharmacy
Pharmacy and Nursing Building
Albuquerque, NM 87131
 $^{77}\text{Br}(\text{L})$
- 277 University of Oregon
Medical School
3181 S.W. Sam Jackson Park Road
Portland, OR 97201
 $^{133}\text{Xe}(0)$
- 278 University of Pennsylvania
3025 Walnut St.
Philadelphia, PA 19104
 $^{133}\text{Xe}(0)$
- 279 University of Pennsylvania Hospital
3400 Spruce Street
Philadelphia, PA 19104
 $^{18}\text{F}(\text{B})$, $^{123}\text{I}(\text{B})$, $^{28}\text{Mg}(\text{B}^*)$
- 280 University of Pittsburgh
Radiation Safety Office
Pittsburgh, PA 15261
 $\text{NU}(\text{P})$
- 281 University of Rochester
Exxon Research
Laboratory for Laser Energetics
College of Engineering
South Campus
East River Road
Rochester, NY 14642
 $^3\text{H}(\text{M})$
- 282 University of Rochester
Rochester, NY 14642
 $^{47}\text{Ca}(0)$, $\text{RSI}(\text{B})$

- 283 University of South Alabama
2451 Sillingim
Mobile, AL 36617

28Mg(B*)
- 284 University of Southern California
School of Pharmacy
1985 Zonal Avenue
Los Angeles, CA 90033

252Cf(S)
- 285 University of Southern California
University Park
Los Angeles, CA 90007

MCP(O)
- 286 University of Tennessee
865 Jefferson Avenue
Memphis, TN 38103

47Ca(O)
- 287 University of Tennessee
1299 Bethel Valley Road
Oak Ridge, TN 37830

47Ca(O), 28Mg(B*)
- 288 University of Texas
5108 Medical Center Drive
Dallas, TX 75235

47Ca(O), 127Xe(B*)
- 289 University of Texas Medical Branch
Nuclear Medicine Division
Room 229, Clinical Science Building
Galveston, TX 77550

127Xe(B*), 133Xe(O)
- 290 University of Texas
PO Box 688
Richardson, TX 75080

230Th(O), 235U(O)
- 291 University of Utah
Purchasing Department
Salt Lake City, UT 84112

244Pu(O), 133Xe(O)
- 292 University of Utah
Radiobiology Division
2C-108 Medical Center
Salt Lake City, UT 84112

Pu(P)
- 293 University of Virginia
RWMF, 11th and Lee Street
Charlottesville, VA 22901

127Xe(B*)
- 294 University of Virginia
Charlottesville, VA 22903

MCP(O), SS(O), 127Xe(B*), 133Xe(O)
- 295 University of Washington
400 Administration Building
Seattle, WA 98105

89Sr(O), 133Xe(O)
- 296 University of Wisconsin
750 University Avenue
Madison, WI 53706

3H(O)
- 297 U.S. Testing Company, Inc.
2800 George Washington Way
Richland, WA 99352

241Am(H), 3H(H), Nu(HO), 147Pm(H),
239Pu(H), RaDEF(H), 90SrY(H)
- 298 Vanderbilt University
Business Manager's Office
Nashville, TN 37203

248Cm(O)
- 299 VA Calm 361
Data Processing Center
1615 Woodward St. E.
Austin, TX 78772

MCP(O), 133Xe(O)
- 300 Veterans Administration Center
Wood, WI 53193

43K(O)

- | | |
|---|---|
| <p>301 Veterans Administration Hospital
11201 Benton Street
Loma Linda, CA 92354

127Xe(B*)</p> | <p>310 Veterans Administration Hospital
4435 Beacon Avenue South
Seattle, WA 98108

103Ru(B)</p> |
| <p>302 Veterans Administration Hospital
Wilshire and Sawtelle Boulevards
Los Angeles, CA 90073

47Ca(0)</p> | <p>311 Veterans Administration Medical Center
3350 La Jolla Village
San Diego, CA 92161

103Ru(0)</p> |
| <p>303 Veterans Administration Hospital
1201 Northwest 16th Street
Miami, FL 33125

133Xe(0)</p> | <p>312 Vetter Research
3189 C Airway Ave.
Costa Mesa, CA 92626

3H(0)</p> |
| <p>304 Veterans Administration Hospital
Chief Supply Service
Building #7
Hines, IL 60141

47Ca(0), 252Cf(S)</p> | <p>313 Vought Corporation
PO Box 6144
Dallas, TX 75222

252Cf(S)</p> |
| <p>305 Veterans Administration Hospital
1400 V.F.W. Parkway
West Roxbury, MA 02132

123Xe(B), 127Xe(B*)</p> | <p>314 Washington State University
Nuclear Radiation Center
Pullman, WA 99163

EU(P)</p> |
| <p>306 Veterans Administration Hospital
Nuclear Medicine
Northport, NY 11768

127Xe(B*)</p> | <p>315 Washington University
499 S. Euclid
St. Louis, MO 63110

77Br(L)</p> |
| <p>307 Veterans Administration Hospital
Syracuse, NY 13210

133Xe(0)</p> | <p>316 Washington University
Lindell and Skinker
ST. Louis, MO 63130

133Xe(0)</p> |
| <p>308 Veterans Administration Hospital
Fulton St. and Durham Rd.
Durham, NC 22705

47Ca(0)</p> | <p>317 Washington University School of Medicine
Mallinckrodt Institute of Radiology
510 South Kings Highway
St. Louis, MO 63110

252Cf(S)</p> |
| <p>309 Veterans Administration Hospital
1310 24th Ave. S.
Nashville, TN 37203

133Xe(0)</p> | |

- 318 Western Electric Company, Inc.
PO Box 241
Reading, PA 19603
85Kr(0)
- 319 Western Electric Company, Inc.
PO Box 1409
Lawrence, MA 01842
85Kr(0)
- 320 Western Electric Company, Inc.
555 Union Blvd.
Allentown, PA 18103
85Kr(0)
- 321 Western Electric Company, Inc.
777 N. Blue Parkway
Lee's Summit, MO 64063
85Kr(0)
- 322 Westinghouse Electric Corporation
Bettis Atomic Power Laboratory
PO Box 79
West Mifflin, PA 15122
Tgs(0), 235U(0)
- 323 Westinghouse Hanford Company
Hanford Engineering Development
Laboratory
PO Box 1970
Richland, WA 99352
241Am(0), 133Ba(H), 144CePr(H),
252Cf(0), 57Co(H), 60Co(H), 60Co(0),
134Cs(H), 137Cs(H), CSI(0), DU(P), EU(P),
203Hg(H), 54Mn(H), 237Np(0), 239Np(H),
NU(H), NU(0), NU(P), 238Pu(H), 239Pu(H),
239Pu(0), 240Pu(0), 241Pu(0), Pu(P),
90SrY(H), SS(0), Tgs(0), 232Th(H),
232Th(0) Th(P), 233U(P), 233U(0),
235U(0), 238U(0), 133Xe(0)
- 324 Yale-New Haven Hospital
333 Cedar Street
New Haven, CT 06510
103Ru(B)
- 325 Yale University
20 Ashmun St
New Haven, CT 06520
129I(0), 103Ru(0)
- 326 Zilog, Inc.
10460 Babb Rd.
Cupertino, CA 95014
85Kr(0)

FOREIGN CUSTOMERS

AUSTRALIA

- 327 Australian AEC
Research Establishment
Lucas Heights, Australia
 $^{244}\text{Pu}(0)$, $^{231}\text{Pa}(0)$, $^{127}\text{Xe}(B^*)$
- 328 Australian National University
PO Box 4
Canberra, A.C.T. Australia
 $^{37}\text{Ar}(0)$
- 329 Embassy of Australia
1601 Massachusetts Ave., N.W.
Washington, D.C. 20036
 $^{242}\text{Pu}(0)$
- 330 Western Australian Institute of
Technology
Hayman Road
Bentley South 6102
Western Australia, Australia
 $^{89}\text{Sr}(0)$

AUSTRIA

- 331 International Atomic Energy Agency
Kaerntnerring 11-13
A-1010 Vienna, Austria
 $^{239}\text{Pu}(0)$, $^{240}\text{Pu}(0)$, $^{241}\text{Pu}(0)$, $^{242}\text{Pu}(0)$,
 $^{244}\text{Pu}(0)$, $^{235}\text{U}(0)$, $^{238}\text{U}(0)$

BELGIUM

- 332 Centre d'Etude de l'Energie Nucleaire
144 Avenue Plasky
Brussels 4, Belgium
 $^{237}\text{Np}(0)$, $^{235}\text{U}(0)$, $^{238}\text{U}(0)$
- 333 Katholieke Universiteit Leuven
Dienst Radioprotektie
De Croylaan 54
Henerlee, Belgium
 $^{28}\text{Mg}(B^*)$, $^{127}\text{Xe}(B^*)$

- 334 EURATOM
51-53 Rue Belliard
Brussels, Belgium
 $^{242}\text{Pu}(0)$
- 335 European Atomic Energy Commission
Central Bureau for Nuclear Measurements
Geel, Belgium
 $^{243}\text{Am}(0)$, $^{237}\text{Np}(0)$, $^{239}\text{Pu}(0)$,
 $^{240}\text{Pu}(0)$, $^{241}\text{Pu}(0)$, $^{242}\text{Pu}(0)$, $^{244}\text{Pu}(0)$,
 $^{235}\text{U}(0)$, $^{238}\text{U}(0)$
- 336 Institut National des Radioelements
Avenue Eugene Plasky, 144
1040 Brussels, Belgium
 $^{192}\text{Ir}(0)$, $^{85}\text{Kr}(0)$
- 337 Universite de Liege
2 rue Armand Stevart
Liege, Belgium
 $^{243}\text{Am}(0)$, $^{248}\text{Cm}(0)$

BRAZIL

- 338 Empresas Nucleares Brasileiras S/A
Nuclebras
Rua General Polidoro
316 Rio de Janeiro (RJ), Brazil
 $^{242}\text{Pu}(0)$

CANADA

- 339 Atomic Energy of Canada, Limited
PO Box 6300
Postal Station J
Ottawa, Canada
 $^{137}\text{Cs}(0)$, $^{134}\text{Cs}(0)$
- 340 Atomic Energy of Canada, Ltd.
Commercial Products
Ottawa, Canada K2A 3W3
 $^{133}\text{Xe}(M)$

341 Atomic Energy of Canada, Ltd.
Chalk River Nuclear Laboratories
Metallurgy Engineering Branch
Chalk River, Ontario, K0J1J0, Canada

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

342 Atomic Energy of Canada, Limited
Whiteshell Nuclear Research
Establishment
Pinawa, Manitoba, Canada

$^{242}\text{Pu}(\text{O})$, $^{230}\text{Th}(\text{O})$, $^{234}\text{U}(\text{O})$, $^{238}\text{U}(\text{O})$

343 Bondar-Clegg and Company, Limited
764 Belfast Road
Ottawa, Ontario, K1G 0Z5, Canada

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

344 Dalhousie University
Halifax, Nova Scotia, Canada

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

345 Health Sciences Center
Nuclear Medicine
700 William Avenue
Winnipeg, Canada

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

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

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

347 McMaster University
Hamilton, Ontario, Canada

$^3\text{H}(\text{O})$, $^{129}\text{I}(\text{O})$, $^{99}\text{Tc}(\text{O})$

348 McMaster University Medical Center
Forsyth Avenue Receiving
Hamilton, Ontario, Canada

$^{127}\text{Xe}(\text{B}^*)$, $^{133}\text{Xe}(\text{O})$

349 Ontario Hydro
700 University Avenue
Toronto, Ontario, Canada M5G 1X6

$^{243}\text{Am}(\text{O})$

350 Royal Ontario Museum
100 Queens Park
Toronto, Ontario, Canada M5S 2C6

$^{230}\text{Th}(\text{O})$

351 St. Joseph's Hospital
Nuclear Medicine Department
268 Grosvenor Street
London, Ontario, N-6A4V2, Canada

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

352 Universite de Laval
Case Postale 2208
Parvillon Vachon
Quebec 10, P.Q. Canada

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

353 University Hospital
Nuclear Medicine Department
London, Ontario, Canada

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

354 University of Alberta
Edmonton, Alberta, Canada T6G2H1

$^{133}\text{Xe}(\text{O})$, $^3\text{H}(\text{O})$

355 University of British Columbia
Vancouver, British Columbia, Canada

$^{89}\text{Sr}(\text{O})$

DENMARK

356 Gammattec
Stormly 16
3500 Hareskov
Denmark

$^{153}\text{Gd}(\text{O})$, $^{88}\text{Sr}(\text{O})$

357 Isotope Pharmacy
378 Frederiksbundsvej
Broenshoej, Denmark

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

358 Rigshospitalet
Pshcho Chem Lab
9 Blegdamovej
Copenhagen, Denmark

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

359 University of Copenhagen
Raadmansgade 71, DK 2200
Copenhagen N, Denmark

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

FRANCE

- 360 CEA
Department des Radioelements
B.P. No. 2
91190 Gif Sur Yvette, France
 $^{153}\text{Gd}(0)$, $\text{SS}(0)$
- 361 French Atomic Energy Commission
1730 Rhode Island Ave., N.W.
Suite 1217
Washington, DC 20036
 $^{241}\text{Am}(0)$, $\text{Cap}(0)$, $^{238}\text{Pu}(0)$, $^{242}\text{Pu}(0)$
- 362 Laboratoire Curie
Institut du Radium
11, rue Pierre et Marie Curie
75231 Paris, Cedex 05
France
 $\text{Cap}(0)$, $^{237}\text{Np}(0)$, $^{238}\text{U}(0)$
- 363 Universite de Nice
Laboratoire de Geologie Structurale
Parc Valrose, 06100
Nice, France
 $\text{SS}(0)$, $^{229}\text{Th}(0)$
- 364 American Hoechst Corporation
PO Box 2500
Somerville, NJ 08876
 $^{85}\text{Kr}(0)$

GERMANY, FEDERAL REPUBLIC OF

- 365 Buchler and Company
Frankfurter Str. 294
Braunschweig
Federal Republic of Germany
 $^{37}\text{Ar}(0)$, $\text{Cap}(0)$, $^{129}\text{I}(0)$, $^{237}\text{Np}(0)$
- 366 Darmstadt, Technischen Hochschule
61 Darmstadt
Federal Republic of Germany
 $^{236}\text{Pu}(0)$
- 367 EURATOM Transuranium Institute
PO Box 452
74 Karlsruhe
Federal Republic of Germany
 $\text{Cap}(0)$, $^{237}\text{Np}(0)$, $^{230}\text{Th}(0)$
- 368 Freie Universitat Berlin
Fachbereich Physik
FB20 WL1A
Boltzmannstrasse 20
1000 Berlin 33
Federal Republic of Germany
 $^{127}\text{Xe}(B^*)$, $^{133}\text{Xe}(0)$
- 369 Gesellschaft fur Kern forschung mbH
Institute fuer Angewandte Reaktor
Physike
Weberstrasse 5
75 Karlsruhe
Federal Republic of Germany
 $^{241}\text{Am}(0)$, $^{243}\text{Am}(0)$, $\text{Cap}(0)$, $\text{Tgs}(0)$
- 370 Gesellschaft fur Schwerionen forschung,
mbH
Finanz Abbielung
Postfach 541
D-6100 Darnstadt
Federal Republic of Germany
 $^{236}\text{Pu}(0)$, $\text{Tgs}(0)$, $^{235}\text{U}(0)$
- 371 Johanna Wolfgang Goeth University
Frankfurt/Main
Federal Republic of Germany
 $^{230}\text{Th}(0)$, $^{234}\text{U}(0)$
- 372 Kernforschung Sanlage
Postfach 365
517 Julich
Federal Republic of Germany
 $^{237}\text{Np}(0)$, $^{239}\text{Pu}(0)$, $^{151}\text{Sm}(0)$, $\text{Tgs}(0)$,
 $^{232}\text{Th}(0)$, $^{235}\text{U}(0)$, $^{238}\text{U}(0)$
- 373 Max Planck Institut fur Kernphysik
Saupfercheckveg
Heidelberg
Federal Republic of Germany
 $^{236}\text{U}(0)$
- 374 Medizinische Hochschule Hannover
Karl-Wiechert-Allee 9
3000 Hannover 61
Federal Republic of Germany
 $^{127}\text{Xe}(B^*)$

375 University of Munster
44 Munster/ Westfalln
Federal Republic of Germany
 $^{37}\text{Ar}(0)$

376 Philipps Universitat, F.B. 14
Kern Chemic
355 Marburg, Lahnberg
Federal Republic of Germany
 $^{243}\text{Am}(0)$, $\text{Cap}(0)$

377 W. Maier Komm. Ges.
7220 Schwenningen a.N.
Postfach 126
Federal Republic of Germany
 $^{147}\text{Pm}(0)$

378 University of Mainz/Rhein
Mainz am Rhein
Federal Republic of Germany
 $^{242}\text{Pu}(0)$, $^{244}\text{Pu}(0)$, $\text{Tgs}(0)$

379 University of Erlangen Nurnberg
Gluckstr.
852 Erlangen
Federal Republic of Germany
 $^{252}\text{Cf}(0)$, $\text{Tgs}(0)$

GREAT BRITAIN

380 British Embassy
3100 Massachusetts Avenue, N.W.
Washington, DC 20008
 $\text{Tgs}(0)$, $^{238}\text{U}(0)$

381 Brandhurst Co., Ltd.
Wellington Road
High Wycombe, Bucks HP12 3PS
England, Great Britain
 $^3\text{H}(0)$

382 Edlow International Company
Suite 404-5
1100 17th St., N.W.
Washington, DC 20036
 $^3\text{H}(0)$

383 Hammersmith Hospital
Ducane Road
London W12 0HS, England
Great Britain
 $^{85}\text{Sr}(L)$, $^{82}\text{Sr}(L)$

384 Institute of Oceanographic Sciences
Brook Road
Wormley
Surrey GU8, 5UB, England
Great Britain

385 Mallinkrodt, Ltd.
Building 521 129G
Southampton Road
Middlesex, England
Great Britain
 $^{127}\text{Xe}(B^*)$

386 Medical Research Council
Harwell, Didcot
Oxon OX 11 0RD
England, Great Britain

387 Medical Research Council
Cambridge, CB2 2QH, England
Great Britain
 $\text{MCP}(0)$

388 Radio Chemical Centre
White Lion Road
Amersham, Bucks, England
Great Britain
 $\text{Cap}(0)$, $^{244}\text{Cm}(0)$, $\text{CSI}(0)$, $^{153}\text{Gd}(0)$, $^3\text{H}(0)$,
 $^{85}\text{Kr}(0)$, $\text{MCP}(0)$, $^{237}\text{Np}(0)$, $^{147}\text{Pm}(0)$,
 $^{106}\text{Ru}(0)$, $^{151}\text{Sm}(0)$, $^{89}\text{Sr}(0)$, $^{99}\text{Tc}(0)$,
 $\text{Tgs}(0)$, $^{91}\text{Y}(0)$, $^{95}\text{Zr}(0)$,

389 Saunders-Roe Developments, Ltd.
North Hyde Road
Hayes, Middlesex, England
Great Britain
 $^3\text{H}(0)$

HONG KONG

390 National Cash Register Mfg. Co., Ltd.
No. 55 Wong Chuk Hang Road
Aberdeen, Hong Kong
 $^{85}\text{Kr}(0)$

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

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

INDIA

392 Bhabha Atomic Research Center
Government of India
3rd Floor Mohatta Building
Bombay 1, India

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

ISRAEL

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

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

ITALY

394 CNEN Laboratorio Dati Nucleari
% Laboratorio FRAE via Biancamano
Pissatore Di Medicina
Bologna, Italy

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

395 Comitato Nazionale l'Energia Nucleare
818 Eighteenth St., N.W.
Washington, DC 20009

$^{242}\text{Pu}(0)$

JAPAN

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

$^{243}\text{Am}(0)$, $\text{Cap}(0)$, $^{244}\text{Cm}(0)$, $^{85}\text{Kr}(0)$,
 $\text{Tgs}(0)$

397 Kyoto University
Engineering Research Institute
Kyoto, Japan

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

398 Marubeni American Corporation
14 Henderson Drive
West Caldwell, NJ 07006

$^{233}\text{U}(0)$

399 Nissho-Iwai American Corporation
1211 Avenue of the Americas
New York, NY 10036

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

400 Toshiba Corporation
1-6 Uchisaiwaicho, 1-Chome
Chiyoda-Ku, Tokyo, Japan

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

401 University of Tokyo
Azabu, Minato-Ku
Tokyo, Japan

$^{234}\text{U}(0)$, $^{236}\text{U}(0)$

NETHERLANDS

402 Institute for Atomic Sciences in
Agriculture
Keyenbergseweg 6, Wageningen,
The Netherlands

$^{243}\text{Am}(0)$

403 N.V. Philips-Duphar
PO Box 2
Weesp, The Netherlands

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

404 Reactor Centrum Nederland
Petten N.H.
The Netherlands

$^{230}\text{Th}(0)$

405 Rijksinkoopbureau
55 A Laan van Meerdervoort
The Hague, The Netherlands

NORWAY

406 Institutt for Atom Energi
OECD Halden Reactor Project
Halden, Norway

$\text{EU}(P)$

407 Institute for Atomic Energy
Isotope Laboratories
N-2007
Kjeller, Norway
 $^{127}\text{Xe}(\text{B}^*)$

SOUTH AFRICA

408 Tygerberg Hospital
Nuclear Medicine Department
Parowvallei
Cape Province, South Africa
 $^{127}\text{Xe}(\text{B}^*)$

SWEDEN

409 Centralab
Radiation Physics
Lasarettet, S221 85
Lund, Sweden
 $^{127}\text{Xe}(\text{B}^*)$

410 University of Uppsala
Uppsala, Sweden
 $^{252}\text{Cf}(0)$, $\text{Tgs}(0)$

SWITZERLAND

411 Basel Universitat
4000 Basel
Switzerland
 $\text{Tgs}(0)$, $^{232}\text{Th}(0)$

412 Eidg. Institut für Reaktorforschung
Würenlingen, Switzerland
 $^{244}\text{Cm}(0)$, $^{230}\text{Th}(0)$, $^{234}\text{U}(0)$

413 University of Fribourg
1700 Fribourg, Switzerland
 $^{237}\text{Np}(0)$, $\text{Tgs}(0)$

414 Merz and Bentelli AG
Bumplizstrasse 91
3018 Bern, Switzerland
 $^3\text{H}(0)$

415 Radium Chemie
A. Zeller and Company
9053 Teufen/Ar
Switzerland
 $^3\text{H}(0)$, $\text{MCP}(0)$, $^{147}\text{Pm}(0)$

TAIWAN

416 United Pacific Semiconductor Corporation
1, San-Chin Street
Su-Lin Cheng, Taipei, Hsien, Taiwan
 $^{85}\text{Kr}(0)$

YUGOSLAVIA

417 Institut Ruder Boskovic
Bijenicka Cesta 54
Zagreb, Yugoslavia
 $^{37}\text{Ar}(0)$

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

DOMESTIC

Actinium 227 (Ac)

223, 257

Aluminum 28 (Al)

53

Americium (Am)

222

Americium 241 (Am)

5, 8, 21, 47, 64, 80, 95, 130, 140,
149, 151, 159, 223, 254, 257, 258, 259,
297, 323

Americium 243 (Am)

52, 54, 157, 223, 238, 257

Argon 37 (Ar)

159

Astatine 211 (At)

81, 258

Barium 133 (Ba)

324

Barium 139 (Ba)

53

Berkelium 249 (Bk)

8, 256, 257, 258

Bromine 77 (Br)

18, 73, 74, 272, 276, 315

Bromine 80 (Br)

53

Bromine 82 (Br)

53

Cadmium 109 (Cd)

5, 95, 140

Californium 249 (Cf)

8, 52, 256, 257, 258

Californium 250 (Cf)

256

Californium 252 (Cf)

8, 18, 50, 51, 52, 54, 92, 95, 106,
107, 130, 136, 158, 159, 192, 223, 228,
238, 252, 258, 262, 273, 284, 304, 313,
317, 323

Cerium 144 (Ce)

140

Cerium 144 + Praseodymium (CePr)

323

Cesium 134 (Cs)

159, 323

Cesium 137 (Cs)

8, 15, 80, 88, 94, 95, 127, 140, 150,
159, 170, 196, 223, 258, 323

Chlorine 38 (Cl)

53

Cobalt 57 (Co)

323

Cobalt 60 (Co)

8, 159, 220, 323

Curium (Cm)

223

Curium 243 (Cm)

8, 109, 258

Curium 244 (Cm)

52, 54, 142, 237, 238, 257

Curium 245 (Cm)

257

Curium 248 (Cm)

298

Cyclotron Service Irradiations (CSI)

5, 13, 23, 88, 95, 110, 111, 133, 140,
152, 159, 167, 202, 223, 224, 245, 261,
323

Depleted Uranium (DU)

1, 8, 12, 25, 54, 62, 137, 148, 176,
181, 183, 191, 220, 224, 229, 231, 232,
233, 253, 258, 323

Deuterium Oxide (D₂O)

54

Dysprosium 165 (Dy)

53

Einsteinium 253 (Es)

8

Encapsulation (Cap)

8, 47, 52, 54, 64, 80, 130, 140, 149,
151, 223, 258

Enriched Uranium (EU)

53, 58, 59, 77, 220, 224, 227, 314

Europium 152+154 (Eu)

140

Fluorine 18 (F)

113, 279

Gadolinium 153 (Gd)

5, 80, 115, 140, 224

Hafnium 181 (Hf)

22

Holmium 166 (Ho)

53

Iodine 123 (I)

279

Iodine 129 (I)

5, 95, 140, 253, 325

Iodine 131 (I)

124, 125, 223, 258

Iridium 192 (Ir)

9, 65, 80, 89, 201, 211, 223, 224

Iron 52 (Fe)

184, 259

Krypton 85 (Kr)

2, 4, 11, 20, 33, 37, 38, 39, 61, 67,
69, 72, 75, 85, 86, 87, 90, 96, 105,
116, 122, 123, 128, 132, 138, 140, 153,
159, 166, 172, 173, 174, 188, 195, 197,
198, 209, 213, 214, 218, 219, 221, 223,
249, 318, 319, 320, 321, 326

Magnesium 28 (Mg)

23, 31, 35, 44, 177, 179, 206, 217,
234, 263, 266, 273, 279, 283, 287

Manganese 54 (Mn)

323

Manganese 56 (Mn)

53

Mercury 203 (Hg)

323

Miscellaneous Compound Preparations (MCP)

13, 15, 75, 80, 113, 127, 140, 150,
159, 170, 196, 212, 223, 224, 225, 241,
257, 259, 273, 285, 294, 299

Molybdenum 99 (Mo)

53

Natural Uranium (NU)

175, 280, 323

Neodymium 147 (Nd)

40, 53, 159

Neodymium 149 (Nd)

159

Neptunium (Np)

8

Neptunium 237 (Np)

8, 91, 159, 167, 188, 223, 238, 323

Neptunium 239 (Np)

323

Niobium 92 (Nb)

257

Niobium 95 (Nb)

8, 52, 127, 159, 223

Osmium 191 (Os)

27

Palladium 109 (Pd)

53

Phosphorus 33 (P)

88, 140

Plutonium (Pu)

8, 223, 254, 258, 323

Plutonium 236 (Pu)

20, 52, 95, 324, 325, 327, 329, 350, 399

Promethium 147 (Pm)

14, 127, 140, 226, 266, 297

Protactinium 231 (Pa)

53, 223

RaDEF

159, 297

Reactor Service Irradiations (RSI)

6, 8, 19, 41, 53, 60, 66, 71, 78, 139,
159, 168, 177, 185, 207, 240, 261, 270,
282

Rhenium 186 (Re)

40

Rhenium 188 (Re)

40

Rubidium 81 (Rb)

3, 27, 30, 141, 269

Strontium 90 (Sr)

8, 75, 88, 95, 101, 140, 159, 212, 225,
226, 297, 323

Tantalum 182 (Ta)

53, 182

Target Preparations, Radioisotope (Tgs)

8, 45, 46, 68, 71, 80, 91, 100, 103,
136, 151, 154, 156, 159, 175, 186, 188,
223, 257, 258, 267, 268, 322, 323

Technetium 99 (Tc)

8, 18, 56, 57, 77, 88, 118, 140, 145,
152, 159, 162, 206, 223, 225, 264

Thorium (Th)

54, 234

Thorium 229 (Th)

29, 52, 82, 142, 223, 236

Thorium 230 (Th)

8, 28, 49, 63, 95, 159, 177, 223, 257,
258, 290

Thorium 232 (Th)

257, 258, 323

Thulium 170 (Tm)

159

Tungsten 178 (W)

27, 140

Uranium 232 (U)

223

Uranium 233 (U)

52, 54, 223, 224, 235, 268, 275, 323

Uranium 234 (U)

68, 179, 223, 235, 258

Uranium 235 (U)

52, 91, 103, 175, 186, 188, 223, 257,
258, 290, 322, 323

Uranium 236 (U)

52, 223, 235

Uranium 238 (U)

24, 46, 68, 91, 93, 99, 175, 179, 188,
221, 223, 252, 257, 258, 267, 323

Withdrawn Radioisotopes (RW)

111, 140, 202, 223

Xenon 123 (Xe)

305

Xenon 127 (Xe)

34, 42, 98, 111, 115, 120, 127, 135,
140, 144, 145, 146, 180, 243, 244, 246,
251, 255, 271, 288, 289, 293, 294, 301,
305, 306

Xenon 133 (Xe)

17, 26, 43, 46, 52, 84, 97, 119, 121,
129, 136, 140, 160, 161, 163, 164, 165,
171, 187, 199, 200, 203, 204, 205, 208,
223, 250, 259, 260, 277, 278, 289, 291,
294, 295, 299, 303, 307, 309, 316, 323

Zirconium 95 (Zr)

52, 54, 79, 95, 140, 159, 169, 223,
237, 242, 258

FOREIGN

Americium 241 (Am)

361, 369

Americium 243 (Am)

335, 337, 349, 369, 376, 396, 402

Argon 37 (Ar)

328, 365, 375, 417

Berkelium 249 (Bk)

392

Californium 252 (Cf)

343, 379, 394, 410

Cesium 137 (Cs)

339

Curium 244 (Cm)

327, 388, 396, 412

Curium 248 (Cm)	Plutonium 242 (Pu)
337	329, 331, 334, 335, 338, 342, 361, 378, 395, 399
Cyclotron Service Irradiations (CSI)	Plutonium 244 (Pu)
388	331, 335, 378
Encapsulation (Cap)	Promethium 147 (Pm)
327, 335, 361, 362, 365, 367, 369, 376, 388, 396	377, 388, 415
Enriched-Uranium (EU)	Protactinium 231 (Pa)
406	327
Gadolinium 153 (Gd)	Ruthenium 106 (Ru)
356, 360, 388	388
Hydrogen 3 (H)	Samarium 151 (Sm)
347, 354, 381, 382, 388, 389, 393, 414, 415	372, 388
Iodine 129 (I)	Special Services (SS)
347, 365	356, 360, 363
Iridium 192 (Ir)	Strontium 82 (Sr)
336	383
Krypton 85 (Kr)	Strontium 83 (Sr)
336, 364, 388, 390, 391, 396, 416	383
Magnesium 28 (Mg)	Strontium 89 (Sr)
333, 358, 359	330, 355, 388
Miscellaneous Compound Preparations (MCP)	Target Preparations, Radioisotope (Tgs)
339, 387, 388, 415	331, 332, 335, 369, 370, 372, 378, 379, 380, 388, 394, 410, 411, 413
Neptunium 237 (Np)	Technetium 99 (Tc)
332, 335, 362, 365, 367, 372, 388, 413	347, 388, 403
Plutonium 238 (Pu)	Thorium 229 (Th)
361	363
Plutonium 239 (Pu)	Thorium 230 (Th)
331, 335, 372	342, 350, 367, 371, 404, 412
Plutonium 240 (Pu)	Thorium 232 (Th)
331, 335	372, 411
Plutonium 241 (Pu)	Uranium 233 (U)
331, 335	331, 398, 399

Uranium 234 (U)

342, 371, 400, 401, 412

Uranium 235 (U)

331, 332, 335, 370, 372

Uranium 236 (U)

331, 373, 401

Uranium 238 (U)

331, 332, 335, 342, 362, 372, 380

Ytterbium 91 (Y)

388

Xenon 127 (Xe)

327, 333, 345, 348, 351, 353, 357, 368,
374, 385, 407, 408, 409

Xenon 133 (Xe)

340, 346, 348, 352, 354, 368, 397

Zirconium 95 (Zr)

341, 344, 388

4. GEOGRAPHICAL LOCATION OF RADIOISOTOPE CUSTOMERS
(identified by customer numbers)

STATES

Alabama (AL)	Indiana (IN)
241, 250, 283	41, 120, 166
Arizona (AZ)	Iowa (IA)
6, 85, 122, 132, 251	27, 93, 271
Arkansas (AR)	Kansas (KS)
252	272
California (CA)	Kentucky (KY)
13, 23, 28, 40, 45, 61, 68, 72, 79, 86, 89, 90, 91, 92, 95, 96, 108, 116, 118, 123, 128, 131, 138, 161, 164, 165, 171, 175, 176, 182, 190, 191, 195, 196, 197, 198, 203, 205, 209, 210, 218, 219, 230, 239, 242, 244, 247, 253, 254, 255, 256, 257, 259, 260, 284, 285, 301, 302, 311, 312, 326	273
Colorado (CO)	Louisiana (LA)
30, 31, 82, 100, 119, 153, 163, 183, 228	65, 201, 204, 217
Connecticut (CT)	Maryland (MD)
192, 265, 324, 325	1, 98, 135, 212, 229, 233, 234, 243, 246
District of Columbia (DC)	Massachusetts (MA)
17, 57, 73, 74, 136	18, 29, 81, 104, 113, 114, 140, 148, 172, 200, 202, 211, 231, 249, 305
Florida (FL)	Michigan (MI)
63, 70, 133, 157, 266, 303	53, 83, 102, 105
Georgia (GA)	Minnesota (MN)
75, 267	115, 126, 127
Hawaii (HI)	Mississippi (MS)
160	274
Idaho (ID)	Missouri (MO)
2, 5, 42, 54, 60	16, 97, 111, 275, 315, 316, 317, 321
Illinois (IL)	Nebraska (NB)
7, 8, 10, 35, 43, 66, 110, 121, 139, 146, 147, 184, 208, 235, 261, 262, 263, 268, 269, 270, 304	38
	New Jersey (NJ)
	3, 15, 26, 36, 39, 44, 56, 58, 62, 76, 94, 167, 168, 170, 174, 185, 186, 232

New Mexico (NM)

51, 109, 188, 189, 258, 276

New York (NY)

4, 20, 21, 32, 33, 37, 46, 49, 71, 78,
99, 103, 134, 141, 142, 143, 149, 177,
193, 194, 199, 206, 207, 215, 225, 226,
236, 281, 282, 306, 307

North Carolina (NC)

19, 48, 50, 107, 144, 145, 178, 245, 308

Ohio (OH)

12, 14, 25, 77, 88, 130, 137, 154, 155,
156, 169, 173, 179, 264

Oklahoma (OK)

34

Oregon (OR)

158, 277

Pennsylvania (PA)

9, 11, 22, 24, 52, 87, 106, 124, 125,
150, 162, 248, 278, 279, 280, 318, 319,
320, 322

Puerto Rico (PR)

216

Rhode Island (RI)

227

South Carolina (SC)

55, 180

Tennessee (TN)

152, 221, 222, 223, 224, 286, 287, 299,
309

Texas (TX)

47, 64, 80, 129, 151, 213, 214, 240,
288, 289, 290, 298, 313

Utah (UT)

101, 291, 292

Virginia (VA)

67, 69, 238, 293, 294

Washington (WA)

59, 84, 159, 181, 187, 220, 237, 295,
297, 310, 314, 323

Wisconsin (WI)

112, 117, 296, 300

FOREIGN

Australia

327, 328, 329, 330

Austria

331

Belgium

332, 333, 334, 335, 336, 337

Brazil

338

Canada

339, 340, 341, 342, 343, 344, 345, 346,
347, 348, 349, 350, 351, 352, 353, 354,
356

Denmark

356, 357, 358, 359

France

360, 361, 362, 363, 364,

Germany, Federal Republic of

365, 366, 367, 368, 369, 370, 371, 372,
373, 374, 375, 376, 377, 378, 379

Great Britain

380, 381, 382, 383, 384, 385, 386, 387,
388, 389

Hong Kong

390, 391

India

392

Israel

393

Italy

394, 395

Japan

396, 397, 398, 399, 400, 401

Netherlands

402, 403, 404, 405,

Norway

406, 407

South Africa

408

Sweden

409, 410

Switzerland

411, 412, 413, 414, 415

Taiwan

416

Yugoslavia

417

5. RADIOISOTOPE SALES AND TRANSFERS - FY 1979

	Domestic			Foreign			Project			Total		
	Shots	Amount mCi	Dollars	Shots	Amount mCi	Dollars	Shots	Amount mCi	Dollars	Shots	Amount mCi	Dollars
actinium-227(H)							2	482.0	80	2	482.0	80
aluminum-28(I)								80	676g			
americium-241(H)							4	0.19	8.4 µCi	4	0.19	
americium-241(H)							22	22 g	13,170	94	2,750 g	1,657,992
americium-241(P)(a)	70	2,668 g	1,608,562	2	60 g	36,240				4	60 mCi	
americium-241(S)	1	60 mCi					3	3.68 kg	600	4	3.68 kg	13,740
americium-241(S)	2		330	6	140.0 mg	12,810	6	1,525.0 mg	480	14	1,665.0 mg	1,155
americium-241(S)				5	13.3	675	1	8.0		13	42.0	
argon-37(O)												
astatine-211(B)	13	42.0					4	2.2		4	2.2	
barium-133(H)								300	90		300	90
berkelium-249(O)				2		230	4	3.0 µg	260	6	3.0 µg	490
bromine-77(B)	1	3.5						580.5			3.223.0	
bromine-77(L)		2,642.5						114.5	60		114.5	60
bromine-80(I)								10.4	60		10.4	
bromine-82(I)												
cadmium-109(B)(b)	10	3,633.2	23,684				5	1.2	250	10	3,633.2	23,684
calcium-47(O)	238	93.1	25,005				5	8.9 µCi	292	5	8.9 µCi	25,255
californium-249(O)							1	3.3 µCi	120	1	3.3 µCi	120
californium-250(O)							1	1.0 mg		1	1.0 mg	
californium-252(H)							1	124.6 µg	795	19	124.6 µg	1833
californium-252(H)	6	12.97 mg	440	5		598	8	124.6 µg		10	26.57 mg	311,880
californium-252(S)	7	300.0	147,210	3	13.68 mg	164,670				3	300.0	300
cerium-144(O)	3		300									
cesium-134(H)							3	0.71		3	0.71	
cesium-137(H)							3	541.4 µCi		3	541.4 µCi	
cesium-137(O)							12	850.11 µCi		12	850.11 µCi	
cesium-137(O)	31	81,482 Ci	10,231	2			4	224.0	1,000	37	81,482 Ci	11,231
chlorine-38(I)								1.3	60		1.3	
cobalt-57(H)							1	1 µCi		1	1 µCi	
cobalt-60(H)							3	203.0 µCi	248	3	203.0 µCi	248
cobalt-60(O)							12	62.0		2	2,000	
cobalt-60(O)*							2	2,000		1		
curium-243(O)							1	132,480.0 mg	490	5	132,480.0 mg	490
curium-244(O)	2		330	7	265.0 mg	27,430	6		600	15	132,745.0 mg	28,360
curium-245(O)	2		65	1	20.0	60	1		65	3		65
curium-248(O)	1	0.1 mg					1			2	20.1 mg	125
cyclotron service												
irradiations(A)	37		11,544	182						219		11,544
cyclotron service							14	22.0	18,364	96	299.0	418,958
irradiations(O)	81	177.0	399,594	1	100.0	1,000					614	58,965
cyclotron service												
irradiation(B*)(b)		614.0	58,965				48	1957 kg	2,040	95	5558 kg	6,246
depleted uranium(P)	(a)		4,206				1	18.4 kg	6,000	1	18.4 kg	6,000
deuterium oxide(P)	47	3601 kg						90	30		90	30
dysprosium-165(I)												

5. RADIOISOTOPE SALES AND TRANSFERS - FY 1979

	Domestic			Foreign			Project			Total		
	Shots	Amount mCi	Dollars	Shots	Amount mCi	Dollars	Shots	Amount mCi	Dollars	Shots	Amount mCi	Dollars
einsteinium-253(0)												
encapsulation(0)			167,109									
enriched						56,800		0.1 mg	65		0.1 mg	65
uranium(P)(a)	6	28.598 g	29,300						12,270			236,179
europium-152(0)	1	15.0	300	3	14,400	14,000	51	57,057	56,900	60	100,055	100,200
fluorine-18(8)	4	77.0								1	15.0	300
gadolinium-153(0)	8	6,916.0	10,375	4	5,500.0	6,850	4	4008.0	5,750	4	77.0	
hafnium-181(0)	1	20.0	60									22,975
holmium-166(1)								1.6	60		20.0	60
iodine-123(8)	1	25.0								1	25.0	
iodine-129(0)	7	5,203.0 mg	3,777	3	1,251.0 mg	1,051	78	1,121.5	16,083	10	6,454.0 mg	4,828
iodine-131(0)	2	250.0	250							80	1,371.5	16,333
iridium-192(H)	4	76 Ci								4	76 Ci	
iridium-192(0)	176	1,011,859 Ci	1,486,660	9	37,542 Ci	52,869	6	461 Ci	674	191	1,049,862 Ci	1,540,203
iron-52(8)	3	35.0								3	35.0	
iron-52(L)		30 mg									30 mg	
krypton-85												
enriched(0)	2	200 Ci	17,000	1	50 Ci	3,000				3	250 Ci	20,000
krypton-85(0)	190	6,729 Ci	148,392	15	943 Ci	20,746	29	1,409 Ci	18,875	234	9,081 Ci	188,013
magnesium-28(8)(b)												
manganese-54(H)	33	8.7	3,146	3	0.8	319	1	0.11 µCi	300	36	9.5	3,465
mercury-203(H)										1	0.11 µCi	
miscellaneous							2	9.0			77.4	300
compound										2	9.0	
preparations(0)	26	265.0	1,104	2	8.0	88	3	0.001	56,867	31	273.0	58,059
molybdenum-99(1)									30		0.001	30
natural uranium(H)												
natural uranium(0)												
natural			54				9	7,850,074.5 g	33	9	7,850,074.5 g	87
uranium(P)(a)	4	1,450.0						172.2			1,622.2	
neodymium-147(1)												
neodymium-147(0)										7	8	30
neodymium-149(0)										3	1.95	750
neodymium-149(0)										3	3.24	
neptunium-237										2		
neptunium-237												
high purity(0)	1	1,000.0 mg	362	5	20,474.0 mg	5,921	5	3,087.0 mg	2,264	11	24,561.0 mg	8,547
neptunium-237										2		130
metal(0)												
neptunium-237												
oxide(0)	1		365	5	65 g	15,225	2	31.9 g	9,006	8	96.9 g	24,596
neptunium-239(H)										1	8.3 Ci	
niobium-92(H)										3	200.41	
niobium-95(0)	27	440.0	11,000				6	28.0	700	33	468.0	11,700
osmium-191(8)	13	10,724.5								13	10,724.5	

5. RADIOISOTOPE SALES AND TRANSFERS - FY 1979

	Domestic			Foreign			Project			Total		
	Shfts	Amount mCi	Dollars	Shfts	Amount mCi	Dollars	Shfts	Amount mCi	Dollars	Shfts	Amount mCi	Dollars
palladium-109(I)	24	1,650.0	21,750					3.2	60		3.2	60
phosphorus-33(O)	2										1,650.0	21,750
plutonium-238(P)(a)	3		492				71	1,978 g	74,000	24	1978 g	74,000
plutonium-236(O)	2		973	1		665	5		3,861	8		4,353
plutonium-237(O)							2	13.4 mCi	9,545	6		11,183
plutonium-238(H)							33	17,240.35 g		2	13.4 mCi	
plutonium-238(M)							3	210.0 mg	350	9	17,240.35 g	
plutonium-238(P)(a)	1	11,170.0 mg	15,962	5	-99,050.0 mg	-173,337	7	10.02		7	10.02 kg	
plutonium-238(P)(a)							28	95.07 mCi		28	95.07 mCi	
plutonium-238(S)							2	32.02 g		2	32.02 g	
plutonium-239(H)							13	782.7 mg	1,208	23	18,425.8 mg	38,556
plutonium-239(M)	4	1,513.1 mg	3,820	6	16,1300 mg	33,528	1	4.9 mCi		1	4.9 mCi	
plutonium-239(O)							1	11.9 g		1	11.9 g	
plutonium-240(H)							9	2,649.1 mg	855	12	4,769.1 mg	7,199
plutonium-240(M)	1	100.0 mg	120	2	2,020.0 mg	6,224	7	9,258.1 mg	670	11	9,628.1 mg	3,703
plutonium-241(O)	2	100.0 mg	639	2	270.0 mg	2,394						
plutonium-242(M)	1	.0045 Ci										
plutonium-242(P)(a)							1	5,266.1 mg	8,395	21	8,769.1 mg	65,022
plutonium-242(O)	1			14	3,503.0 mg	56,627	1	10.0 mg	296	3	80.0 mg	1,650
plutonium-244(O)				2	70.0 mg	1,365						
polonium-210(M)	1	5					3	212.0		3	212.0	
potassium-43(O)	44	94.5	9,450				2	0.28 mCi		44	94.5	9,450
promethium-147(H)							1	3 Ci	100	2	0.28 mCi	
promethium-147(O)	8	1,210 Ci	1,690	18	23,158 Ci	23,458	2	132.3 mg		27	24,371 Ci	25,248
protactinium-231(M)				1	100.0 mg	2,170	2	286.0 mg	7,835	3	386.0 mg	10,005
protactinium-231(O)							3	12,400.4 pCi		3	12,400.4 pCi	
RADEF(H)(c)							205			261		6,077
reactor service	56		6,077									18,076.82
irradiations(A)												
reactor service	34		18,076.82									
irradiations(B)												
reactor service												
irradiations(I)												
rhodium-186(I)												
rhodium-188(I)												
rhodium-81(I)	56	1,675.0										
rhodium-103(I)	10	125.0	1,625									
rhodium-103(O)	10	65.0										
rhodium-106(H)												
rhodium-106(O)	7	125.0	1,050	3	150.0	3,750	8	37.0	925	10	1,675.0	38,396
rhodium-151(O)	1	40.0 mg	1,440	2	103.0 mg	3,708	1	4.7 mCi	275	18	125.0	30
sodium-24(I)							3	11.0		13	286.0	2,550
special services(O)	5		44,910									5,075
strontium-82(L)												
strontium-85(L)	28	212										
strontium-89(O)	1	301.0	4,075	3	6.0	81						
strontium-90(H)	11	0.5 mCi	30,619									
strontium-90(O)												
strontium-90												
yttrium(H)												

1113633

5. RADIOISOTOPE SALES AND TRANSFERS - FY 1979

	Domestic				Foreign				Total			
	Shots	Amount mCi	Dollars	Shots	Amount mCi	Dollars	Shots	Amount mCi	Dollars	Shots	Amount mCi	Dollars
tantalum-182(H) target	1	3.0	55,562				1	0.9 Ci	30	1	0.9 Ci	30
preparations(O) technetium-99(O)	25	77,830.0 mg	4,280	6	52,560.0 mg	68,484	9	32,762.0 mg	314,906	1	3.0	418,951
thorium-229(H)	3		195	2		180	2	10.9 mg	1,868	40	163,152.0 mg	9,058
thorium-229(O)				2			2	0.2 mg	70	12	1 kg	70
thorium-230(H)				2			2	0.2 mg	130	2	0.3 mg	505
thorium-230(O)	5	15.1 mg	1,413	2	1.5 mg	238	3	56.921 g	212	2	56.921 g	450
thorium-230-90-9(O)	3	20.0 mg	526	1	100.0 mg	9,827	3	115.0 mg	292	5	116.5 mg	11,532
thorium-232(H)				4	90.0 mg	2,336	3	14.0 mg		9	129.1 mg	2,862
thorium-232(O)				2	3,000.0 mg	160	1	0.1 g		5	110.0 mg	
thorium-170(U)							9	21,399.8 mg	585	1	0.1 g	745
tritium(H)	10	95.0 Ci		1	14,000	250	1	14 µCi		11	24,399.8 mg	250
tritium(O)	212	1,050,061 Ci	821,077	52	1,337,572 Ci	1,006,984	3	14 µCi		3	14 µCi	
tritium(P)	4	276.0					30	2,811 Ci	3,409	10	95.0 Ci	1,831,470
tungsten-178(B)	1	10.0							3,000	294	2,380,435 Ci	3,000
tungsten-178(B)(b)										4	276.0	
uranium-232(O)	2	116.0 mg	141	3	4,600.0 mg	12,063	1	11,707.3 mg	65	1	16,423.3 mg	65
uranium-233(O)							13	97 g	4,715	18	97 g	16,919
uranium-233(P)							1	10.0 g	7,000	1	10.0 g	7,000
uranium-234(H)	3	3,400.0 mg	28,483	5	2,131.0 mg	18,054	2	50.0	393	1	5,581.0 mg	46,930
uranium-235(O)	5	5,460.0 mg	867	9	72,692.0 mg	11,523	17	153,424.7 mg	1,035	10	231,576.7 mg	13,725
uranium-236(O)	3	1.02		3	576.0 mg	432	4	3,300.0 mg	260	31	3,876.0 mg	692
uranium-238(H)	1	91.0 g								7	1.02	
uranium-238(O)	8	874,630.0 g	1,807	9	600,485.0 mg	11,497	6	2,264.0 g	743	7	2,355 g	14,047
withdrawn radio- isotopes(O)	17	61,332.0	171,708				13	154,682.1 mg		30	1,629,797.1 mg	
xenon-123(B)	1	110.0					7	3,100.0	9,854	24	64,432.0	181,562
xenon-127(B)	1	25.0		1	48.0					1	110.0	
xenon-127(B)(b)	122	24,514.0	35,533	38	10,700.0	15,663	2	73.0		2	73.0	
xenon-133(H)	428	691 Ci	47,349	51	50 Ci	3,810	24	11 Ci	1,857	160	35,214.0	51,196
ytterbium-91(O)										1	1.0	
zirconium 95	14	1,321.0	6,757	2	5.0	58				503	752 Ci	53,016
zirconium-95(H)				5	61.0	355	10	330.5	1,912	2	5.0	58
Handling Charges(O)			140,805	1	1 Ci					29	1,712.5	9,024
						16,505			23,085	1	1 Ci	180,395
Subtotal	2,241		5,649,012	340		1,581,064	1,214		865,681	3,796		8,095,956
Loans										3		2,940
TOTAL										3,799		8,098,896

(a) If no amount is listed, all of the shipments were less than a reportable quantity. If an amount is listed, part of the shipments were less than a reportable quantity.
 (b) Not Kidge billed.
 (c) 210p - 210B1 - 210pb

DISTRIBUTION

No. of
Copies

OFFSITE

J. C. Haugen
Argonne National Laboratory
9700 South Cass Avenue
Argonne, IL 60439

P. Colsmann
Brookhaven National Laboratory
Associated Universities, Inc.
Upton, NY 11973

P. Richards
Brookhaven National Laboratory
Associated Universities, Inc.
Upton, NY 11973

L. G. Stang, Jr.
Brookhaven National Laboratory
Associated Universities, Inc.
Upton, NY 11973

J. A. Morley
DOE Albuquerque Operations Office
PO Box 5400
Albuquerque, NM 87115

D. C. Graves
DOE Albuquerque Operations Office
PO Box 5400
Albuquerque, NM 87115

G. R. Gartrell
DOE Dayton Area Office
PO Box 66
Miamisburg, OH 45342

W. Ellgen
DOE Office of the Assistant Secretary
for International Affairs (MS-7220C)
Washington, DC 20545

DOE Office of the Assistant Secretary
for International Affairs (MS-7220C)
Washington, DC 20545

DOE Division of Environmental
Control Technology (MS-E201)
Washington, DC 20545

D. E. Large
DOE Oak Ridge Operations Office
PO Box E
Oak Ridge, TN 37830

No. of
Copies

OFFSITE

J. W. Nehls
DOE Oak Ridge Operations Office
PO Box E
Oak Ridge, TN 37830

10 J. N. Maddox
Office of Health and Environmental
Research
(MS-E201)
Office of the Assistant Secretary
for Environment
Washington, DC 20545

P. B. Brimhall
DOE Idaho Operations Office
550 Second Street
Idaho Falls, ID 83401

W. K. Benson
DOE Division of International
Security Affairs (MS-E171)
Washington, DC 20545

J. E. Reid
DOE Office of Controller (MS-C217)
Washington, DC 20545

E. L. Sillcox
DOE/OBP
Forrestal Bldg. (MS-8F031)
Washington, DC 20545

DOE Savannah River Operations Office
PO Box A
Aiken, SC 29801

27 DOE Technical Information Center
PO Box 62
Oak Ridge, TN 37830

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

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

1113635

No. of
Copies

OFFSITE

2 J. W. Meadows
Lawrence Livermore Laboratory
University of California
PO Box 808
Livermore, CA 94550

N. A. Matwiyoff
Los Alamos Scientific Laboratory
University of California
PO Box 1663
Los Alamos, NM 87544

H. A. O'Brien
Los Alamos Scientific Laboratory
University of California
PO Box 1663
Los Alamos, NM 87544

W. T. Cave
Mound Facility
Monsanto Research Corporation
PO Box 32
Miamisburg, OH 45342

L. P. Thomas
Mound Facility
Monsanto Research Corporation
PO Box 32
Miamisburg, OH 45342

R. E. Vallee
Mound Facility
Monsanto Research Corporation
PO Box 32
Miamisburg, OH 45342

H. R. Gwinn
Oak Ridge National Laboratory
Union Carbide Corporation
PO Box X
Oak Ridge, TN 37830

E. H. Kobisk
Oak Ridge National Laboratory
Union Carbide Corporation
PO Box X
Oak Ridge, TN 37830

E. E. Lamb
Oak Ridge National Laboratory
Union Carbide Corporation
PO Box X
Oak Ridge, TN 37830

E. Newman
Oak Ridge National Laboratory
Union Carbide Corporation
PO Box X
Oak Ridge, TN 37830

No. of
Copies

OFFSITE

5 J. E. Ratledge
Oak Ridge National Laboratory
Union Carbide Corporation
PO Box X
Oak Ridge, TN 37830

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

K. W. MacMurdo
Savannah River Laboratory
E. I. du Pont de Nemours and Company
Aiken, SC 29801

D. H. Turno
Savannah River Laboratory
E. I. du Pont de Nemours and Company
Aiken, SC 29801

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

R. F. Barker
U.S. Nuclear Regulatory Commission
Washington, DC 20555

D. R. Hopkins
U.S. Nuclear Regulatory Commission
Washington, DC 20555

E. P. Resner
U.S. Nuclear Regulatory Commission
Washington, DC 20555

B. Singer
U.S. Nuclear Regulatory Commission
Washington, DC 20555

A. N. Tse
U.S. Nuclear Regulatory Commission
Washington, DC 20555

E. D. Flack
U.S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
E/W 359
Washington, DC 20555

R. E. Devine
U.S. Nuclear Regulatory Commission
Library
Washington, DC 20555

No. of
Copies

OFFSITE

G. Smith
U.S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406

J. Sutherland
U.S. Nuclear Regulatory Commission
101 Marietta Street
Suite 3100
Atlanta, GA 30303

B. Davis
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, IL 60137

Donald Hamilton
Department of Health Education
and Welfare
Food and Drug Administration
1901 Chapman Avenue
Mailstop HFX-70
Rockville, MD 20857

G. Brown
U.S. Nuclear Regulatory Commission
611 Ryan Plaza Drive
Suite 1000
Arlington, TX 76012

H. Book
U.S. Nuclear Regulatory Commission
1990 N. California Blvd.
Suite 202
Walnut Creek, CA 94596

No. of
Copies

ONSITE

2 DOE Richland Operations Office

W. R. Pohlod
H. E. Ransom

1 Hanford Engineering Development
Laboratory

D. Engel

1 UNC Nuclear Industries

P. A. Carlson

25 Pacific Northwest Laboratory

W. J. Bair
J. S. Burlison (10)
L. C. Counts
J. V. Filsinger
J. J. Fuquay
J. H. Jarrett
R. W. McKee
R. W. Perkins
E. J. Wheelwright
Technical Information (5)
Publishing Coordination (2)La

ornl

ORNL/TM-7214

MAY 9 1980

OAK
RIDGE
NATIONAL
LABORATORY

UNION
CARBIDE

Stable Isotope Customer List and Summary of Shipments—FY 1979

W. C. Davis

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

1113638

ORNL/TM-7214

Contract No. W-7405-eng-26
CHEMICAL TECHNOLOGY DIVISION

STABLE ISOTOPE CUSTOMER LIST AND SUMMARY
OF SHIPMENTS - FY 1979

Compiled by
W. C. Davis

Date Published - April 1980

OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee 37830
operated by
UNION CARBIDE CORPORATION
for the
DEPARTMENT OF ENERGY

1113639

CONTENTS

	<u>Page</u>
INTRODUCTION	1
I. ALPHABETICAL LIST OF CUSTOMERS, WITH CONTACTS AND ISOTOPES PURCHASED	2
A. Domestic	2
B. Foreign	9
II. ALPHABETICAL LIST OF ISOTOPES, CROSS-REFERENCED TO CUSTOMER NUMBERS	17
A. Domestic	17
B. Foreign	21
III. ALPHABETICAL LIST OF STATES AND COUNTRIES, CROSS-REFERENCED TO CUSTOMER NUMBERS	28
A. Domestic	28
B. Foreign	29
IV. STABLE ISOTOPE SALES - FY 1979	30

STABLE ISOTOPE CUSTOMER LIST AND SUMMARY
OF SHIPMENTS - FY 1979

W. C. Davis

INTRODUCTION

This compilation is published as an aid to those concerned with the separation and sale of stable isotopes. The information is divided into four sections:

1. alphabetical list of domestic and foreign customers, showing the stable isotopes purchased during the fiscal year;
2. alphabetical list of isotopes, cross-referenced to customer numbers and divided into domestic and foreign categories;
3. alphabetical list of states and countries, cross-referenced to customer numbers and indicating geographical concentrations of isotope users; and
4. tabulation of the shipments, quantities, and dollars for domestic, foreign, and project categories for each isotope.

Other reports published in this series are:

ORNL/TM-1928	ORNL/TM-3987
ORNL/TM-2038	ORNL/TM-5089
ORNL/TM-2401	ORNL/TM-5853
ORNL/TM-2747	ORNL/TM-6241
ORNL/TM-3146	ORNL/TM-6710
ORNL/TM-3543	

We wish to thank S. E. Curtis of the Business Systems Department of the ORGDP Computing Technology Center for his assistance in developing the tabulations.

1113641

I. ALPHABETICAL LIST OF CUSTOMERS, WITH CONTACTS AND ISOTOPES PURCHASED

A. DOMESTIC

- 1 Abilene Christian College
Box 8218
Abilene, Texas

54Fe, 92Mo, 100Mo
- 2 Aerojet Nuclear Company
550 Second Street
P. J. Box 1345
Idaho Falls, Idaho 83401

40K, 150Nd, 25S
- 3 Alabama, University of
Medical Center
1919 Seventh Avenue, South
Birmingham, Alabama 35486

43Ca
- 4 Alaska, University of
College, Alaska 99735

29Si, 30Si
- 5 Aldrich Chemical Company, Inc.
940 West St. Paul Avenue
Milwaukee, Wisconsin 53233

7Li
- 6 Allied Chemical Corporation
Central Accounts Payable
P. J. Box 2251R
Morristown, N. J. 07960

7Li
- 7 Amersham Corporation
Arlington Heights, Illinois 60005

54Fe
- 8 Argonne National Laboratory
9700 South Cass Avenue
Argonne, Illinois 60439

109Ag, 11B, 42Ca, 44Ca, 52Cr, 65Cu,
144Er, 54Fe, 57Fe, 150Gd, 100Gd,
6Li, 7Li, 24Mg, 25Mg, 26Mg, 96Mo,
150Nd, 104Pd, 105Pd, 106Pd, 108Pd,
34S, 76Se, 144Sm, 146Sm, 150Sm,
148Sn, 122Sn, 124Sn, SS, 122Te, Tgs,
170Yb, 172Yb, 66Zn, 68Zn
- 9 Arizona State University
Tempe, Arizona 85281

6Li, 7Li, 50Ni
- 10 Arkansas, University of
Fayetteville, Arkansas 72701

107Ag
- 11 Baylor University
Box 6397
Waco, Texas 76703

6Li, 7Li
- 12 Bell Telephone Laboratories
Murray Hill, New Jersey 07971

57Fe, 113In, 61Ni, 34S, 77Se, 119Sn,
SS, 100W, 66Zn
- 13 Bendix Research Laboratories
20800 Civic Center Drive
Southfield, Michigan 48075

100Hg, 201Hg, 202Hg, 204Hg, SS
- 14 Bigelow Laboratory for Ocean Sciences
McKown Point
West Boothbay Harbor, Maine 04575

30Si
- 15 Brookhaven National Laboratory
Upton, Long Island, New York 11973

107Ag, 11B, 42Ca, 113Cd, 130Ce, 62Cu,
65Cu, 167Er, 151Eu, 57Fe, 155Gd,
156Gd, 157Gd, 70Ge, 74Ge, 76Ge,
200Hg, 113In, 6Li, 7Li, 24Mg, 92Mo,
142Nd, 144Nd, 60Ni, 149Os, 190Os,
192Os, 200Pb, 102Pd, 104Pd, 106Pd,
110Pd, 105Pt, 107Re, 99Ru, 100Ru,
102Ru, 20Si, 29Si, 30Si, 144Sm,
146Sm, 122Sn, SS, 122Te, 124Te, 130Te,
100W, 100W
- 16 Brooklyn College
Bedford Avenue and Avenue H
Brooklyn, New York 11210

35Cl, 39K, 7Li, 50Ni
- 17 California Institute of Technology
1201 E. California Boulevard
Pasadena, California 91109

54Fe, 57Fe, 58Fe, 202Hg, 190Os,
200Pb, SS, 44Ti, 47Ti, 48Ti, 50Ti,
100W, 61Zr, 94Zr
- 18 California State College
5151 State College Drive
Los Angeles, California 90032

6Li
- 19 California, University of
400 Sproul Hall
Berkeley, California 94720

70Zn
- 20 California, University of
Davis, California 95616

70Br, 81Br, 207Pb, 208Pb, SS,
203Ti, 205Ti
- 21 California, University of
Post Office Box 109
La Jolla, California 92037

42Ca, 142Ca, 167Er, 151Eu, 54Fe, 61K,
138La, 24Mg, 61Ni, 40Ti, 171Yb
- 22 California, University of
405 Hilgard Avenue
Los Angeles, California 90024

138Ba, 151Eu, 170Hf, 61K, 138La,
174Lu, 150Nd, 87Rb, 167Se, 86Sr,
Tgs, 44Ti, 48Ti

1113642

- 23 California, University of
Post Office box 112
Administration Building
Riverside, California 92502
 ^{113}Cd , ^{199}Hf , ^{119}Sn , SS
- 24 California, University of
San Francisco Medical Center
San Francisco, California 94122
 ^{57}Fe
- 25 California, University of
Santa Barbara, California 93106
 ^{57}Fe
- 25 California, University of
Lawrence Berkeley Laboratory
Berkeley, California 94701
 ^{108}B , ^{90}Ca , ^{100}Cd , ^{24}Mg , ^{208}Pb , ^{112}Sn ,
SS, Tgs, ^{90}Zr
- 27 California, University of
Lawrence Livermore Laboratory
Box 808
Livermore, California 94550
 ^{108}B , ^{113}B , ^{138}Ba , ^{35}Cl , ^{170}Hf , ^{177}Hf ,
 ^7Li , ^{176}Lu , ^{140}Nd , ^{76}Se , ^{80}Se ,
 ^{82}Se , ^{84}Sr , ^{87}Sr , SS, Tgs
- 29 California, University of
Los Alamos Scientific Laboratory
Post Office box 1663
Los Alamos, New Mexico 87544
 ^{113}B , ^{138}Ba , ^{135}Ba , ^{136}Ba , ^{137}Ba , ^{138}Ba ,
 ^{81}Br , ^{90}Ca , ^{160}Er , ^{151}Eu , ^{59}Fe ,
 ^{157}Gd , ^{158}Gd , ^{160}Gd , ^{76}Ge , ^{90}K ,
 ^6Li , ^{25}Mg , ^{24}Mg , ^{208}Pb , ^{207}Pb ,
 ^{105}Re , ^{187}Re , ^{28}Si , ^{140}Sm , ^{152}Sm ,
 ^{150}Sn , ^{118}Sn , ^{120}Sn , ^{122}Sn , SS, ^{123}Te ,
 ^{124}Te , ^{125}Te , ^{126}Te , ^{128}Te , ^{130}Te , Tgs,
 ^{94}Tl , ^{96}Tl , ^{203}Tl , ^{205}Tl , ^{182}W , ^{183}W ,
 ^{184}W , ^{186}W
- 29 Carnegie-Mellon University
5000 Forbes
Pittsburgh, Pennsylvania 15213
 ^{92}Mo , ^{94}Mo , ^{100}Mo , ^{76}Se , ^{120}Te
- 33 Catholic University of America
104 McCort-Ward Hall
Washington, D. C. 20017
Tgs
- 31 Cincinnati, University of
Cincinnati, Ohio 45221
 ^{110}Cd , ^{125}Te , ^{128}Te
- 32 Colorado State University
Fort Collins, Colorado 80521
 ^{65}Cu , ^{59}Fe , ^{58}Fe
- 33 Colorado, University of
Boulder, Colorado 80302
 ^{108}B , ^{113}B , ^{37}Cl , ^{102}Pd , ^{104}Pd , ^{106}Pd ,
 ^{87}Rb , ^{174}Yb
- 34 Columbia University
Box 6, Low Library
New York, New York 10027
 ^{90}Ca , ^{90}K , ^{176}Lu , ^{208}Pb , ^{205}Si , SS
- 35 Consumers Power Company
Palisades Nuclear Plant
Route 2, Box 134
Covert, Michigan 49043
 ^7Li
- 36 Cornell University
Ithaca, New York 14850
 ^6Li , ^7Li
- 37 Cyclotron Corporation
950 Gilman Street
Berkeley, California 94710
 ^{100}Mo , SS, ^{123}Te , ^{124}Te , ^{203}Tl
- 38 Department of Chemistry
Mount Holyoke College
South Hadley, Massachusetts 01075
 ^{113}Cd
- 39 Diagnostic Isotopes
123 Pleasant Avenue
Upper Saddle River, New Jersey 07435
SS, ^{203}Tl
- 40 Diamond Shamrock Corp.
1901 Spring Street
Redwood City, California 94063
 ^7Li
- 41 Dow Chemical USA
Texas Division
Freeport, Texas 77541
 ^6Li
- 42 Dresser Atlas
Division of Dresser Industries, Inc.
P. O. Box 1407
Houston, Texas 77001
 ^{108}B
- 43 Duke University
Durham, North Carolina 27706
 ^{63}Cu , ^{65}Cu , ^{25}Mg , ^{58}Ni , ^{28}Si , ^{30}Si ,
SS, Tgs, ^{96}Tl
- 44 Eastern Michigan University
Accounting Department
Ypsilanti, Michigan 48197
 ^{140}Nd
- 45 Eastman Kodak Company
Kodak Park works
Rochester, New York 14650
 ^{107}Ag , ^{180}Os , ^{190}Os , ^{99}Ru

- 45 Efrata California, Incorporated
19851 Bardsen Avenue
Irvine, California 92715
 ^{67}Zn
- 47 Environmental Protection Agency
Division of Financial Management
Accounting Operations Office
Washington, D. C. 20460
 ^{122}Te
- 48 Florida State University
Tallahassee, Florida 32306
 ^{66}Ga , ^{164}Dy , ^{170}Er , ^{56}Fe , ^{57}Fe ,
 ^{204}Hg , ^{190}Cs , ^{192}Os , ^{194}Pt , ^{198}Pt ,
 ^{174}Yb
- 49 Florida, University of
Gainesville, Florida 32601
 ^{70}Ga
- 50 GTE Sylvania
100 Endicott Street
Danvers, Massachusetts 01923
 ^{199}Hg
- 51 Georgetown University
3801 Reservoir Road, N.W.
Washington, D. C. 20007
 ^{95}Mo
- 52 Georgia Institute of Technology
225 North Avenue, N.W.
Atlanta, Georgia 30332
 ^{151}Eu , ^{153}Eu , ^6Li
- 53 Gulf Energy and Environmental Systems
P. O. Box 63d
San Diego, California 92112
 ^{140}Nd , ^{150}Nd , ^{150}Sm
- 54 Harshaw Chemical Company
Division of Kewanee Oil Company
6801 Cochran Road
Solon, Ohio 44139
 ^6Li , ^7Li , Tgs
- 55 Harvard University
Cambridge, Massachusetts 02138
 ^{190}Os , ^{117}Sn , SS, ^{67}Zn
- 56 Hewlett Packard Company
1501 Page Mill Road
Palo Alto, California 94304
 ^{85}Rb , ^{87}Rb
- 57 Hewlett-Packard Company
Accounts Payable
P. O. Box 10222
Palo Alto, California 94303
 ^{199}Hg , ^{202}Hg
- 59 Howard University
2401 6th Street
Washington, D. C. 20001
 ^{63}Cu , ^{65}Cu
- 59 ICN-NBCo
26201 Miles Road
Cleveland, Ohio 44128
 ^{203}Tl
- 60 Illinois, University of
203 Administration Building E
Urbana, Illinois 61803
 ^{166}Er , ^{168}Er , ^{95}Mo , ^{97}Mo , SS
- 61 Indiana University
Bloomington, Indiana 47401
 ^{60}Ca , ^{40}Ca , ^{35}Cl , ^{151}Eu , ^{153}Eu ,
 ^{155}Gd , ^{157}Gd , ^{140}Gd , ^{39}K , ^{41}K , ^7Li ,
 ^{92}Mo , ^{207}Pb , ^{105}Pd , ^{195}Pt , ^{196}Pt ,
 ^{85}Rb , ^{87}Rb , ^{114}Sn , ^{146}Sm , ^{150}Sm ,
 ^{154}Sm , ^{114}Sn , Tgs, ^{162}W , ^{182}W , ^{186}W ,
 ^{171}Yb , ^{92}Zr
- 62 Indiana and Michigan Power Company
Donald C. Cook Nuclear Plant
P. O. Box 458
Bridgman, Michigan 49106
 ^7Li
- 63 Iowa State University
Ames, Iowa 50010
 ^{137}Sm , Tgs, ^{60}Zn
- 64 Iowa, University of
Iowa City, Iowa 52240
 ^6Li , ^7Li
- 65 Isotope Products Laboratories
404 South Luke Street
Burbank, California 91502
 ^{174}Hf , ^{74}Se , ^{203}Tl
- 66 Johns Hopkins University
Baltimore, Maryland 21218
 ^{158}Gd , Tgs
- 67 Kansas, University of
Lawrence, Kansas 66044
 ^{110}Cd , ^{153}Eu , ^{155}Gd
- 68 Kentucky, University of
Lexington, Kentucky 40506
 ^{124}Sn
- 69 Litton Industries
Guidance and Control Systems
5500 Canoga Avenue
Woodland Hills, California 91367
 ^{85}Rb , ^{87}Rb

1113644

- 70 Maryland, University of
College Park, Maryland 20742
11B, 6Li, 59Ni, 208Pb, Tgs
- 71 Massachusetts Institute of Technology
Box 69
Cambridge, Massachusetts 02139
107Ag, 40Ca, 104Cd, 112Cd, 114Cd,
50Cr, 63Cu, 54Fe, 56Fe, 154Gd,
160Gd, 202Hg, 204Hg, 40K, 24Mg,
92Mo, 94Mo, 100Mo, 58Ni, 60Ni,
64Ni, 76Se, 78Se, 86Sr, SS, Tgs,
162W, 183W, 68Zn, 70Zn, 90Zr
- 72 Medi-Physics, Inc.
5855 Christie Avenue
Emeryville, California 94608
112Cd, 69Ga, 124Te, 68Zn
- 73 Memphis State University
Memphis, Tennessee 38111
10B
- 74 Michigan State University
East Lansing, Michigan 48823
106Cd, 160Dy, 168Er, 170Er, 57Fe,
154Gd, 156Gd, 228S, 232S, 238U, Tgs,
170Yb, 171Yb, 173Yb, 174Yb, 176Yb,
90Zr
- 75 Michigan, University of
Ann Arbor, Michigan 48104
24Mg, Tgs
- 76 MicroMatter Company
197 - 34th Avenue East
Seattle, Washington 98102
100Cd, 160Er, 168Er, 154Gd, 144Sm,
70Zn
- 77 Mini-Dose Laboratories, Inc.
1825 Emerson Street
Denver, Colorado 80218
SS, 203Tl
- 78 Minnesota, University of
402 Morrill Hall
Minneapolis, Minnesota 55455
57Fe, 25Mg, 144Sm, Tgs
- 79 Missouri, University of
Columbia, Missouri 65201
114Cd, 58Fe, 6Li, 62Ni, 152Sm
- 80 Moody College
NSF Neutron Matter Dist.
P. O. Box 1375
Galveston, Texas 77553
138Ba, 114Sn, 124Sn
- 81 Mount Sinai Medical Center
4300 Alton Road
Miami Beach, Florida 33139
203Tl, 68Zn
- 82 National Bureau of Standards
Connecticut Avenue and Van Ness Street, N.W.
Washington, D. C. 20234
57Fe, 154Gd, 157Gd, 228S, 232S, Tgs,
50V, 68Zn
- 83 New England Nuclear Corporation
575 Albany Street
Boston, Massachusetts 02118
107Ag, 114Cd, 140Ce, 170Er, 112In,
41K, 192Os, 100Pd, 114Sn, 124Sn, SS,
124Te, 203Tl, 160W, 168Yb, 67Zn
- 84 New Mexico State University
Las Cruces, New Mexico 88003
24Mg, SS
- 85 New York University
Washington Square
New York, New York 10016
161Dy, 163Dy, 154Gd, 208Pb, 207Pb,
SS, 203Tl
- 86 New York, State University of
1400 Washington Avenue
Albany, New York 12203
144Sm
- 87 New York, State University of
Research Foundation
Stony Brook, New York 11790
100Hg, 200Hg, 202Hg, 204Hg, 208Pb,
166Pt, 198Pt, 100Ru, 232S, 238U,
238U, 30Si, SS, 166W
- 88 North Carolina State University
P. O. Box 5935
Raleigh, North Carolina 27607
58Fe, 41K, 6Li, SS
- 89 North Carolina, University of
Chapel Hill, North Carolina 27514
151Eu, 25Mg, 87Sr, 67Zn
- 90 Northern States Power Company
414 Nicollet Mall
Minneapolis, Minnesota 55401
7Li
- 91 Northwestern University
619 Clark Street
Evanston, Illinois 60201
62Ca, 114Cd
- 92 Notre Dame, University of
Notre Dame, Indiana 46556
138Ba, 160Gd, 142Nd, 144Nd, 150Nd,
163W

1113645

91 Nuclear Enterprises, Incorporated
935 Terminal Way
San Carlos, California 94070

*Li

94 Ohio State University
191 North Oval Drive
Columbus, Ohio 43210

¹⁵⁰Dv, Tgs

95 Ohio State University
Research Foundation
1314 Kinnear Road
Columbus, Ohio 43212

*Li, Tgs, ⁹²Zr

96 Ohio University
Athens, Ohio 45701

⁶⁰Ni, SS

97 Ophthos Instrument Company
9600 Overlea Drive
Rockville, Maryland 20850

¹⁹⁹Hg, ²⁰⁰Hg, ²⁰¹Hg, ²⁰²Hg, ²⁰³Hg,
⁹⁷Rb

98 Oregon State University
Corvallis, Oregon 97330

¹⁴⁴Nd, ¹⁴⁶Nd, ¹⁵⁰Nd, ²⁴Si, ³⁰Si,
¹⁴⁷Sm, ¹³⁰Te

99 Oramet, Inc.
Route 111
East Hampstead, New Hampshire 03826

*Li

100 Pacific Northwest Laboratory
Richland, Washington 99352

¹⁴²Ce, ¹⁴⁴Nd, ¹⁵²Sm, SS, ¹⁷⁶Yb

101 Pennsylvania State University
University Park, Pennsylvania 16802

¹¹³Cd

102 Pennsylvania, University of
3025 Walnut Street
Philadelphia, Pennsylvania 19104

¹¹³Cd, ⁷³Ge, ⁷⁶Ge, ¹⁰²Ru, SS, ⁹⁷Zn

103 Pittsburgh, University of
Pittsburgh, Pennsylvania 15213

¹⁰⁷Ag, ¹⁰⁹Ag, ¹⁶⁰Er, ¹⁷⁰Er, *Li,
²⁰Si, ²⁹Si, ³⁰Si, SS, Tgs

104 Portland General Electric Company
621 S.W. Alder Street
Portland, Oregon 97205

⁷Li

105 Princeton University
James Forrestal Campus
Princeton, New Jersey 08540

⁷⁶Br, ⁸¹Br, ⁷²Ge, *Li, ⁷Li, ¹⁰²Pd,
Tgs

106 Public Service Electric & Gas Co. (PSE&G)
80 Park Place
Neward, New Jersey 07101

⁷Li

107 Purdue University
Pharmacy Annex
Lafayette, Indiana 47907

³⁵Cl, ²⁰³Hg

108 Reactor Experiments, Inc.
963 Terminal Way
San Carlos, California 94070

*K, ²⁰³Pb, ²⁰⁵Pb, *Sr

109 Rochester, University of
575 Elmwood Avenue
Rochester, New York 14627

¹¹³Cd, ⁵⁷Fe, ¹⁸⁰Hf, ²⁰³Pb, ³²S, Tgs

110 Rockwell International
Atomics International Division
Rocky Flats Plant
P. O. Box 464
Golden, Colorado 80401

¹¹³Cd, ⁵⁷Fe, ²⁰³Pb, ⁷⁷Se

111 Rutgers, The State University
New Brunswick, New Jersey 08903

*Ga, ⁷¹Ga, *Ni, ¹⁰²Pd, ¹⁵⁰Sm,
¹¹⁹Sn

112 Sandia Corporation
Post Office Box 5800
Albuquerque, New Mexico 87115

*Li, ⁷Li

113 Singer Company
70 New Dutch Lane
Fairfield, New Jersey 07006

¹⁹⁹Hg, ²⁰¹Hg, ²⁰³Hg

114 South Carolina Electric and Gas Company
P. O. Box 764
Columbia, South Carolina 29278

⁷Li

115 South Carolina, University of
Columbia, South Carolina 29208

¹¹³Cd, ¹⁹⁹Hg, ²⁰⁷Pb, ⁷⁷Se

116 Southern California, University of
University Park
Los Angeles, California 90007

*Li, ⁷Li

1113646

- 117 Spire Corporation
Patriots Park
Bedford, Massachusetts 01730
 ^{151}Eu , ^{119}Sn
- 118 Stanford University
P. O. Box 4409
Stanford, California 94305
 ^{42}Ca , ^{70}Ge , ^{106}Pd , ^{104}Pd , ^{29}Si , SS
- 119 Syracuse University
150 Marshall Street
Syracuse, New York 13210
 ^{54}Fe , ^{57}Fe
- 120 Teledyne Isotopes
123 Woodland Avenue
Westwood, New Jersey 07675
 ^{208}Pb , ^{87}Rb
- 121 Teledyne Wah Chang Albany
Division of Teledyne Ind Inc
P. O. Box 450
Albany, Oregon 97321
 ^{174}Hf
- 122 Tennessee Valley Authority
Division of Purchasing
Chattanooga, Tennessee 37401
 ^7Li
- 123 Tennessee University of
Knoxville, Tennessee 37916
SS
- 124 Texas A and M Research Foundation
P. O. Box H
College Station, Texas 77843
 ^{50}Cr , ^{53}Cr
- 125 Texas A and M University
Post Office Box 44
College Station, Texas 77843
 ^{40}Ca , ^{44}Ca , ^6Li , ^{150}Nd , ^{50}Ni , ^{60}Ni ,
 ^{62}Ni , ^{208}Pb , ^{28}Si , ^{144}Sm , ^{152}Sm , SS,
Tgs, ^{66}Zn , ^{64}Zn , ^{68}Zn , ^{90}Zr
- 125 Texas at Arlington, University of
Arlington, Texas 76010
 ^{63}Cu , ^{65}Cu
- 127 Texas University of
Austin, Texas 78712
Tgs, ^{92}Zr
- 128 U. S. Atomic Energy Commission
Richland Operations Office
P. O. Box 530
Richland, Washington D. C. 99352
 ^{76}Se
- 129 J. S. Energy Research and Development Administration
Purchasing Office
4800 Forbes Avenue
Pittsburgh, Pennsylvania 15213
 ^{199}Hg
- 130 U.S. Services, Inc.
19 Ox Bow Lane
Summit, New Jersey 07901
SS
- 131 Union Carbide Corporation
Tarrytown Technical Center
Post Office Box 65
Tarrytown, New York 10591
 ^{107}Ag
- 132 Union Carbide Corporation, Nuclear Division
Oak Ridge National Laboratory
Post Office Box X
Oak Ridge, Tennessee 37830
 118 , ^{63}Cu , ^{161}Dy , ^{162}Dy , ^{163}Dy ,
 ^{164}Er , ^{167}Er , ^{151}Eu , ^{54}Fe , ^{56}Fe ,
 ^{191}Ir , ^{193}Ir , ^{90}K , ^{201}K , ^{203}Hg , ^{142}Nd ,
 ^{143}Nd , ^{144}Nd , ^{146}Nd , ^{148}Nd , ^{58}Ni ,
 ^{60}Ni , ^{62}Ni , ^{208}Pb , ^{206}Pb , ^{207}Pb ,
 ^{195}Pt , ^{197}Pt , ^{76}Se , ^{31}Si , ^{28}Si , ^{144}Sm ,
 ^{152}Sm , ^{154}Sm , ^{112}Sn , ^{114}Sn , ^{116}Sn ,
 ^{118}Sn , SS, ^{122}Te , Tgs, ^{203}Tl , ^{205}Tl ,
 ^{180}W , ^{184}W , ^{186}Yb , ^{171}Yb , ^{173}Yb ,
 ^{66}Zn , ^{64}Zn , ^{68}Zn
- 133 United States Army
Finance and Accounting Officer
Fort Monmouth, New Jersey 07703
 ^{29}Si
- 134 United States Department of Agriculture
Research Service
P. O. Box 53326
New Orleans, Louisiana 70150
 ^{53}Cr , ^{54}Cr , ^{63}Cu , ^{54}Fe , ^{67}Zn ,
 ^{70}Zn
- 135 United States Geological Survey
Financial Management
National Center, Room 1447-A
12201 Sunrise Valley Drive
Reston, Virginia 22092
 ^{42}Ca , ^{44}Ca , ^{63}Cu , ^{65}Cu , ^{201}K , ^{203}Hg ,
 ^{208}Pb , ^{207}Pb , ^{206}Pb , ^{122}Te , ^{124}Te
- 135 United States National Aeronautics and Space Admin.
Ames Research Center
Moffett Field, California 94035
 ^{40}Ca
- 137 United States Navy
National Naval Medical Center
Bethesda, Maryland 20014
 ^{57}Fe
- 138 United States Navy
Naval Research Laboratory
Washington, D. C. 20390
 ^{199}Hg , SS, ^{28}Si , ^{29}Si

1113647

- 139 United States Public Health Service
National Institutes of Health, Isotope Laboratory
Building 21
Bethesda, Maryland 20214

57Fe
- 140 United Technologies Corporation
Silver Lane
East Hartford, Connecticut 06108

79Br, 81Br
- 141 University of Connecticut
Health Center
Farmington, Connecticut 06032

106Cd, 151Eu, 153Eu
- 142 University of Lowell
Lowell, Massachusetts 01854

6Li
- 143 University of New Orleans
Lakefront
New Orleans, Louisiana 70122

67Zn
- 144 University of Texas
P.O. Box 583
Richardson, Texas 75080

113Cd, 25Mg, 26Mg, 64Zn
- 145 Utah, University of
Purchasing Department
Salt Lake City, Utah 84112

119Sn
- 146 V. A. Medical Center
Attn: Warehouse
3350 La Jolla Village
San Diego, California 92161

90Co
- 147 Vanderbilt University
Business Managers Office
Nashville, Tennessee 37203

79Br, 110Cd
- 148 Vec-Tor, Incorporated
4126 Linden Avenue
Suite 102
Dayton, Ohio 45432

198Hg, 202Hg, 204Hg
- 149 Virginia Electric and Power Company
P. O. Box 1134
Richmond, Virginia 23209

7Li
- 150 Virginia Polytechnic Institute
Blacksburg, Virginia 24061

142Ce, 141Dy, 147Er, 153Eu, 159Gd,
138La, 176Lu, 145Nd, 208Pb, 87Rb,
147Sm, 118Sn, 173Yb
- 151 Virginia, University of
Charlottesville, Virginia 22903

42Ca, 44Ca, 55I, Tgs
- 152 Walter S. Vaning
3141 Meadow Road #104
Dallas, Texas 75231

10B, 63Cu, 7Li, 119Sn
- 153 Washington, University of
400 Administration Building
Seattle, Washington 98105

90Ca, 144Er, 91K, 6Li, 24Mg, 25Mg,
26Mg, 208Pb, 28Si, 33
- 154 Wayne State University
Detroit, Michigan 48202

57Fe, 77Se, 80Se
- 155 West Virginia University
Administration Building
Morgantown, West Virginia 26506

87Fe
- 156 Westinghouse Electric Corporation
Bettis Atomic Power Laboratory
Post Office Box 73
West Mifflin, Pennsylvania 15122

151Eu, 174Hf, 177Hf
- 157 Westinghouse Electric Corporation
Research and Development Center
Beulah Road, Churchill Borough
Pittsburgh, Pennsylvania 15235

90Zr, 91Zr
- 158 Westinghouse Electric Corporation
Atomic Power Divisions
P. O. Box 355
Pittsburgh, Pennsylvania 15230

7Li
- 159 Westinghouse Hanford Company
P. O. Box 1970
Richland, Washington 99352

6Li, Tgs
- 160 Wisconsin, University of
750 University Avenue
Madison, Wisconsin 53706

50Cr, 56Fe, 57Fe, 6Li, 90Mo
- 161 Wisconsin, University of, Milwaukee
2150 North Prospect Avenue
Milwaukee, Wisconsin 53202

99Mo
- 162 Yale University
20 Ashmun Street
New Haven, Connecticut 06520

43Ca, 112Cd, 113Cd, 159Gd, 154Gd,
24Mg

9. FOREIGN

ARGENTINA

- 163 Comision Nacional de Energia Atomica
Gerencia de Energia
Avda. del Libertador 8280
Buenos Aires, Argentina

⁷⁷Se

AUSTRALIA

- 164 Australian Atomic Energy Commission
Lucas Heights
Sydney, Australia

¹⁰⁵Re, ¹⁰⁶Sn

- 165 Australian National University
P. O. Box 4
Canberra, A. C. T., Australia

¹⁴⁰Ce, ¹⁴⁴Er, ¹⁴⁷Er, ¹⁴⁸Er, ¹⁷⁰Er,
¹⁴⁰Jd, ⁷⁶Ge, ¹⁹⁰Hg, ²⁰⁰Hg, ²⁰²Hg,
²⁰⁴Hg, ⁶Li, ⁷Li, ²⁴Mg, ¹⁵⁰Nd, ⁶⁶Ni,
¹⁹²Os, ³⁴S, ¹⁵²Sm, ¹⁵⁴Sm, ¹⁷⁰Yb,
¹⁷¹Yb, ¹⁷²Yb, ¹⁷³Yb, ¹⁷⁴Yb

- 166 Canberra Community Hospital
Canberra City
Australian Capital Territory 2601, Australia

⁹⁹Mo, ⁹⁹Mo, SS, ¹⁰³W

- 167 Commonwealth Scientific and Ind. Res. Organization
Division of Applied Physics
University Grounds, City Road, Chippendale N.

Sydney, N. S. W., Australia

¹⁰⁰Er, Tgs

- 168 Embassy of Australia
1601 Massachusetts Avenue, N.W.
Washington, D.C. 20036

¹⁵²Gd

- 169 Melbourne, University of
Parkville N.2, Melbourne
Victoria, Australia

⁴²Ca, ⁴⁴Ca, ⁴⁶Ca, ⁵⁰Cr, ⁵²Cr, ⁵³Cr,
¹⁵¹Eu, ¹⁵³Eu, ²³Mg, ⁶⁰Ni, ⁶²Ni, ³⁴S,
¹⁴⁴Sm, ¹⁵⁰Sm, ¹⁵²Sm, ¹⁵⁴Sm, SS, Tgs,
⁶⁴Ti, ⁶⁷Ti, ⁶⁸Ti, ⁶⁹Ti, ⁵⁰Ti, ¹⁰⁴W

- 170 Tasmania, University of
Hobart, Tasmania, Australia

¹³⁰I

- 171 The Flinders University of South Australia
School of Physical Sciences
Bedford Park, South Australia 5042

⁶Li

- 172 The University of Sydney
Off Fisher Road
Sydney, N.S.W., 2006, Australia

⁵⁰Cr, ⁵³Cr, ⁵⁷Fe

- 173 University of Adelaide
Adelaide, South Australia 5001

¹⁴²Ce, ¹⁴¹Dy, ¹⁴⁷Er, ¹⁵³Eu, ¹⁵⁹Gd,
⁶¹K, ¹³⁸La, ¹⁷⁴Lu, ¹⁴³Nd, ¹⁴⁹Sm,
¹⁷¹Yb

- 174 Western Australian Institute of Technology
Hayman Road
Bentley South 6102
Western Australia

¹⁵⁰Nd, ¹⁴⁷Sm

AUSTRIA

- 175 International Atomic Energy Agency
Kärntnering 11-13
A-1010 Vienna, Austria

¹⁵¹Eu, ¹⁵⁴Eu, ⁹⁹Mo, Tgs

BANGLADESH

- 176 Atomic Energy Centre
P. O. Box No. 164
Rama, Dacca
Bangladesh

⁴⁴Ca, ⁵²Cr, ⁵⁴Cr, ⁵⁶Fe, ⁴¹K, ²³Mg,
²⁸Si, ⁶⁶Ti, ⁶⁸Ti

BELGIUM

- 177 Centre d'Etude de l'Energie Nucleaire

144 Avenue Plasky
Brussels 4, Belgium

Tgs

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

¹⁵²Gd, ¹⁵⁴Gd, ²⁰⁰Pb, ¹⁰⁵Pd, SS

- 179 IRE, Institut National des Radioelements
Avenue Eugene Plasky, 144
1040 Brussels, Belgium

⁷⁸Br, ⁸¹Br, ⁴⁴Ca, ¹¹³Cd

- 180 Katholieke Universiteit Leuven
Department Natuurkunde
Institut voor Kern-en Stralingsfysika
Celestijnenlaan 200 D
D-3030 Heverlee, Belgium

¹⁷⁵Lu, ¹⁷⁶Lu, ⁸²Se, ¹²⁴Te

- 181 Lab voor Kernfysica
Proeftuinstraat 86
9000 Ghent
Belgium

¹⁰⁴Ru

- 182 Liege, Universite de
2 rue Armand Stevart
Liege, Belgium

⁹²Mo

183 Rijksuniversiteit Gent
Natuurkundig Laboratorium
Proeftuinstraat 40
Gent, Belgium

*Ni, Tas

184 Université de Louvain
Institut de Physique Corpusculaire
Chemin du Cyclotron, 2
B-1348 Louvain-la-Neuve
Belgium

*Li, *Sn, Tas

BRAZIL

185 Governo Federal, Conselho Nacional de Pesquisas
Instituto de Energia Atomica
Caixa Postal 11049
Sao Paulo S. S. P. A., Brazil

108, 109Cd, 111Cd, 142Ce, 141Dy,
147Er, 153Eu, 155Gd, 138La, *Li,
176Lu, 24Mg, 143Nd, 150Nd, 208Pb,
152Sm, 154Sm, 156Sm, 158Sm, 160Sm, 162Sm, 164Sm, 166Sm, 168Sm, 170Sm, 172Sm, 174Sm, 176Sm, 178Sm, 180Sm, 182Sm, 184Sm, 186Sm, 188Sm, 190Sm, 192Sm, 194Sm, 196Sm, 198Sm, 200Sm, 202Sm, 204Sm, 206Sm, 208Sm, 210Sm, 212Sm, 214Sm, 216Sm, 218Sm, 220Sm, 222Sm, 224Sm, 226Sm, 228Sm, 230Sm, 232Sm, 234Sm, 236Sm, 238Sm, 240Sm, 242Sm, 244Sm, 246Sm, 248Sm, 250Sm, 252Sm, 254Sm, 256Sm, 258Sm, 260Sm, 262Sm, 264Sm, 266Sm, 268Sm, 270Sm, 272Sm, 274Sm, 276Sm, 278Sm, 280Sm, 282Sm, 284Sm, 286Sm, 288Sm, 290Sm, 292Sm, 294Sm, 296Sm, 298Sm, 300Sm, 302Sm, 304Sm, 306Sm, 308Sm, 310Sm, 312Sm, 314Sm, 316Sm, 318Sm, 320Sm, 322Sm, 324Sm, 326Sm, 328Sm, 330Sm, 332Sm, 334Sm, 336Sm, 338Sm, 340Sm, 342Sm, 344Sm, 346Sm, 348Sm, 350Sm, 352Sm, 354Sm, 356Sm, 358Sm, 360Sm, 362Sm, 364Sm, 366Sm, 368Sm, 370Sm, 372Sm, 374Sm, 376Sm, 378Sm, 380Sm, 382Sm, 384Sm, 386Sm, 388Sm, 390Sm, 392Sm, 394Sm, 396Sm, 398Sm, 400Sm, 402Sm, 404Sm, 406Sm, 408Sm, 410Sm, 412Sm, 414Sm, 416Sm, 418Sm, 420Sm, 422Sm, 424Sm, 426Sm, 428Sm, 430Sm, 432Sm, 434Sm, 436Sm, 438Sm, 440Sm, 442Sm, 444Sm, 446Sm, 448Sm, 450Sm, 452Sm, 454Sm, 456Sm, 458Sm, 460Sm, 462Sm, 464Sm, 466Sm, 468Sm, 470Sm, 472Sm, 474Sm, 476Sm, 478Sm, 480Sm, 482Sm, 484Sm, 486Sm, 488Sm, 490Sm, 492Sm, 494Sm, 496Sm, 498Sm, 500Sm, 502Sm, 504Sm, 506Sm, 508Sm, 510Sm, 512Sm, 514Sm, 516Sm, 518Sm, 520Sm, 522Sm, 524Sm, 526Sm, 528Sm, 530Sm, 532Sm, 534Sm, 536Sm, 538Sm, 540Sm, 542Sm, 544Sm, 546Sm, 548Sm, 550Sm, 552Sm, 554Sm, 556Sm, 558Sm, 560Sm, 562Sm, 564Sm, 566Sm, 568Sm, 570Sm, 572Sm, 574Sm, 576Sm, 578Sm, 580Sm, 582Sm, 584Sm, 586Sm, 588Sm, 590Sm, 592Sm, 594Sm, 596Sm, 598Sm, 600Sm, 602Sm, 604Sm, 606Sm, 608Sm, 610Sm, 612Sm, 614Sm, 616Sm, 618Sm, 620Sm, 622Sm, 624Sm, 626Sm, 628Sm, 630Sm, 632Sm, 634Sm, 636Sm, 638Sm, 640Sm, 642Sm, 644Sm, 646Sm, 648Sm, 650Sm, 652Sm, 654Sm, 656Sm, 658Sm, 660Sm, 662Sm, 664Sm, 666Sm, 668Sm, 670Sm, 672Sm, 674Sm, 676Sm, 678Sm, 680Sm, 682Sm, 684Sm, 686Sm, 688Sm, 690Sm, 692Sm, 694Sm, 696Sm, 698Sm, 700Sm, 702Sm, 704Sm, 706Sm, 708Sm, 710Sm, 712Sm, 714Sm, 716Sm, 718Sm, 720Sm, 722Sm, 724Sm, 726Sm, 728Sm, 730Sm, 732Sm, 734Sm, 736Sm, 738Sm, 740Sm, 742Sm, 744Sm, 746Sm, 748Sm, 750Sm, 752Sm, 754Sm, 756Sm, 758Sm, 760Sm, 762Sm, 764Sm, 766Sm, 768Sm, 770Sm, 772Sm, 774Sm, 776Sm, 778Sm, 780Sm, 782Sm, 784Sm, 786Sm, 788Sm, 790Sm, 792Sm, 794Sm, 796Sm, 798Sm, 800Sm, 802Sm, 804Sm, 806Sm, 808Sm, 810Sm, 812Sm, 814Sm, 816Sm, 818Sm, 820Sm, 822Sm, 824Sm, 826Sm, 828Sm, 830Sm, 832Sm, 834Sm, 836Sm, 838Sm, 840Sm, 842Sm, 844Sm, 846Sm, 848Sm, 850Sm, 852Sm, 854Sm, 856Sm, 858Sm, 860Sm, 862Sm, 864Sm, 866Sm, 868Sm, 870Sm, 872Sm, 874Sm, 876Sm, 878Sm, 880Sm, 882Sm, 884Sm, 886Sm, 888Sm, 890Sm, 892Sm, 894Sm, 896Sm, 898Sm, 900Sm, 902Sm, 904Sm, 906Sm, 908Sm, 910Sm, 912Sm, 914Sm, 916Sm, 918Sm, 920Sm, 922Sm, 924Sm, 926Sm, 928Sm, 930Sm, 932Sm, 934Sm, 936Sm, 938Sm, 940Sm, 942Sm, 944Sm, 946Sm, 948Sm, 950Sm, 952Sm, 954Sm, 956Sm, 958Sm, 960Sm, 962Sm, 964Sm, 966Sm, 968Sm, 970Sm, 972Sm, 974Sm, 976Sm, 978Sm, 980Sm, 982Sm, 984Sm, 986Sm, 988Sm, 990Sm, 992Sm, 994Sm, 996Sm, 998Sm, 1000Sm

197 Cominco Limited
Exploration Research Laboratory
1486 East Pender
Vancouver, British Columbia
Canada V5L 1V8

*Li, 7Li

194 Geological Survey of Canada
Ottawa 4, Ontario, Canada

*K, *K, 208Po

195 Health Sciences Centre
791 Notre Dame Avenue
Winnipeg, Manitoba, Canada R3E 0P1

12*Te

196 Health and Welfare Canada
Health Protection Branch, Research Centre
Ross Avenue Tunney's Pasture
Ottawa, Ontario, Canada

205 Queens University
Kingston, Ontario, Canada
52Cr, 54Fe, 55K, 50Ti, 66Zn

206 Saint Francis Xavier University
Antigonish, Nova Scotia, Canada
67Rb

207 Saskatchewan, University of
Saskatoon, Saskatchewan, Canada
6Li

209 Scintrex, Ltd.
222 Snidercroft Road
Concord, Ontario, Canada
206Pb, 207Pb, 208Pb, Tgs

209 Seakem Oceanography Limited
9817 West Saanich Road
Sidney, British Columbia v
Sidney, British Columbia V8L 3S1
Canada
54Fe, 60Ni, 110Sn, 120Sn, 66Zn

210 Simon Fraser University
Burnaby 2, B. C., Canada
125Te

211 Toronto, University of
Toronto, Ontario, Canada
74Ge, 199Pt

212 University of Alberta
Edmonton, Alberta, Canada T6G2H1
143Nd, 144Sm

213 Windsor, University of
Windsor, Ontario, Canada
109Ag, 58Fe, 70Ge, 72Ge, 73Ge,
74Ge, 76Ge, 100Hf, 202Hg, 92Mo,
94Mo, 95Mo, 96Mo, 97Mo, 98Mo,
100Mo, 20Si

DENMARK

214 Aarhus, University of
Aarhus C, Denmark
59Cl, 144Er, 7Li, Tgs, 66Ti, 68Ti,
50Ti

215 Atomic Energy Commission
Research Establishment Riso
Isotope Division
Roskilde, Denmark
44Ca, 206Pb

215 Denmark Technical, University of
Lyngby, Denmark
57Fe

217 Kobenhavns Universitet
Blegdamsvej 17
Kobenhavn O, Denmark
144Er, 54Fe, 152Sm

218 Kobenhavns Universitet
Riso Pr.
Roskilde, Denmark
42Ca, 44Ca, 144Er, 170Hf, 204Hg, 92Mo,
94Mo, 102Pd, 144Sm, 154Sm, SS, 66Ti,
60Zr, 92Zr

ENGLAND

219 Cambridge University
Cambridge, England
206Hg

220 Central Electricity Generating Board
Research Division
Berkeley Nuclear Laboratories
Berkeley, Glos., England
Tgs, 66Zn

221 D. A. Pitman Limited
Jessamy Road
Weybridge, Surrey
England
7Li

222 Derby Luminescents Ltd.
Levy West Division
Millmarsh Lane, Brimsdown
Enfield, Middx. EN3 7QW
England
6Li

223 Institute of Geological Sciences
15 and 17 Young Street, Kensington
London W.8, England
140Ce, 102Dy, 143Nd, 150Nd, 144Sm,
173Yb

224 Liverpool, University of
Liverpool 3, England
54Fe, 73Ge, 74Ge, 25Mg, 59Ni, 61Ni,
33S, 92Se, 20Si, 20Si, 30Si, SS

225 Manchester University
Manchester 13, England
135Ba, 151Eu, 155Gd, 175Lu, 206Pb,
195Pt, 199Pt, 144Re, 187Re, 99Ru,
Tgs

226 Ministry of Agriculture, Fisheries and Food
Fisheries Radiobiological Laboratory
Hamilton Dock, Lowestoft (Suffolk)
England
SS, Tgs, 144W

227 Nuclear Enterprises Limited
Sighthill, Industrial Estate
Sighthill, Edinburgh EH11 4EY
England
6Li

228 R. D. Swann, Ltd.
109 Fenchurch Street
London, E.C.3, England
313

229 Radiochemical Centre
White Lion Road
Amersham, Bucks, England

^{132}Ba , ^{44}Ca , ^{50}Cr , ^{150}Dy , ^{190}Hg ,
 ^{176}Lu , ^{58}Ni , ^{76}Si , SS, ^{122}Te , ^{203}Tl ,
 ^{180}Yb

230 St. Mary's Hospital Medical School
Norfolk Pl, Paddington
London W2 1PG, England

^{40}Ca

231 United Kingdom Treasury and Supply Delegation
25 Broadway
New York, New York 10004

^{100}Dy , ^{151}Eu , ^{72}Ge , ^{76}Ge , ^{58}Ni ,
 ^{60}Ni , ^{82}Ni , ^{208}Pb , ^{209}Pb , ^{154}Sm ,
 ^{115}Sn , ^{124}Sn

FINLAND

232 Valtion Hankintakeskus
P. O. Box 134
Helsinki 53
Finland

^{63}Cu , Tgs, ^{92}Zr

FRANCE

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

^{113}Cd , ^{35}Cl , ^{37}Cl , ^{63}Cu , ^{153}Eu ,
 ^{157}Gd , ^{76}Ge , ^{72}Ge , ^{76}Ge , ^{170}Hf ,
 ^{90}K , ^{138}La , ^{150}Dy , ^{152}Dy , ^{190}Pt ,
 ^{198}Pt , ^{30}S , ^{30}Si , ^{144}Sm , ^{88}Sr , SS,
 ^{120}Te , Tgs, ^{90}Zr , ^{92}Zr

234 CRN, Labo PNPA
B. P. 20/CRJ
67 Strasbourg 3, France

^{150}Sm , ^{138}Ba , ^{40}Ca , ^{42}Ca , ^{44}Ca , ^{140}Ce ,
 ^{50}Cr , ^{52}Cr , ^{56}Fe , ^{142}Nd , ^{143}Nd , ^{144}Nd ,
 ^{146}Nd , ^{30}Si , ^{144}Sm , ^{122}Sn , SS, Tgs,
 ^{90}Tl , ^{171}Yb

235 Hydrelec
Avenue Eugene Freyssinet
19 Brive, France

108

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

^{113}Cd , ^{188}Er , ^{73}Ge , ^{90}K

237 Institut de Physique Nucleaire de Lyon
43 Boulevard du 11 Novembre 1918
69 Villeurbanne, France

^{94}Mo , ^{100}Mo , ^{87}Rb , Tgs

238 Laboratoire de Chimie Nucleaire
Universite de Bordeaux
LeHaut-Vigneau
33 Gradignan, France

^{106}Pd , ^{107}Pd , ^{110}Pd , Tgs

GERMANY

239 American Hoechst Corporation
P. O. Box 2500
Somerville, New Jersey 08876

^{50}Cr , ^{56}Fe , ^{190}Hg , ^{208}Pb , SS,
 ^{180}Yb

240 Bochum, Ruhr-Universitat
463 Bochum, West Germany

^{24}Mg

241 Bonn, Universitat
Nussallee 12-14
53 Bonn, Germany

^{202}Hg , ^{200}Hg

242 Buchler and Company
Frankfurter Str. 234
Braunschweig, Germany

^{42}Ca , ^{57}Fe , ^{170}Hf , Tgs, ^{173}Yb

243 Darmstadt, Technischen Hochschule
61 Darmstadt, Germany

^{140}Ce , ^{208}Pb , Tgs, ^{90}Zr

244 Deutsches Krebsforschungszentrum
Berliner Str. 21
6900 Heidelberg, Germany

^{6}Li , ^{122}Te , Tgs

245 Erlangen-Nurnberg, University
Gluckstr.
852 Erlangen, West Germany

^{107}Ag

246 Freie Universitat
1 Berlin 33, Germany

^{138}Ba , ^{136}Ba , ^{137}Ba , ^{35}Cl , ^{170}Er ,
 ^{151}Eu , ^{153}Eu , ^{154}Gd , ^{156}Gd , ^{158}Gd ,
 ^{160}Gd , ^{208}Hg , ^{113}In , ^{7}Li , ^{142}Nd ,
 ^{146}Nd , ^{148}Nd , ^{150}Nd , ^{208}Pb , ^{144}Sm ,
 ^{147}Sm , ^{150}Sm , ^{112}Sn , ^{124}Sn , ^{126}Te ,
 ^{127}Te , ^{128}Te , ^{129}Te , ^{130}Te , Tgs,
 ^{170}Yb , ^{172}Yb , ^{174}Yb , ^{176}Yb

247 Freie und Hansestadt Hamburg
2 Hamburg-Bahrenfeld, Germany

^{160}Gd , ^{148}Nd , ^{61}Ni , ^{106}Pd , ^{108}Pd ,
Tgs

248 Gesamthochschule Wuppertal
FB9 - Prof. Burger
Gewerbeschulstr. 34
D-5600 Wuppertal 2
West Germany

^{79}Br , ^{142}Ce , ^{35}Cl , ^{138}La , ^{150}Nd ,
 ^{87}Rb , ^{30}Si

- 249 Gesellschaft für Strahlen-
Umweltforschung München
Post Oberschleißheim
Industriestadt Landster 1
D-8142 Neuherberg, FRG, West Germany
 ^{40}Ca , ^{40}Ca
- 250 Gesellschaft für Kernforschung mbH
Institute fuer Angewandte Reaktor Physik
Weberstrasse 5
75 Karlsruhe
West Germany
 ^{134}Ba , ^{136}Ba , ^{138}Ba , ^{140}Cd , ^{54}Fe ,
 ^{152}Gd , ^{160}Gd , ^{6}Li , ^{35}S , ^{124}Te , ^{126}Te ,
 ^{130}Te , ^{66}Zn
- 251 Gesellschaft für Schwerionenforschung, mbH,
Finanz Abteilung,
Postfach 541,
D-6100 Darmstadt,
West Germany
 ^{40}Ca , ^{154}Dy , ^{74}Ge , ^{143}Nd , ^{208}Pb ,
 ^{198}Pt , ^{124}Sn , ^{35}S , ^{124}Te , ^{66}Ti , ^{50}Ti
- 252 Giessen, Universität
6300 Giessen, Germany
 ^{30}Si , ^{70}S
- 253 Hahn-Meitner-Institut
für Kernforschung Berlin, Sexton Kernphysik
Berlin, Germany
 ^{134}Ba , ^{136}Ba , ^{138}Ba , ^{137}Ba , ^{40}Ca ,
 ^{110}Cd , ^{112}Cd , ^{114}Cd , ^{116}Cd , ^{140}Ce ,
 ^{142}Ce , ^{160}Dy , ^{161}Dy , ^{162}Dy , ^{163}Dy ,
 ^{164}Dy , ^{166}Er , ^{168}Er , ^{167}Er , ^{168}Er ,
 ^{170}Er , ^{154}Eu , ^{157}Eu , ^{158}Gd , ^{159}Gd ,
 ^{157}Gd , ^{159}Gd , ^{160}Gd , ^{72}Ge , ^{179}Hf ,
 ^{180}Hf , ^{41}K , ^{204}Pb , ^{206}Pb , ^{90}Mo , ^{95}Mo ,
 ^{50}Ni , ^{62}Ni , ^{192}Os , ^{104}Pd , ^{110}Pd ,
 ^{198}Pt , ^{197}Sm , ^{148}Sm , ^{149}Sm , ^{150}Sm ,
 ^{152}Sm , ^{154}Sm , ^{122}Sn , ^{66}Sr , ^{87}Sr ,
 ^{126}Te , ^{128}Te , ^{66}Ti , ^{67}Ti , ^{68}Ti , ^{69}Ti ,
 ^{50}Ti , ^{102}W , ^{103}W , ^{173}Yb , ^{66}Zn
- 254 Hannover, Technische Hochschule
Hannover, W. Germany
 ^{77}Se
- 255 Institut der Max-Planck-Gesellschaft
Faradayweg 4-6
1 Berlin 33, West Germany
 ^{50}Ni , ^{35}S
- 255 Institute für Metallforschung-Metallphysik
Technische Universität Berlin
1 Berlin 15, Joachimstaler Str. 31/32
Germany
 ^{101}Ir , ^{193}Ir , ^{6}Li , ^{7}Li
- 257 Johann Wolfgang Goethe University
Frankfurt/Main, Germany
 ^{60}Ni
- 258 Kawasaki Steel Corporation
Dusseldorf Office
4 Dusseldorf, Kreuzstrabe 20, W. Germany
 ^{30}Si
- 259 Kernforschung Sanlage
Postfach 365
517 Jülich, Germany
 ^{50}Cr , ^{54}Cr , ^{152}Gd , ^{154}Gd , ^{155}Gd ,
 ^{156}Gd , ^{157}Gd , ^{160}Gd , ^{20}Mg , ^{25}Mg ,
 ^{204}Pb , ^{61}Ni , ^{62}Ni , ^{195}Pt , ^{196}Pt ,
 ^{198}Pt , ^{99}Ru , ^{76}Se , ^{77}Se , ^{78}Se ,
 ^{80}Se , ^{82}Se , ^{144}Sm , ^{147}Sm , ^{148}Sm ,
 ^{150}Sm , ^{152}Sm , ^{35}S , ^{124}Te , ^{126}Te ,
 ^{130}Te , ^{70}S , ^{163}Yb
- 260 Köln, Universität
Zulpicher Str. 47
5 Köln 1, Germany
 ^{70}Ge , ^{72}Ge , ^{74}Ge , ^{200}Hg , ^{201}Hg ,
 ^{6}Li , ^{90}Mo , ^{100}Mo
- 261 Kristallhandel Keipin
IMSchilling 18
6906 Leimen bei Heidelberg, West Germany
 ^{6}Li , ^{7}Li
- 262 Mainz/Rhein, Universität
Mainz am Rhein, Germany
 ^{40}Ca , ^{102}Ru , ^{104}Ru , ^{70}S
- 263 Marburg/Lehn, Universität
Marburg/Lehn, Germany
 ^{198}Pt , ^{70}S
- 264 Max Planck Institut für Kernphysik
Saupfercheckweg
Heidelberg, Germany
 ^{40}Ca , ^{42}Ca , ^{44}Ca , ^{46}Ca , ^{6}Li , ^{20}Mg ,
 ^{92}Mo , ^{94}Mo , ^{96}Mo , ^{98}Mo , ^{100}Mo ,
 ^{50}Ni , ^{60}Ni , ^{62}Ni , ^{64}Ni , ^{112}Sn ,
 ^{114}Sn , ^{116}Sn , ^{120}Sn , ^{122}Sn , ^{124}Sn , ^{70}S ,
 ^{66}Ti
- 265 Max Planck Institute für Chemie
Saarstrasse 23, Mainz
West Germany
 ^{57}Fe , ^{41}K , ^{61}Ni , ^{104}Pd , ^{99}Ru
- 266 Max-Planck Institut für Metallforschung-Verwaltung
92 Saarstrasse
7000 Stuttgart, West Germany
 ^{7}Li
- 267 München, Technische Hochschule
Arcistrasse 21
8 München 2
Germany
 ^{132}Ba , ^{134}Ba , ^{136}Ba , ^{42}Ca , ^{43}Ca , ^{44}Ca ,
 ^{114}Cd , ^{132}Gd , ^{176}Hf , ^{178}Hf , ^{180}Hf ,
 ^{6}Li , ^{160}Os , ^{208}Pb , ^{35}S , ^{29}Si , ^{30}Si ,
 ^{144}Sm , ^{147}Sm , ^{148}Sm , ^{150}Sm , ^{35}S ,
 ^{130}Te , ^{70}S
- 268 Münster, Universität
44 Münster/Westfalen, Germany
 ^{142}Ce , ^{161}Dy , ^{167}Er , ^{153}Eu , ^{154}Gd ,
 ^{174}Lu , ^{147}Nd , ^{29}Si , ^{30}Si , ^{147}Sm ,
 ^{171}Yb

269 Philipps Universität, F. B. 14
 Attn: Dr. Reinhard Brandt
 Kern Chemie
 355 Marburg, Lahnberg, West Germany
 190Pt, Tgs

270 Saarlands, Universität des
 66 Saarbrücken 15, West Germany
 63Cu

271 Universität Bielefeld
 Fakultät für Physik
 Universitätsstrasse
 4800 Bielefeld 1
 West Germany
 108, Tgs

272 Universität Regensburg
 Universitätsstr. 31
 D-8400 Regensburg
 West Germany
 61Br, 37Cl

273 der Universität Würzburg
 Physikalisches Institut
 Röntgenring 8
 8700 Würzburg, Germany
 150Dy

GREECE

274 Greek Atomic Energy Commission, N. R. C. Democ
 Agbia Paraskovi Attikis
 Athens, Greece
 57Fe

INDIA

275 Alligarh Muslim University
 Alligarh, U. P., India
 142Ce, 100Gd, 70Ge, 200Pb, 110Pd,
 60Se, 150Se, 100W

275 Bhabha Atomic Research Centre
 Government of India
 3rd Floor Yashwantrao Chavan Building
 Bombay 1, India
 107Ag, 109Ag, 110Cd, 142Ce, 63Cu,
 65Cu, 100Er, 170Er, 151Eu, 60Ga,
 150Gd, 160Gd, 6Li, 23Na, 24Na,
 90Mo, 142Nd, 143Nd, 144Nd, 145Nd,
 150Nd, 59Ni, 60Ni, 62Ni, 200Pb,
 30S, 60Se, 150Se, 117Sn, 118Sn,
 119Sn, 122Sn, 60Sr, 172Yb, 174Yb,
 66Zn, 70Zr, 90Zr

277 Tata Institute of Fundamental Research
 Holiday Camp, Colaba
 Bombay 5, India
 114Cd, 144Hg, 200Hg, 201Hg, 204Hg,
 206Pb, 208Pb, 209Pb, 193Pt, 196Pt,
 198Pt

IRAN

278 Atomic Energy Organization of Iran
 Nuclear Research Centre
 P.O. Box 3327
 Tehran, Iran

44Ca, 50Cr, 63Cu, 56Fe, 202Hg, 61K,
 130La, 90Mo, 112Sn, 66Zn

279 University College
 Accounts Office
 Belfield, Dublin 4
 Ireland
 63Cu

ISRAEL

280 Government of Israel
 Ministry of Defense
 850 Third Avenue
 New York, New York 10022
 208Pb

281 Landseas Corporation
 1212 Avenue of the Americas
 New York, New York 10036
 155Gd, 70Ge, 70Ge, 143Nd, 145Nd,
 146Nd, 148Nd, 150Sm, 112Sn, 118Sn,
 130Te, Tgs

282 Tel-Aviv University
 Ramat-Aviv
 Tel-Aviv, Israel
 110Sn

ITALY

283 Euratom C.C.R.
 Ispra (Varese), Italy
 37Cl, 200Pb

284 Istituto Nazionale di Fisica Nucleare
 Largo E. Fermi 2
 50125 Florence, Italy
 100Ru, 102Ru

285 Padova, Università degli Studi di
 Via F. Marzolo 8
 Padova, Italy
 92Mo, 94Mo, 96Mo, 102Pd, 104Pd,
 106Pd

JAPAN

286 Daito Yakuin Kaisha, Limited
 13, 4-Chome, Nihonbashi-honcho,
 Chuo-ku, Tokyo,
 Japan
 6Li

287 Japan Atomic Energy Research Institute
 Tokai Research Establishment
 Tokai-Mura, Naka-Gun, Ibaraki-Ken
 Japan
 143Nd, 145Nd, 146Nd, 148Nd, SS, 103W

288 Japan Radioisotope Association
Hon-Komagocho 2 Chome 28
Bunkyo-Ku
Tokyo, Japan

^{107}Ag , ^{109}Ag , ^{133}Ba , ^{118}Ba , ^{130}Ba , ^{132}Ba ,
 ^{134}Ba , ^{136}Ba , ^{138}Ba , ^{90}Ce , ^{142}Ce , ^{144}Ce ,
 ^{106}Cd , ^{112}Cd , ^{113}Cd , ^{114}Cd , ^{116}Cd ,
 ^{140}Ce , ^{90}Cr , ^{52}Cr , ^{53}Cr , ^{54}Cr , ^{63}Cu ,
 ^{65}Cu , ^{164}Er , ^{166}Er , ^{151}Eu , ^{153}Eu ,
 ^{56}Fe , ^{57}Fe , ^{58}Fe , ^{59}Fe , ^{154}Gd ,
 ^{156}Gd , ^{70}Ge , ^{76}Ge , ^{174}Hf , ^{176}Hf ,
 ^{178}Hf , ^{180}Hf , ^{190}Hf , ^{201}Hg , ^{113}In ,
 ^{115}In , ^{7}Li , ^{6}Li , ^{174}Lu , ^{176}Lu , ^{25}Mg , ^{26}Mg ,
 ^{42}Mo , ^{94}Mo , ^{95}Mo , ^{98}Mo , ^{100}Mo ,
 ^{102}Mo , ^{104}Mo , ^{142}Nd , ^{144}Nd , ^{150}Nd ,
 ^{152}Nd , ^{154}Nd , ^{58}Ni , ^{60}Ni , ^{61}Ni , ^{62}Ni ,
 ^{64}Ni , ^{149}Os , ^{205}Pb , ^{207}Pb , ^{208}Pb , ^{106}Pd ,
 ^{108}Pd , ^{110}Pd , ^{194}Pt , ^{195}Pt , ^{197}Pt ,
 ^{74}Se , ^{121}Sb , ^{76}Se , ^{80}Se , ^{82}Se , ^{208}Si ,
 ^{210}Si , ^{30}Si , ^{144}Sm , ^{147}Sm , ^{150}Sm ,
 ^{152}Sm , ^{154}Sm , ^{156}Sm , ^{158}Sm , ^{117}Sn ,
 ^{119}Sn , ^{121}Sn , ^{123}Sn , ^{125}Sn , ^{127}Sn ,
 ^{129}Sn , ^{88}Sr , ^{86}Sr , ^{87}Sr , ^{89}Sr , ^{104}Y ,
 ^{106}Y , ^{88}Zn , ^{90}Zn , ^{92}Zn , ^{94}Zn ,
 ^{96}Zn , ^{98}Zn

289 Kansai Electronics Co., Ltd.
8 Toqanocho
Kitaku, Osaka, Japan

^{138}Ba , ^{153}Eu , ^{54}Fe , ^{6}Li , ^{132}Os ,
 ^{196}Pt , ^{144}Sm , ^{150}Sm , ^{124}Sn , ^{88}Sr , ^{120}Te ,
 ^{126}Te , ^{128}Te , ^{64}Zn , ^{66}Zn , ^{68}Zn

290 Marubeni America Corporation
14 Hendersen Drive
West Caldwell, N. J. 07006
 ^{6}Li

291 Sumitomo Corporation of America
875 N. Michigan Avenue
Chicago, Illinois 60611
 ^{112}Cd , ^{88}Sr , ^{120}Te , ^{207}Pb

NETHERLANDS

292 Fom Institute for Atomic and Molecular Physics
Kruislaan, The Netherlands
 ^{35}Cl

293 Reactor Centrum Nederland
Petten N. H., The Netherlands
 ^{109}Ag , ^{90}Ce , ^{113}In , ^{41}K , ^{6}Li , ^{174}Lu ,
 ^{26}Mg , ^{60}Ni , ^{185}Re , ^{123}Sb , ^{117}Sn ,
 ^{88}Sr , ^{68}Zn

294 Rijksinkoopbureau
(Netherlands Govt. Purchasing Office)
55 A Laan van Meerdervoort
The Hague, Netherlands
 ^{151}Dy , ^{166}Er , ^{150}Gd , ^{6}Li , ^{26}Mg ,
 ^{58}Ni , ^{74}Se , ^{30}Si , ^{120}Sn , ^{88}Sr , ^{120}Te ,
 ^{64}Ti , ^{66}Zn , ^{67}Zn

295 State University of Groningen
Westersingel 34
Groningen
The Netherlands
 ^{92}Ce , ^{106}Cd , ^{160}Dy , ^{164}Er , ^{152}Gd ,
 ^{154}Gd , ^{115}In , ^{191}Ir , ^{193}Ir , ^{144}Nd ,
 ^{62}Ni , ^{60}Ni , ^{190}Os , ^{102}Pd , ^{196}Pt ,
 ^{198}Pt , ^{100}Ru , ^{88}Se , ^{64}Ti , ^{170}Yb

296 University of Nijmegen
Faculty of Science
Toernooiveld
Nijmegen, The Netherlands

^{196}Pt

297 Vrije Universiteit
Amsterdam, The Netherlands
 ^{87}Sr , ^{88}Sr , ^{89}Sr , ^{120}Te , ^{126}Te

NEW ZEALAND

298 Massey University
Department of Chemistry, Biochemistry and Biophysics
Palmerston North
New Zealand
 ^{63}Cu

NORWAY

299 Institutt for Atomenergi
Kjeller, Norway
 ^{100}Mo , ^{208}Pb , ^{198}Pt

300 The University of Trondheim
Procurement Division
N. 7034 Trondheim NTH
Norway
 ^{35}Cl , ^{37}Cl

PORTUGAL

301 Junta de Energia Nuclear
Laboratorio de Fisica e Engenharia Nucleares
Estrada Nacional No. 10
Sacavem, Portugal
 ^{114}Sn

SCOTLAND

302 Glasgow, University of
Glasgow, W.2. Scotland
 ^{148}Nd , ^{149}Sm

SOUTH AFRICA

303 South African Atomic Energy Board
Private Bag 256
Pretoria, South Africa
 ^{88}Rb , ^{87}Rb , ^{86}Sr

304 Stellenbosch, University of
Stellenbosch, South Africa
 ^{37}Cl , ^{74}Se , ^{88}Sr

305 Witwatersrand University
Johannesburg, South Africa
 ^{142}Ce , ^{151}Dy , ^{167}Er , ^{153}Eu , ^{155}Gd ,
 ^{41}K , ^{138}La , ^{143}Nd , ^{144}Nd , ^{208}Pb , ^{87}Rb ,
 ^{150}Sm , ^{171}Yb

SWEDEN

306 Aktiebolaget Atomenergi
Studsvik,
Nyköping, Sweden

^{57}Fe , ^7Li

307 Chalmers University of Technology
Gibrallergatan 5-b
Gothenburg, Sweden

^6Li

308 Forskningsinstitutet för Atomfysik
Stockholm 50, Sweden

^{100}Er , ^{150}Gd , ^{178}Hf , ^{100}Mo , ^{150}Nd ,
 ^{147}Sm , ^{172}Yb , ^{176}Yb

309 University of Lund
Sölvegatan 14
Lund, Sweden
S-223 62

^{113}Cd , ^{199}Hg , ^{25}Mg , ^{207}Pb , ^{140}Sm ,
 ^{149}Sm , ^{119}Sn , ^{67}Zn

310 Uppsala, University of
Uppsala, Sweden

^{130}Ba , ^{136}Ba , ^{155}Gd , ^{138}La , ^{143}Nd ,
 ^{121}Sb , ^{123}Sb , ^{70}Zn

SWITZERLAND

311 Erlibourg, University of
1709 Fribourg, Switzerland

^{110}Pd , Tqs

312 European Organization of Nuclear Research
1211 Geneva 23, Switzerland

^{100}Yb

313 Swiss Federal Institute of Technology
Sonneggstrasse 5
CH-8006 Zurich, Switzerland

^{143}Nd , ^{87}Rb , ^{140}Sm

314 Swiss Institute for Nuclear Research
5234 Villigen, Switzerland

^{160}Gd

315 Zurich, der universität
8001 Zurich, Switzerland

^{142}Dy , ^{58}Ni , ^{60}Ni , ^{62}Ni , ^{30}S , ^{28}Si ,
 ^{150}Sm , ^{88}Sr , Tqs, ^{66}Zn , ^{68}Zn

VENEZUELA

316 Instituto Venezolano de
Investigaciones Científicas
Apartado 1827
Caracas, Venezuela

^{63}Cu

317 Ministerio de Energía y Minas
Caracas, Venezuela

^{135}Ba , ^{130}Ce , ^{161}Dy , ^{167}Er , ^{151}Eu ,
 ^{155}Gd , ^{138}La , ^{176}Lu , ^{140}Nd , ^{147}Sm ,
 ^{171}Yb

II. ALPHABETICAL LIST OF ISOTOPES, CROSS-REFERENCED TO CUSTOMER NUMBERS

A. DOMESTIC

Barium 134	Calcium 048
28	26, 61, 71, 135, 146
Barium 135	Cerium 136
28	15
Barium 136	Cerium 140
22, 28	83
Barium 137	Cerium 142
28	21, 100, 150
Barium 138	Chlorine 035
27, 28, 80, 92	16, 27, 61, 107
Boron 010	Chlorine 037
26, 27, 33, 42, 73, 152	33
Boron 011	Chromium 050
8, 15, 27, 28, 33, 70, 132	71, 124, 160
Bromine 079	Chromium 052
20, 105, 143, 147	8
Bromine 081	Chromium 053
20, 28, 105, 140	124, 134
Cadmium 106	Chromium 054
26, 71, 74, 76, 141	134
Cadmium 110	Copper 063
147	15, 43, 58, 126, 132, 135, 162
Cadmium 111	Copper 065
110	8, 15, 32, 43, 58, 71, 126, 134, 135
Cadmium 112	Dysprosium 158
71, 72, 162	94
Cadmium 113	Dysprosium 161
15, 23, 38, 101, 102, 115, 144, 162	85, 132, 150
Cadmium 114	Dysprosium 162
67, 71, 79, 83, 91, 109	132
Cadmium 116	Dysprosium 163
31	85, 132
Calcium 040	Dysprosium 164
28, 34, 61, 125, 136, 153	48, 74
Calcium 042	Erbium 166
8, 15, 21, 31, 118, 136, 151	60, 76, 132, 153
Calcium 043	Erbium 167
3, 162	15, 21, 132, 150
Calcium 044	Erbium 168
8, 48, 125, 151	8, 28, 60, 74, 76, 103
	Erbium 170
	48, 74, 83, 103

1113657

Europium 151

15, 21, 22, 24, 52, 61, 89, 117, 132, 141, 155

Europium 153

52, 61, 67, 141, 150

Gadolinium 154

75

Gadolinium 155

15, 61, 67, 82, 85, 150, 162

Gadolinium 156

15, 74, 162

Gadolinium 157

15, 28, 82

Gadolinium 158

8, 28, 61, 36

Gadolinium 160

8, 28, 61, 71, 92

Gadolinium High Purity 154

71, 74

Gallium 069

72, 111

Gallium 071

111

Germanium 070

15, 49, 118

Germanium 072

105

Germanium 073

102

Germanium 074

15, 28

Germanium 076

15, 102

Hafnium 174

65

Hafnium 176

27, 156

Hafnium 177

27, 156

Hafnium 179

22, 121

Hafnium 180

109

Indium 113

12, 15, 83

Iridium 191

132

Iridium 193

132

Iron 054

1, 7, 8, 17, 21, 28, 32, 71, 119, 132, 134

Iron 056

48, 160

Iron 057

8, 12, 15, 17, 24, 25, 48, 74, 78, 82, 109, 110, 119, 137, 139, 154, 155, 160

Iron 058

17, 32, 71, 79, 88, 132

Lanthanum 138

21, 22, 150

Lead 204

85, 132, 135

Lead 206

28, 108, 125, 132

Lead 207

20, 28, 61, 85, 115, 135

Lead 208

15, 17, 20, 26, 34, 70, 87, 108, 109, 132, 135, 150, 153

Lead High Purity 204

110, 120

Lithium 006

8, 9, 11, 15, 18, 24, 36, 41, 52, 54, 64, 70, 79, 88, 93, 95, 99, 103, 105, 112, 116, 125, 142, 153, 159, 160

Lithium 007

5, 6, 8, 9, 11, 15, 16, 27, 35, 36, 40, 61, 62, 64, 90, 104, 105, 106, 112, 114, 122, 149, 152, 158

Lutetium 176

22, 27, 34, 150

Magnesium 024

8, 15, 26, 75, 84, 132, 153

Magnesium 025

8, 21, 28, 43, 78, 89, 135, 144, 153, 162

Magnesium 026

8, 28, 71, 144, 153

Mercury 129	Nickel 062
50, 47, 143	79, 125, 132
Mercury 199	Nickel 064
13, 23, 57, 97, 113, 115, 129, 138	71
Mercury 200	Osmium 189
15, 97, 97	15, 45
Mercury 201	Osmium 190
13, 97, 113	15, 17, 45, 48, 55
Mercury 202	Osmium 192
13, 17, 57, 71, 87, 97, 148	15, 48, 83
Mercury 204	Palladium 102
13, 43, 71, 87, 97, 107, 113, 148	15, 33, 105
Molybdenum 92	Palladium 104
1, 15, 29, 51, 71	8, 33
Molybdenum 95	Palladium 105
51, 50, 161	8, 61, 111
Molybdenum 96	Palladium 106
8, 29, 71, 160	8, 15, 118
Molybdenum 97	Palladium 108
60	8, 15, 83, 118
Molybdenum 100	Palladium 110
1, 29, 37, 71	15
Neodymium 142	Platinum 195
15, 92, 132	61, 132
Neodymium 143	Platinum 196
132	48, 61, 87
Neodymium 144	Platinum 198
132	15, 33, 48, 87, 132
Neodymium 145	Potassium 039
132, 150	16, 61
Neodymium 146	Potassium 040
27, 44, 98, 132	2, 28, 34, 71, 132
Neodymium 148	Potassium 041
15, 53, 92, 98, 100	21, 22, 61, 83, 88, 108, 132, 135, 153
Neodymium 150	Rhenium 185
2, 8, 22, 53, 92, 98, 125	28
Nickel 058	Rhenium 187
9, 16, 43, 70, 71, 125, 132	15, 28
Nickel 060	Rubidium 085
15, 71, 96, 125, 132	56, 61, 69
Nickel 061	Rubidium 087
12, 21, 111	22, 33, 46, 56, 69, 97, 120, 150

Ruthenium 039

15, 45

Ruthenium 100

15

Ruthenium 102

15, 102

Ruthenium 104

87

Samarium 144

8, 61, 76, 78, 86, 125, 132

Samarium 147

22, 98

Samarium 148

8, 28, 61

Samarium 149

15, 150

Samarium 150

8, 61, 111

Samarium 152

28, 79, 100, 125, 132

Samarium 154

15, 28, 53, 61, 63, 132

Selenium 074

65, 71, 132

Selenium 076

8, 27, 29, 71

Selenium 077

12, 110, 115, 154

Selenium 078

128

Selenium 080

27, 154

Selenium 082

27

Silicon

132

Silicon 028

15, 28, 34, 61, 87, 103, 125, 132, 138, 153

Silicon 029

4, 15, 43, 74, 87, 98, 103, 118, 133, 133

Silicon 030

4, 14, 15, 43, 87, 98, 103

Silver 107

10, 15, 45, 71, 83, 103, 131

Silver 109

3, 103

Special Services

2, 8, 12, 13, 15, 17, 20, 23, 26, 27, 28, 34, 37, 39, 43, 55, 60, 71, 77, 83, 84, 85, 87, 88, 96, 100, 102, 103, 118, 125, 132, 151, 153

Strontium 084

22, 71, 108

Strontium 086

27

Strontium 087

27, 89

Sulfur 032

74, 109

Sulfur 033

82, 123, 130, 138

Sulfur 034

8, 12, 74, 82, 87

Target Preparation Stable

8, 22, 26, 27, 28, 30, 43, 48, 54, 61, 63, 66, 70, 71, 74, 75, 78, 82, 94, 95, 103, 105, 109, 125, 127, 132, 151, 159

Tellurium 122

8, 15, 47, 132, 135

Tellurium 123

28, 37

Tellurium 124

28, 37, 72

Tellurium 125

28, 31

Tellurium 126

15, 28, 83

Tellurium 128

28, 31, 135

Tellurium 130

15, 28, 29, 98

Thallium 203

20, 28, 37, 39, 59, 65, 81, 83, 85, 132

Thallium 205

20, 77, 132

Tin 112

26, 61, 132

Tin 116		Ytterbium 171	
30, 133		21, 61, 74, 132	
Tin 117		Ytterbium 172	
55		8	
Tin 118		Ytterbium 173	
28, 132, 151		74, 132, 150	
Tin 119		Ytterbium 174	
12, 23, 63, 111, 117, 145, 152		74	
Tin 120		Ytterbium 176	
8, 28		33, 48, 74, 100	
Tin 122		Zinc 064	
8, 15, 24		12, 82, 125, 132, 144	
Tin 124		Zinc 066	
8, 68, 80, 93, 132		8, 125, 132	
Titanium 046		Zinc 067	
17, 21, 22, 28		55, 83, 89, 102, 134, 143	
Titanium 047		Zinc 068	
17		8, 71, 72, 81, 125, 132	
Titanium 048		Zinc 070	
22, 28, 43		19, 71, 76, 134	
Titanium 049		Zinc High Purity 70	
17		63	
Titanium 050		Zirconium 090	
17, 28		26, 71, 125, 157	
Tungsten 180		Zirconium 091	
17, 83		17, 157	
Tungsten 182		Zirconium 092	
28, 61, 71		61, 95, 127	
Tungsten 183		Zirconium 094	
28, 61, 71, 92		74	
Tungsten 184		Zirconium 096	
15, 28, 132		17	
Tungsten 186			B. FOREIGN
15, 28, 61, 87			
Tungsten High Purity 180		Antimony 121	
12, 132		288, 310	
Vanadium 050		Antimony 123	
82		293, 310	
Ytterbium 168		Barium 130	
83, 132		288	
Ytterbium 170		Barium 132	
8, 74		229, 267, 288	

Barium 134

246, 250, 253, 288, 310

Barium 135

190, 225, 253, 317

Barium 136

246, 250, 253, 267, 288, 310

Barium 137

246, 253

Barium 138

234, 250, 237, 288, 289

Boron 010

185, 191, 192, 235, 271, 288

Boron 011

192, 288

Bromine 079

179, 248

Bromine 081

179, 188, 272

Cadmium 106

185, 198, 288, 295

Cadmium 110

192, 250, 253

Cadmium 111

185

Cadmium 112

288, 291

Cadmium 113

179, 242, 233, 236, 253, 288, 309

Cadmium 114

253, 267, 288

Cadmium 116

253, 276, 277, 288

Calcium 040

234, 262, 254, 288

Calcium 042

169, 218, 234, 242, 249, 264, 267, 238, 295

Calcium 043

267

Calcium 044

169, 176, 189, 218, 229, 234, 249, 251, 264, 267, 278, 288, 293

Calcium 046

179, 215

Calcium 048

169, 230, 253, 264

Cerium 136

317

Cerium 140

165, 223, 234, 243, 253, 288

Cerium 142

173, 185, 248, 253, 268, 275, 276, 305

Chlorine 035

170, 186, 214, 233, 246, 248, 292, 300

Chlorine 037

186, 233, 272, 283, 300, 304

Chromium 050

169, 172, 189, 199, 229, 234, 239, 259, 278, 288

Chromium 052

169, 176, 205, 234, 288

Chromium 053

169, 172, 196, 288

Chromium 054

176, 259, 288

Copper 063

232, 233, 270, 276, 278, 279, 288, 316

Copper 065

276, 288, 298

Dysprosium 156

251

Dysprosium 158

229, 273

Dysprosium 160

231, 253, 295

Dysprosium 161

173, 185, 253, 268, 294, 305, 317

Dysprosium 162

223, 253, 315

Dysprosium 163

253

Dysprosium 164

253

Erbium 164

165, 253, 288, 295

Erbium 166

214, 253, 276, 288

Erbium 167

165, 173, 185, 253, 268, 305, 317

Erbium 168

165, 167, 217, 218, 236, 253, 294, 308

Erbium 170

165, 246, 253, 276

Europium 151

169, 175, 225, 231, 246, 253, 276, 288, 317

Europium 153

169, 173, 175, 185, 233, 246, 253, 268, 288, 289, 305

Gadolinium 152

168, 178, 257, 295

Gadolinium 154

246, 253, 295

Gadolinium 155

173, 185, 225, 246, 250, 259, 268, 291, 310, 317

Gadolinium 156

178, 190, 253, 276, 288

Gadolinium 157

233, 253, 295

Gadolinium 158

246, 253, 300

Gadolinium 160

165, 246, 247, 250, 253, 259, 275, 276, 288, 294, 314

Gadolinium High Purity 154

259

Gadolinium High Purity 155

259, 305

Gallium 069

276

Germanium 070

213, 233, 260, 288

Germanium 072

213, 231, 233, 253, 260

Germanium 073

213, 224, 236

Germanium 074

213, 233, 275, 281

Germanium 076

165, 211, 213, 224, 231, 251, 260, 281, 288

Hafnium 174

288

Hafnium 176

267, 288

Hafnium 178

233, 267, 308

Hafnium 179

218, 242, 253, 288

Hafnium 180

199, 213, 267, 288

Indium 113

246, 288, 293

Indium 115

295

Iridium 191

256, 295

Iridium 193

256, 295

Iron 054

190, 204, 205, 209, 217, 224, 234, 288, 289

Iron 056

250, 288

Iron 057

172, 204, 216, 242, 265, 274, 288, 306

Iron 058

176, 213, 239, 278, 288

Lanthanum 138

173, 185, 233, 246, 305, 310, 317

Lanthanum 139

278

Lead 204

185, 231, 276, 277, 283, 288

Lead 206

208, 246, 277, 288

Lead 207

195, 196, 208, 288, 309

Lead 208

178, 194, 199, 201, 208, 225, 231, 243, 251, 267, 275, 277, 280, 288, 299

Lead High Purity 204

201, 215, 288, 305

Lead High Purity 207

288

Lithium 006

165, 171, 184, 185, 190, 193, 203, 217, 222,
227, 244, 250, 256, 261, 264, 257, 175,
286, 288, 289, 290, 293, 294, 307

Lithium 007

165, 193, 214, 221, 246, 256, 261, 265, 288,
306

Lutetium 175

180, 225

Lutetium 176

173, 180, 185, 229, 268, 288, 293, 317

Magnesium 024

165, 240, 259, 288, 294

Magnesium 025

169, 176, 224, 259, 276, 288, 309

Magnesium 026

185, 218, 253, 259, 264, 276, 288, 293

Mercury 196

189, 229, 239, 253

Mercury 198

165, 190, 277, 283

Mercury 199

202, 309

Mercury 200

165, 190, 250, 277

Mercury 201

190, 260, 277, 288

Mercury 202

165, 213, 241, 278

Mercury 204

165, 190, 219, 241, 246, 277

Molybdenum 092

182, 198, 203, 213, 218, 253, 264, 235, 288

Molybdenum 094

175, 213, 218, 237, 253, 264, 276, 285, 288

Molybdenum 095

166, 213, 253, 288

Molybdenum 096

186, 203, 213, 264, 285, 288

Molybdenum 097

213, 288

Molybdenum 098

166, 186, 203, 213, 260, 264, 278, 288, 299

Molybdenum 100

186, 203, 213, 237, 260, 264, 288, 308

Neodymium 142

199, 234, 246, 276, 288

Neodymium 143

185, 190, 199, 212, 223, 234, 251, 276, 281,
287, 305

Neodymium 144

190, 234, 288

Neodymium 145

173, 199, 246, 247, 268, 281, 287, 302, 310,
313

Neodymium 146

234, 276, 281, 287, 295, 305, 317

Neodymium 148

246, 276, 281, 287, 288

Neodymium 150

165, 174, 185, 201, 223, 246, 248, 276, 288,
308

Nickel 058

224, 229, 231, 253, 255, 264, 276, 288, 294,
315

Nickel 060

169, 209, 231, 264, 276, 288, 315

Nickel 061

196, 204, 224, 247, 259, 265, 288

Nickel 062

169, 183, 189, 231, 253, 259, 264, 276, 288,
295, 315

Nickel 064

165, 257, 264, 288, 293, 295

Osmium 189

267, 288

Osmium 190

233, 295

Osmium 192

165, 233, 253, 289

Palladium 102

285, 295

Palladium 104

253, 285, 288

Palladium 105

178

Palladium 106

238, 247, 265, 285, 288

Palladium 118

218, 278, 247, 288, 299

Palladium 119

204, 238, 253, 275, 311

Platinum 195

225, 259, 277

Platinum 196

225, 233, 259, 263, 269, 277, 288, 289, 295, 296

Platinum 198

204, 211, 233, 251, 253, 259, 277, 295

Potassium 039

197, 205

Potassium 040

194, 233, 236

Potassium 041

173, 176, 196, 194, 253, 265, 278, 288, 293, 305

Rhenium 185

164, 225, 233

Rhenium 187

225

Rubidium 085

197, 288, 333

Rubidium 087

188, 201, 236, 237, 248, 288, 303, 305, 313

Ruthenium 099

225, 259, 265

Ruthenium 100

284, 295

Ruthenium 102

262, 284

Ruthenium 104

181, 262

Samarium 144

164, 198, 218, 233, 234, 246, 259, 267, 288, 289

Samarium 147

174, 201, 253, 259, 267, 288, 308, 317

Samarium 148

169, 253, 259, 267, 288, 309

Samarium 149

173, 185, 199, 212, 223, 246, 253, 268, 288, 302, 305, 309, 313

Samarium 150

169, 253, 259, 267, 281, 288, 289, 315

Samarium 152

165, 169, 187, 199, 200, 217, 253, 288

Samarium 154

165, 169, 199, 218, 231, 246, 253, 259, 275, 276, 288

Samarium High Purity 150

199, 234

Selenium 074

239

Selenium 076

259

Selenium 077

163, 196, 254, 259

Selenium 078

259, 288

Selenium 080

259, 275, 276, 288, 295

Selenium 082

180, 224, 259, 288

Silicon 028

202, 224, 288, 315

Silicon 029

176, 213, 224, 229, 267, 268, 288

Silicon 030

224, 233, 234, 248, 252, 258, 267, 268, 288, 294

Silver 107

245, 276, 288

Silver 109

213, 276, 288, 293

Special Services

166, 169, 178, 189, 190, 198, 199, 218, 224, 226, 229, 233, 234, 239, 250, 251, 255, 259, 267, 287, 288, 289, 291, 297, 304

Strontium 084

190, 201, 233, 276, 288, 293, 303

Strontium 086

253, 294, 315

Strontium 087

253, 297

Strontium 088

297

Sulfur 032

186

Sulfur 033

224, 228, 267

Sulfur 034

165, 169, 186, 204, 233, 276, 288, 294, 304, 315

Target Preparation Stable

167, 169, 175, 177, 183, 184, 190, 198, 199, 203, 208, 214, 220, 225, 226, 232, 233, 234, 237, 238, 242, 243, 244, 246, 247, 250, 251, 252, 253, 259, 262, 263, 264, 267, 269, 271, 281, 288, 289, 297, 311, 315

Tellurium 122

229, 244

Tellurium 124

180, 185, 186, 233, 246, 250, 289, 291, 297

Tellurium 125

210, 246, 259

Tellurium 126

246, 288, 289

Tellurium 128

190, 199, 246, 250, 259, 288, 289, 294

Tellurium 130

190, 246, 253, 259, 267, 281, 288

Thallium 203

189, 229, 291

Thallium 205

189

Tin 112

198, 246, 264, 278, 281, 288

Tin 114

281

Tin 115

293

Tin 116

264, 288, 301

Tin 117

196, 276, 288

Tin 118

184, 209, 234, 276, 288

Tin 119

231, 276, 282, 288, 309

Tin 120

190, 264, 288, 294

Tin 122

190, 234, 253, 264, 276, 288

Tin 124

190, 209, 231, 246, 251, 264, 289

Titanium 046

169, 176, 214, 218, 253, 288, 294, 295

Titanium 047

169, 253, 288

Titanium 048

169, 176, 214, 234, 251, 253, 264, 288

Titanium 049

169, 253, 288

Titanium 050

169, 205, 214, 251, 253

Tungsten 180

288

Tungsten 182

253

Tungsten 183

166, 253, 287, 288

Tungsten 184

226

Tungsten 186

169, 275

Ytterbium 168

229, 239, 259, 312

Ytterbium 170

165, 190, 246, 295

Ytterbium 171

165, 173, 185, 190, 234, 268, 305, 317

Ytterbium 172

165, 246, 276, 308

Ytterbium 173

165, 223, 242, 253

Ytterbium 174

165, 190, 246

Ytterbium 176

246, 276, 308

Zinc 064

186, 205, 209, 220, 278, 288, 289, 294, 315

Zinc 066

186, 289, 315

Zinc 067

185, 204, 234, 309

Zinc 068

185, 250, 253, 276, 293

Zinc 070

288

Zinc High Purity 70

288, 310

Zirconium 090

218, 233, 343, 276, 288, 289

Zirconium 091

288

Zirconium 092

218, 232, 243, 288

Zirconium 096

276, 288

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

A. DOMESTIC		Massachusetts	
		38, 50, 55, 71, 83, 117, 142	
Alabama		Michigan	
3		13, 35, 44, 62, 74, 75, 154	
Alaska		Minnesota	
4		78, 90	
Arizona		Missouri	
9		79	
Arkansas		New Hampshire	
10		99	
California		New Jersey	
17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 37, 40, 46, 53, 56, 57, 65, 69, 72, 93, 116, 118, 136, 146		6, 12, 39, 100, 106, 111, 113, 120, 130, 133	
Colorado		New Mexico	
32, 33, 77, 110		28, 84, 112	
Connecticut		New York	
149, 141, 152		15, 16, 34, 36, 45, 85, 86, 87, 109, 119, 131	
District of Columbia		North Carolina	
30, 47, 51, 58, 82, 128, 133		43, 88, 89	
Florida		Ohio	
48, 49, 81		31, 54, 55, 94, 95, 96, 148	
Georgia		Oregon	
52		98, 104, 121	
Idaho		Pennsylvania	
2		29, 101, 102, 103, 129, 156, 157, 158	
Illinois		South Carolina	
7, 8, 50, 91		114, 115	
Indiana		Tennessee	
61, 92, 107		73, 122, 123, 132, 147	
Iowa		Texas	
63, 64		1, 11, 41, 42, 80, 124, 125, 126, 127, 144, 152	
Kansas		Utah	
67		145	
Kentucky		Virginia	
68		135, 149, 150, 151	
Louisiana		Washington	
134, 143		76, 100, 153, 159	
Maine		West Virginia	
14		155	
Maryland		Wisconsin	
66, 70, 97, 137, 139		5, 160, 161	

d. FOREIGN

Argentina

163

Australia

164, 165, 166, 167, 168, 169, 170, 171, 172,
173, 174

Austria

175

Bangladesh

176

Belgium

177, 178, 179, 180, 181, 182, 183, 184

Brazil

185, 186

Canada

187, 188, 189, 190, 191, 192, 193, 194, 195,
196, 197, 198, 199, 200, 201, 202, 203, 204,
205, 206, 207, 208, 209, 210, 211, 212, 213

Denmark

214, 215, 216, 217, 218

England

219, 220, 221, 222, 223, 224, 225, 226, 227,
228, 229, 230, 231

Finland

232

France

233, 234, 235, 236, 237, 238

Germany

239, 240, 241, 242, 243, 244, 245, 246, 247,
250, 252, 253, 254, 255, 256, 257, 259, 260,
261, 262, 263, 264, 265, 266, 267, 268, 270,
273

Greece

274

India

275, 276, 277

Iran

278

Ireland

279

Israel

280, 281, 282

Italy

283, 284, 285

Japan

286, 287, 288, 289, 290, 291

Netherlands

292, 293, 294, 295, 296, 297

New Zealand

298

Norway

299, 300

Portugal

301

Scotland

302

South Africa

303, 304, 305

Sweden

306, 307, 308, 309, 310

Switzerland

311, 312, 313, 314, 315

Venezuela

316, 317

West Germany

248, 249, 251, 258, 269, 271, 272

IV. STABLE ISOTOPE SALES - FY 1979

ISOTOPE	SHIP	DOMESTIC MILLIGRAMS	DOLLARS	SHIP	FOREIGN MILLIGRAMS	DOLLARS	SHIP	PROJECT MILLIGRAMS	DOLLARS	SHIP	TOTAL MILLIGRAMS	DOLLARS
ANTIMONY-121				3	585.7	820	3			3	585.7	820
ANTIMONY-123				3	125.7	176	3			3	125.7	176
BARIUM-130				1	405.0	5830	1			1	405.0	5830
BARIUM-132				7	4448.0	11197	1	40.0	106	8	4488.0	11303
BARIUM-134				4	1150.0	1610	1	100.0	85	4	1150.0	1610
BARIUM-135				7	13928.0	11838	1			2	14087.0	11973
BARIUM-136				2	300.0	150	2			2	300.0	150
BARIUM-137				2	34000.0	2800	2			2	34000.0	2800
BARIUM-138				9	594000.0	5505	2	8633.0	77	15	594000.0	20285.7
BORON-10				2	13000.0	2316	9	41900.0	1560	18	173100.0	3384
BORON-11				4	3080.0	4600	2			6	4516.0	6393
BROMINE-81				3	780.0	630	1	250.0	200	7	1950.0	1506
BROMINE-106				3	345.0	6006	2	83.0	1589	12	488.0	9345
CADMIUM-110				5	760.0	540	1			4	631.4	590
CADMIUM-111				1	83.0	53	1	100.0	65	2	183.0	118
CADMIUM-112				5	10520.0	4775				9	15245.0	7216
CADMIUM-113				6	360.0	3110				23	6230.0	5624
CADMIUM-114				6	6070.0	2044				12	9170.0	3850
CADMIUM-116				5	326.1	84				6	6143.1	297
CALCIUM-40				14	324.0	684	1	700.0	210	16	2719.0	20855
CALCIUM-42				34	19437	11837	3	800.0	3815	33	19437	14805
CALCIUM-43				31	1574	1415	1			32	1574	1415
CALCIUM-44				37	576	6465	1	600.0	740	38	4145.0	17468
CALCIUM-46				37	3495.0	5037	1			38	4145.0	17468
CALCIUM-48				2	25.0	5037	2	2399.1	389995	11	2552.1	50377
CALCIUM-49				5	95.0	14900	2	80.0	1052	7	84.0	353066
CERIUM-136				1	300.0	305				1	300.0	1397
CERIUM-140				1	5580.0	350				1	5580.0	1500
CERIUM-142				8	438.0	788	2	500.0	900	10	1006.0	1810
CHLORINE-35				12	14900.0	5215	1	1000.0	350	16	17042.0	5965
CHLORINE-37				17	1110.0	8214				8	1135.0	8399
CHROMIUM-50				16	4174.0	15156				19	4270.0	15521
CHROMIUM-52				5	550.0	375				5	550.0	375
CHROMIUM-53				4	483.0	290				7	766.0	460
CHROMIUM-54				3	190.0	1249				4	210.0	1491
COPPER-63				11	17500.0	2625	2	400.0	100	17	24886.0	3412
COPPER-65				13	1170.0	351	2	5904.0	1911	12	9098.0	2869
DYSPROSIUM-156				1	300.0	5445				1	300.0	5445
DYSPROSIUM-158				3	60.0	777				3	60.0	7557
DYSPROSIUM-160				3	213.0	480				3	213.0	480
DYSPROSIUM-161				7	1130.0	363	1	80.0	50	9	1352.0	463
DYSPROSIUM-162				3	425.0	170	1	20.0	50	4	445.0	220
DYSPROSIUM-163				1	200.0	80	1	80.0	50	2	280.0	130
DYSPROSIUM-164				1	200.0	50				3	420.0	150
ERBIUM-164				4	330.0	924				4	330.0	924
ERBIUM-166				6	1286.0	300	1	20.0	50	9	2156.0	477
ERBIUM-167				7	1400.0	350	1	100.0	50	10	1950.0	512
ERBIUM-168				8	3200.0	680	1	1582.0	375	12	5432.0	1215
EUROPIUM-151				11	666.0	260				8	1286.0	470
EUROPIUM-153				12	10580.0	4779	3	2136.0	986	21	14101.0	6389
GADOLINIUM-152				4	9014.0	4069				17	9948.2	4489
GADOLINIUM-154				4	220.0	3483				4	220.0	3483
GADOLINIUM-155				9	350.0	1800				14	425.0	1980
GADOLINIUM-156				5	1757.0	3110				19	2415.0	4262
GADOLINIUM-157				2	1900.0	1525	2	406.0	325	3	2506.0	2000
GADOLINIUM-158				2	660.0	759				3	960.0	1104
GADOLINIUM-159				4	785.0	471	2	600.0	360	3	1710.0	1061

11113670

ISOTOPE	SHIP	DOMESTIC MILLIGRAMS	DOLLARS	SHIP	FOREIGN MILLIGRAMS	DOLLARS	SHIP	PROJECT MILLIGRAMS	DOLLARS	SHIP	TOTAL MILLIGRAMS	DOLLARS
GADOLINIUM-160	3	603.0	540	14	30060.0	27054	2	400.0	360	19	31060.0	27954
GALLIUM-69	2	1103.0	500	1	500.0	225				3	1600.0	725
GALLIUM-71	1	53.0	50		3900.0	977	2	1030.0	300	9	5330.0	1377
GERMANIUM-70	2	403.0	100	5	3750.0	762				6	4000.0	612
GERMANIUM-72	1	253.0	50	5	7550.0	992	2	3050.0	500	7	12046.0	1888
GERMANIUM-73	1	143.0	896	5	8900.0	1352	1	200.0	1194	11	570.0	1852
GERMANIUM-74	1	133.0	1059	9	6400.0	5216				3	683.0	7469
GERMANIUM-76	2	763.0	9346	1	1470	500	1	50.0	610	2	80.0	10816
H.P. GD-154				2	100.0	335				1	100.0	335
H.P. GD-155				1	100.0	335				1	100.0	335
H.P. GD-157				1	125.0	1525				1	150.0	277
H.P. LEAD-204				1	150.0	277				1	170.0	1266
H.P. LEAD-207				1	170.0	1266				2	16.0	2738
H.P. SM-150				4	6.0	929				3	10.5	1390
H.P. ZINC-70				2	10.0	1076				3	225.0	6318
MAFNIUM-176	1	1.0	314	2	420.0	5296	1	100.0	1022	3	520.0	476
MAFNIUM-177	1	1.5					2	225.0	476	3	1080.0	1458
MAFNIUM-178	2	125.0	245	5	1080.0	1458				7	1400.0	1890
MAFNIUM-179	1	43.0	275	4	1360.0	1836	1	30.0	396	8	1509.0	18483
MAFNIUM-180	1	319.0	2775	6	1160.0	15312				1	200.0	100
INDIUM-113	1			1	200.0	100	2	600.0	750	4	760.0	950
INDIUM-115	2			2	160.0	136	1	1732.0	2158	3	660.0	8661
IRIDIUM-191	10	2865.0	5158	13	731.0	1343	3	675.0	4492	24	5329.0	1140
IRON-54	2	1703.0	100	19	10400.0	1040	4	1.0	50	10	11400.0	24029
IRON-56	17	1813.0	10845	7	980.0	8692				17	3474.0	16723
IRON-57	10	282.0	11400	1223	140.0	5273	1			10	423.0	3043
IRON-58	3	39.2	1223	1	45.0	1820				1	55.0	50
LANTHANUM-138	2	23.0	111	1	395.0	2192	1	50.0	277	9	465.0	2580
LANTHANUM-139	2	259.0	176	6	450.0	2045	1	411.0	1768	8	4850.0	4059
LEAD-206	5	2925.0	1429	19	620.0	310				11	5631.0	2326
LEAD-207	4	10936003.0	19081	12	1425000.0	1212	10	75700.0	2010	103	24179700.0	37546
LEAD-208	48	184816003.0	19081	12	1425000.0	1212	8	650000.0	478	148	184816000.0	1856681
LITHIUM-6	4	153.0	4104	6	102.0	607	4	200.0	1150	14	350.0	122
LITHIUM-7	2	1793.0	595	6	2485.0	869	5	1620.0	610	13	452.0	5862
MAGNESIUM-24	10	2103.0	4200	8	1050.0	2100	2	720.0	700	20	5805.0	2074
MAGNESIUM-26	3	453.0	515	12	5308.0	9575	4	720.0	1338	19	3500.0	7000
MERCURY-196	4	142.0	1631	4	190.0	2423				4	6478.0	11729
MERCURY-198	4	403.0	5411	2	50.0	665	1	100.0	395	8	197.0	126683
MERCURY-199	8	123.0	474	2	240.0	948				10	330.0	4054
MERCURY-200	2	312.0	2467	4	170.0	2796				17	460.0	6076
MERCURY-201	4	363.0	5122	4	1050.0	1989				8	320.0	1817
MERCURY-202	6	550.0	5583	8	1050.0	14563	3	3500.0	1050	18	493.0	5264
MERCURY-204	10	550.0	480	9	193.2	190				10	1600.0	20146
MOLYBDENUM-92	4	1603.0	194	15	851.0	580				15	5293.2	1720
MOLYBDENUM-94	3	645.5	325	5	2886.0	910				8	851.0	580
MOLYBDENUM-96	4	125.0	50	6	640.0	250				10	3532.5	1104
MOLYBDENUM-97	1			2	250.0	100				3	1940.0	575
MOLYBDENUM-98	4	11003.0	5500	7	21048.0	26350				10	21040.0	26350
MOLYBDENUM-100					900.0	550				11	11500.0	6050

256729

4822 202

31836 24

22004 72

9+L 101

1113671

ISOTOPE	SHIP	DOMESTIC MILLIGRAMS	DOLLARS	SHIP	FOREIGN MILLIGRAMS	DOLLARS	SHIP	PROJECT MILLIGRAMS	DOLLARS	SHIP	TOTAL MILLIGRAMS	DOLLARS
NEODYMIUM-142	2	113.0	218	8	1650.0	3052	2	230.0	425	12	1598.0	3696
NEODYMIUM-143				10	1520.5	1216	1	60.0	150	11	1580.5	1266
NEODYMIUM-144				9	1366.0	1410	1	55.0	163	11	1421.0	511
NEODYMIUM-145				9	1332.6	1410	1	60.0	63	11	1440.6	1523
NEODYMIUM-146	1	43.0	50	6	1253.0	564	2	1055.0	510	10	2620.0	1204
NEODYMIUM-147	2	312.0	140	6	830.0	1079	2	700.0	910	18	1919.0	2364
NEODYMIUM-148	2	289.0	375	12	3377.0	4054	1	400.0	480	19	4153.0	4885
NEODYMIUM-150	5	376.0	451	12	47234.0	7234	1	2000.0	3000	16	51809.0	7449
NICKEL-58	7	4575.0	715	13	27853.3	4261	1	2798.0	3942	10	49086.3	7431
NICKEL-60	2	1131.0	170	13	200.0	1817				10	21172.7	1773
NICKEL-61	2	16.0	-443	16	16224.7	36304				11	540.0	4469
NICKEL-62	2	2150.0	4622	14	430.0	4902				11	466.0	6391
NICKEL-64	2	113.0	1489	19	300.0	795				7	1488.0	1221
OSMIUM-180	2	153.0	390	2	150.0	262	1	238.0	415	7	1468.0	2009
OSMIUM-182	4	1103.0	1931	2	1348.0	1415	1	150.0	157	6	130.0	1730
OSMIUM-184	2	153.0	157	5	85.0	1440				4	130.0	203
PALLADIUM-102	2	43.0	762	2	170.0	350	1	100.0	200	5	725.0	750
PALLADIUM-104	2	30.0	60	3	580.0	554	1	200.0	200	3	1180.0	1094
PALLADIUM-105	2	523.0	550	5	526.0	500	2	300.0	370	9	1501.0	1531
PALLADIUM-106	2	303.0	270	6	1256.5	2411	4	450.0	337	18	1306.5	2506
PALLADIUM-108	8	925.0	693	8	1450.0	2084	1	540.0	350	10	2390.0	1460
PALLADIUM-110				5	2390.0	3487	3			16	1995.0	2469
PLATINUM-195	2	403.0	240	10	1395.0	2084	2	420.0	763	16	631.0	4700
PLATINUM-196	4	413.0	405	12	265.0	110				4	72.1	220
PLATINUM-198	4	183.0	450	10	49.2	49.2	1	2.0	421	6	1447.0	13936
POTASSIUM-39	2	365.0	110	2	563.0	3403	1	10.0	64	26	270.0	250
POTASSIUM-40	2	21.9	4016	3	280.0	200	1	18.0	50	4	592.0	207
POTASSIUM-41	13	1074.0	6868	3	150.0	52	2	42.0	155	7	1870.0	561
RHENIUM-185				1	100.0	330				32	6924.0	24239
RHENIUM-187	4	770.0	231	1	100.0	1377				5	500.0	625
RUBIDIUM-85	17	3159.0	11061	15	365.0	495	1	100.0	165	3	300.0	480
RUBIDIUM-87	1	103.0	165	3	300.0	320	1	100.0	160	4	400.0	240
RUTHENIUM-99				3	300.0	150				4	500.0	475
RUTHENIUM-100	1	103.0	60	3	280.0	350	3	460.0	380	19	2831.0	1898
RUTHENIUM-102	3	103.0	95	13	280.0	1756				11	2500.0	675
RUTHENIUM-104	1	393.0	-247	3	280.0	525				10	3708.0	1112
SAMARIUM-147	3	603.0	150	9	2331.6	525	2	1075.0	322	15	3208.0	1122
SAMARIUM-148	1	503.0	150	7	2300.0	600	1	200.0	50	10	3200.0	800
SAMARIUM-149	1	203.0	150	13	1796.0	87	1	250.0	112	12	2386.0	1222
SAMARIUM-150	1	353.0	162	9	5601.0	660	3	1900.0	260	15	10634.0	1390
SAMARIUM-152	3	3133.0	469	9	5764.0	934	2	845.0	173	19	7724.0	1283
SAMARIUM-154	3	1133.0	175	14	200.0	2010	6	98.0	10310	11	305.0	31060
SELENIUM-74	3	7.0	732	2	300.0	1180	3	320.0	2430	6	590.0	4023
SELENIUM-76	2	73.0	413	1	195.0	2123	1	30.0	310	7	839.0	-17631
SELENIUM-77	2	57.0	-20084	4	700.0	1062	1	589.0	551	3	956.0	1613
SELENIUM-78	1	55.0	50	2	162.0	1625	1	200.0	1675	7	362.0	6438
SELENIUM-80				5	136.0	4753	1	1324.0	1125	5	4274.0	3632
SELENIUM-82				4	1300.0	1105	3	200.0	1125	16	3960.0	3632
SILICON-28	8	1653.0	1402	5	2500.0	1724	1	400.0	760	20	3960.0	10728
SILICON-29	10	983.0	2747	13	2500.0	13570	1	200.0	727	26	3726.0	18574
SILICON-30	7	846.0	4277	15	1000.0	13570	1	550.0	220	11	4350.0	1740
SILVER-107	1	103.0	960	3	1033.0	560	1	1000.0	600	6	2183.0	1310
SILVER-109	3	3.0	415	4	49.0	2545	1	4070.0	1314	11	57.0	2901
STRONTIUM-84				6	700.0	350				13	4770.0	1604
STRONTIUM-86	1	103.0	50	2	500.0	295	2	12000.0	3633	5	12690.0	3576
STRONTIUM-87	2	323.0	144	1	120.0	54				3	440.0	196

1113672

ISOTOPE	SHIP	DOMESTIC MILLIGRAMS	DOLLARS	SHIP	FOREIGN MILLIGRAMS	DOLLARS	SHIP	PROJECT MILLIGRAMS	DOLLARS	SHIP	TOTAL MILLIGRAMS	DOLLARS
SULFUR-33	4	47.0	1539	4	255.0	5938	1	200.0	650	8	302.0	7477
SULFUR-34	2	147.0	481	12	961.9	3126	3	184.0	2676	18	1308.9	4257
TELLURIUM-122	2	213.0	5040	12	500.0	5040				7	874.0	12756
TELLURIUM-123	1	103.0	1000							1	100.0	1000
TELLURIUM-124	6	2600.0	21822	11	15700.0	129940	17			17	41700.0	348762
TELLURIUM-125	1	43.0	101			1350	5	395.0	118	5	645.0	1451
TELLURIUM-126	1	503.0	150	4	835.0	251	1			6	1730.0	519
TELLURIUM-128	1	665.0	100	11	5640.0	936	13	1000.0	150	13	6306.0	1036
TELLURIUM-130	2	1203.0	140	5	3600.0	610	1	50.0	52	11	5800.0	940
TELLURIUM-203	15	40860.0	429030	8	56000.0	58800	21			21	464650.0	487882
THALLIUM-205	4	3722.0	16749	1	1000.0	450	5			5	38222.0	17199
TIN-112	1	103.0	1935	6	390.0	6714	9	169.0	2033	9	659.0	10682
TIN-114	1			1	5.0	150	1			1	10.0	150
TIN-115	1	153.0	52	1	443.0	497	1	1000.0	350	5	1593.0	467
TIN-116	1	60585.0	30293	3	950.0	340	4			4	61536.0	30673
TIN-117	1	45.0	30	7	1410.0	1551	1	4000.0	2977	9	5455.0	4578
TIN-118	8	10373.0	3111	9	850.0	2053	17			17	17220.0	5166
TIN-119	1			9	2600.0	1050	1	300.0	120	7	2000.0	1170
TIN-120	1			9	2600.0	1120	2	847.0	552	9	2447.0	1712
TIN-122	3	710.0	355	9	19540.0	9770	13	300.0	150	13	20550.0	10275
TITANIUM-46	3	683.0	979	5	885.0	1095	1	125.0	143	12	1595.0	2217
TITANIUM-47	1	43.0	50	5	505.0	625	4			4	540.0	675
TITANIUM-48	1	967.0	268	2	2105.0	755	11			11	3073.0	1045
TITANIUM-49	1	43.0	68	3	500.0	745	4			4	540.0	1045
TITANIUM-50	1	63.0	120	6	20600.0	33185	8	212.0	353	8	20852.0	33602
TUNGSTEN-180	2	63.0	720	1	400.0	360	3			3	120.0	1080
TUNGSTEN-182	2	183.0	645	2	1184.0	430	4			4	1000.0	1250
TUNGSTEN-184	3	513.0	230	3	700.0	245	6			6	3027.0	1050
TUNGSTEN-186	2	53.0	607	2	260.0	117	1	112.0	427	1	1916.0	575
VANADIUM-50	1	73.0	1422	7	540.0	25812	2	21.0	965	19	636.0	28270
VITRERIUM-168	1	103.0	680	4	530.0	3724	1	100.0	510	1	705.0	4914
VITRERIUM-170	3	303.0	450	8	863.0	431	12	1500.0	50	12	1603.0	491
VITRERIUM-171	1			4	675.0	270	7			7	2175.0	870
VITRERIUM-172	2	375.0	150	4	2125.0	850	5	100.0	50	5	2600.0	1050
VITRERIUM-173	1	303.0	190	4	1300.0	325	5	900.0	270	5	1600.0	400
VITRERIUM-174	3	487.0	415	8	1036.0	311	2	320.0	245	2	2423.0	771
VITRERIUM-176	4	203.0	130	2	4420.0	1989	10	513.0	5306	10	5270.0	2454
ZINC-66	1	629.0	2437	4	314.5	1220	15	942.5	245	15	1120.0	765
ZINC-67	9	40287.0	54427	5	10785.0	14582	16	5300.0	5306	16	56372.0	3707
ZINC-68	6	463.0	18774	1	50.0	1155	19			19	74316	74316
ZIRCONIUM-90	5	3173.0	3001	12	1350.0	1324	18	640.0	576	18	513.0	1999
ZIRCONIUM-91	3	305.0	4020	5	20.0	1265	3			3	5160.0	4901
ZIRCONIUM-92	1	1043.0	1243	5	990.0	1609	8			8	325.0	4885
ZIRCONIUM-94	1	273.0	948	2	11.0	910	1			1	2030.0	2852
ZIRCONIUM-96	1						3			3	200.0	960
TOTAL	657	198076007.3	1196025	1290	15312600.5	1051408	217	1650841.1	431155	2164	215039488.9	2678633
	-101		-230	-72		-31856	-29		-4924	-202		-25622
	556		975961	1218		1014572	188		426377	1962		2421941

215039
213477
1562

96382

1113673

INTERNAL DISTRIBUTION

- | | |
|--------------------|---|
| 1. W. A. Bell, Jr. | 18. J. G. Tracy |
| 2-3. W. C. Davis | 19. D. B. Trauger |
| 4. H. R. Gwinn | 20. R. G. Wymer |
| 5. A. L. Harkey | 21. A. Zucker |
| 6. R. G. Jennings | 22. L. Burris, Jr. (consultant) |
| 7. J. E. Keeton | 23. G. R. Choppin (consultant) |
| 8. E. Lamb | 24. W. H. Corcoran (consultant) |
| 9-13. E. Newman | 25. Laboratory Records, RC |
| 14. E. L. Ottinger | 26-27. Laboratory Records Department |
| 15. F. G. Perey | 28. ORNL Patent Section |
| 16. M. E. Ramsey | 29-30. Central Research Library |
| 17. J. E. Ratledge | 31. ORNL-Y-12 Technical Library
Document Reference Section |

EXTERNAL DISTRIBUTION

32. Office of Assistant Manager, Energy Research and Development, DOE-ORO, Oak Ridge, TN 37830
33. J. L. Burnett, Jr., Office of Basic Energy Sciences, DOE, Washington, DC 20545
34. J. S. Burlison, Battelle Pacific Northwest Laboratory, Battelle Blvd., Richland, WA 99352
35. J. S. Kane, Office of Basic Energy Sciences, DOE, Washington, DC 20545
- 36-37. J. N. Maddox, Financial Services Division (EV-51), DOE, Washington, DC 20545
38. J. P. Muskey, Office of the Controller, DOE, Washington, DC 20545
39. J. W. Nehls, Research and Technology Division, DOE-ORO, Oak Ridge, TN 37830
40. H. S. Oster, Jr., Research and Technology Division, DOE-ORO, Oak Ridge, TN 37830
41. R. J. Starks, Eagle-Picher Industries, Inc., P.O. Box 1090, Miami, OK 74354
42. R. E. Vallee, Monsanto Research Corporation, Miamisburg, OH 45342
43. W. W. H. Weyzen, Division of Biomedical and Environmental Research, DOE, Washington, DC 20545
- 44-70. Technical Information Center, Box 62, Oak Ridge, TN 37830