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LIST OF DOE RADIOISOTOPE CUSTOMERS WITH SUMMARY OF RADIOISOTOPE SHIPMENTS, FY 1985

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ABSTRACT

This edition of the radioisotope customer list was prepared at the request of the Office of Health and Environmental Research (ER-73), Office of Energy Research, Department of Energy (DOE). This document describes radioisotope distribution from DOE facilities to private firms including foreign and other DOE facilities.

The information is divided into five sections: 1) isotope suppliers, facility contacts, and isotopes or services supplied; 2) customers, suppliers, and isotopes purchased; 3) isotopes purchased cross-referenced with customer numbers; 4) geographic locations of radioisotope customers; and 5) radioisotope sales and transfers - FY 1985.

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 National Engineering Laboratory/EG&G Idaho, Inc
Los Alamos National Laboratory
Oak Ridge National Laboratory
Pacific Northwest Laboratory
Savannah River Plant/DOE
UMC Nuclear Industries, Inc.

PREVIOUS REPORTS

Previous reports in this series are:

TID-2160 (FY 1964)	ORNL-IIC-38 (FY 1971)	PNL-2930 (FY 1978)
ORNL-IIC-6 (FY 1965)	BNWL-1774 (FY 1972)	PNL-3274 (FY 1979)
ORNL-IIC-9 (FY 1966)	BNWL-1824 (FY 1973)	PNL-3839 (FY 1980)
ORNL-IIC-13 (FY 1967)	BNWL-1902 (FY 1974)	PNL-4177 (FY 1981)
ORNL-IIC-17 (FY 1968)	BNWL-1993 (FY 1975)	PNL-4759 (FY 1982)
ORNL-IIC-27 (FY 1969)	BNWL-2147 (FY 1976)	PNL-5126 (FY 1983)
ORNL-IIC-32 (FY 1970)	PNL-2572 (FY 1977)	PNL-5492 (FY 1984)

Similar reports covering DOE's stable isotopes' distribution programs 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 Sales: Mound Facility Customer and Shipment Summary," FY 1979, MLM-2718; FY 1980, MLM-2843; FY 1981, MLM-2994; FY 1982, MLM-3095; FY 1983, MLM-3234.

"Stable Isotope Customer List and Summary of Shipments," FY 1979, ORNL/TM-7214; FY 1980, ORNL/TM-7764; FY 1981, ORNL/TM-8302; FY 1982, ORNL/TM-8704; FY 1983, ORNL/TM-8979; FY 1984, ORNL/TM-9430; FY 1985, ORNL/TM-9866/R1.

SUMMARY

This edition of the radioisotope customer list was prepared at the request of the Office of Health and Environmental Research (ER-73), Office of Energy Research, Department of Energy (DOE). This document lists DOE's radioisotope production and distribution activities by its facilities at Argonne National Laboratory, Brookhaven National Laboratory, Hanford Engineering Development Laboratory, Pacific Northwest Laboratory, Idaho Operations Office, Los Alamos National Laboratory, Oak Ridge National Laboratory, Savannah River Plant, and UNC Nuclear Industries, Inc.

The information is divided into five sections:

1. Isotope Suppliers, Facility Contact, and Isotopes or Services Supplied. Table 1 lists suppliers of isotopes and the contact person for each DOE facility. If a reader needs more specific information about isotope sales or shipments for a particular facility, he or she should contact the person listed for that facility.
2. List of Customers, Suppliers, and Isotopes Purchased. Table 2 is an alphabetical list of domestic and foreign customers and their addresses. Each customer has a customer number that is used to cross-reference data in the other sections of the report. Isotope purchases for each customer are listed below each address along with the supplier code for the laboratory supplying the isotopes.
3. List of Isotopes Purchased Cross-Referenced to Customer Numbers. Table 3 lists the isotopes in alphabetical order and cross-references them to customer numbers. This section gives a quick reference of the number of customers purchasing a particular isotope.
4. Geographic Locations of Radioisotope Customers. Table 4 is an alphabetical list of states and foreign countries that cross-references customer numbers and indicates the geographical concentration of isotope users.
5. Radioisotope Sales and Transfers - FY 1985. Table 5 summarizes the FY-1985 radioisotope shipment activities of the DOE laboratory facilities listed in Table 1. The table alphabetically lists the isotopes with their suppliers (denoted by the first letter of their name). Data on shipments, quantities (including units of measure), and dollar values of each isotope are listed under domestic, foreign and DOE categories. The value of the radioisotopes sold in FY 1985 was \$11.4 million.

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LIST OF ABBREVIATIONS

AG-105	Silver-105	C1	Curie
AL-26	Aluminum-26	CM-243	Curium-243
AM-241	Americium-241	CM-244	Curium-244
AM-243	Americium-243	CM-248	Curium-248
AO	Administration only. No shipments made from site	CO-57	Cobalt-57
AT-211	Astatine-211	CO-58	Cobalt-58
AU-195	Gold-195	CO-60	Cobalt-60
AU-198	Gold-198	CS-137	Cesium-137
B-11	Boron-11	CSI	Cyclotron Service Irradiations
BA-140	Barium-140	CSI-B	Cyclotron Service Irradiations by Brookhaven
BE-7	Beryllium-7	CSI-L	Cyclotron Service Irradiations by Los Alamos
BK-249	Berkelium-249	CU-65	Copper-65
BR-77	Bromine-77	DU	Depleted Uranium
BR-82	Bromine-82	E	Enriched
C-11	Carbon-11	ES-253	Einsteinium-253
C-14	Carbon-14	EU	Enriched Uranium
CA-47	Calcium-47	EU-152	Europium-152
CAP	Encapsulation	F-18	Fluorine-18
CD-109	Cadmium-109	FE-52	Iron-52
CE-139	Cerium-139	FF-55	Iron-55
CE-144	Cerium-144	FE-59	Iron-59
CF-249	Californium-249	FP	Fission Products
CF-252	Californium-252	g	gram

GA	Gallium-67	MS	Miscellaneous Services
GD-148	Gadolinium-148	NA-22	Sodium-22
GD-153	Gadolinium-153	NA-24	Sodium-24
GE-68	Germanium-68	NB-95	Niobium-95
H-3	Hydrogen-3 (tritium)	NI-63	Nickel-63
HF-172	Hafnium-172	NP-237	Neptunium-237
HO-163	Holmium-163	NP-237H	High Purity NP-237
I-123	Iodine-123	NP-237O	Oxide of NP-237
I-129	Iodine-129	NU	Natural Uranium
I-131	Iodine-131	OS-191	Osmium-191
IN-111	Indium-111	P-33	Phosphorus-33
IR-192	Iridium-192	PA-231	Protactinium-231
kCi	kilocurie	PD-109	Palladium-109
kg	kilogram	PM-147	Promethium-147
KR-85	Krypton-85	PO-208	Poisonium-208
KR-85E	Enriched Krypton-85	PU-236	Plutonium-236
LU-172	Lutetium-172	PU-237	Plutonium-237
LU-173	Lutetium-173	PU-238	Plutonium-238
MCP	Miscellaneous Compound Preparations	PJ-239	Plutonium-239
μ Ci	microcurie	PU-240	Plutonium-240
μ g	microgram	PU-241	Plutonium-241
μ Ci	millicurie	PU-242	Plutonium-242
mg	milligram	RB-81	Rubidium-81
MG-28	Magnesium-28	RB-83	Rubidium-83
MI	Miscellaneous Isotopes	RB-86	Rubidium-86
MIS	Miscellaneous Quantities	RSI	Reactor Service Irradiations

RU-97	Ruthenium-97	U-233	Uranium-233
RU-103	Ruthenium-103	U-234	Uranium-234
RU-106	Ruthenium-106	U-235	Uranium-235
RW	Withdrawn radioisotopes prepared under special approval	U-236	Uranium-236
		U-238	Uranium-238
SE-75	Selenium-75	V-48	Vanadium-48
SI-31	Silicon-31	V-54	Vanadium-54
SI-32	Silicon-32	XE-127	Xenon-127
SM-151	Samarium-151	Y-87	Yttrium-87
SM-117	Tin-117	Y-88	Yttrium-88
SP	Special Processing	ZN-65	Zinc-65
SR-82	Strontium-82	ZR-95	Zirconium-95
SR-89	Strontium-89		
SR-90	Strontium-90		
SS	Special Services		
TC-99	Technetium-99		
TE-128	Tellurium-128		
TH-229	Thorium-229		
TH-230	Thorium-230		
TH-232	Thorium-232		
TH-234	Thorium-234		
TI-44	Titanium-44		
TM-167	Thulium-167		
TM-170	Thulium-170		
TP	Target Preparations		
TB-158	Terbium-158		

1. ISOTOPE SUPPLIERS, FACILITY CONTACT, AND
ISOTOPES OR SERVICES SUPPLIED

TABLE 1. Isotope Suppliers, Facility Contact, and Isotopes or Services Supplied

Isotope Supplier	Supplier Code	Facility Contact	Isotopes or Service
Argonne National Laboratory	ANL	B. Z. Friddle Special Materials Division Argonne National Laboratory 9700 S. Cass Ave. Argonne, IL 60439 FTS 972-3425 Commercial (312) 972-3425	No isotopes sold directly. Isotopes produced counted in ORNL sales.
Brookhaven National Laboratory	BNL	K. S. Dahms Isotopes and Special Materials Group Brookhaven National Laboratory Upton, NY 11973 FTS 666-4051 Commercial (516) 282-4051	AT-211, AU-198, B-11, CO-57, CO-60, CS-137, CSI, CU-67, F-18, H-3, I-123, I-131, IN-111, MG-28, MI, NA-22, NI-63, NP-237, OS-191, RSI, RU-97, TC-99, TE-128, U-238, XE-127
Hanford Engineering Development Laboratory	HEDL	W. R. Brooksher, Manager Safeguards and Security Westinghouse Hanford Company P.O. Box 1970 Richland, WA 99352 FTS 444-9927 Commercial (509) 376-9927	No isotopes produced in FY 1985
Idaho National Engineering Laboratory	INEL	J. T. Parks EG&G Idaho, Inc. Idaho National Engineering Laboratory P.O. Box 1625 Idaho Falls, ID 83415 FTS 583-4466 Commercial (208) 526-4466	RSI, CO-60

TABLE 1. (contd)

Isotope Supplier	Supplier Code	Facility Contact	Isotopes or Service
Los Alamos National Laboratory	LANL	K. E. Peterson Group INC-11, Mail Stop J514 Los Alamos National Laboratory Los Alamos, NM 87545 FTS 843-4675 Commercial (505) 667-4675	AL-26, BE-7, CU-67, FE-52, GE-68, I-123, NA-22, SR-82, TI-44, XE-127, Y-88
Oak Ridge National Laboratory	ORNL	G. M. Carpenter Isotope Sales Oak Ridge National Laboratory P.O. Box X Oak Ridge, TN 37830 FTS 624-6984 Commercial (615) 575-6984	AM-241, AM-243, C-14, CAP, CE-144, CF-252, CM-244, CO-60, CS-137, CS1, EU-152, FE-55, GD-153, H-3, I-129, IR-192, KR-85, KR-85E, MCP, MG-28, MS, NB-95, NI-63, NP-237H, NP-2370, P-33, PA-231, PM-147, PU-236, PU-238, PU-239, PU-240, PU-241, PU-242, RU-103, RU-106, RW, SE-75, SM-151, SP, SR-89, SR-90, SS, TC-99, TH-229, TH-230, TH-232, TP, U-233, U-234, U-235, U-236, U-238, XE-127, ZR-95
Pacific Northwest Laboratory	PNL	O. P. Amacker Safety and Materials Management Pacific Northwest Laboratory P.O. Box 999 Richland, WA 99352 FTS 375-2804 Commercial (509) 375-2804	No isotopes produced in FY 1985

TABLE 1. (contd)

<u>Isotope Supplier</u>	<u>Supplier Code</u>	<u>Facility Contact</u>	<u>Isotopes or Service</u>
Savannah River Plant	SRP	G. A. Smithwick Process & Weapons Division Department of Energy P. O. Box A Aiken, SC 29801 FTS 239-2217 Commercial (803) 725-6211 Extension 2217	CF-252
UNC Nuclear Industries, Inc.	UNC	A. P. Lerrick, Manager Chemistry & Waste Treatment Technology Operations Division UNC Nuclear Industries P. O. Box 490 Richland, WA 99352 FTS 444-7411 Commercial (509) 373-7411	TM-170

2. LIST OF CUSTOMERS, SUPPLIERS, AND ISOTOPES PURCHASED

TABLE 2. Alphabetical List of Customers, Suppliers, and Isotopes Purchased

1	AT&T Technologies P.O. Box 1409 Lawrence, MA 01842	9	Argonne National Laboratory 9700 South Cass Ave. Argonne, IL 60439
	ORNL: KR-85		LANL: GE-68 ORNL: CSI, H-3, SP, TP
2	AT&T Technologies Incorporated P.O. Box 105201 Atlanta, GA 30348	10	Argonne National Laboratory P.O. Box 2528 Idaho Falls, ID 83401
	CRNL: KP-85		ORNL: I-120, TP
3	Accu Ray Corporation 650 Ackerman Road P.O. Box 00248 Columbus, OH 43202	11	Bemidji State University Bemidji, MN 56601
	ORNL: XR-85		ORNL: FE-55
4	Advanced Medical Systems, Inc. 621 Factory Row Geneva, OH 44041	12	Benedict Nuclear Pharmaceuticals, Inc. 1313 Washington Avenue Golden, CO 80401
	ORNL: CO-60, MCP, SR-90, SS		LANL: I-123
5	Advanced Micro Devices, Inc. P.O. Box 453 Sunnyvale, CA 94086	13	Bicron Corp. 12345 Kinsman Road Newbury, OH 44065
	ORNL: KR-85		ORNL: CM-244, TP
6	Albert Einstein College of Medicine 1300 Morris Park Avenue Bronx, NY 10461	14	Biosources, Limited 4-4 Bud Way Nashua, NH 03060
	LANL: CU-67 ORNL: CSI		ORNL: GD-153
7	Amersham Corporation Arlington Heights, IL 60005	15	Boston College Chestnut Hill, MA 02167
	ORNL: CM-244, TP		ORNL: TC-99
8	Analytics Incorporated 1094 Hemphill Avenue Atlanta, GA 30318	16	Brigham & Women's Hospital 10 Vining Street Boston, MA 02115
	BNL: XE-127		ORNL: GD-153

TABLE 2. (contd)

17	Brookhaven National Laboratory Isotopes & Special Metals Group Upton, Long Island, NY 11973	24	Children's Medical Center 300 Longwood Avenue Boston, MA 02115
	LANL: XE-127 ORNL: CF-252, CSI, H-3, MIS, RU-103, SP, TP		BNL: OS-191 ORNL: TC-99
18	California Institute of Technology 391 South Holliston Pasadena, CA 91125	25	Ciba Geigy Corporation 181 Passaic Avenue Summit, NJ 07901
	ORNL: SF		BNL: MG-28 ORNL: MG-28 (AO)
19	California State University 800 North State College Fullerton, CA 92624	26	City of Hope Medical Center 1500 E. Duarte Road Duarte, CA 91010
	LANL: CU-67 ORNL: CSI		ORNL: MCP
20	Calm VA-1 (525) P.O. Box 2971 Austin, TX 78769	27	Clarkson College of Technology Potsdam, NY 13573
	ORNL: XE-127		ORNL: TP
21	Carnegie-Mellon University 5000 Forbes Pittsburgh, PA 15213	28	Colgate Palmolive Research Center 909 River Road Piscataway, NJ 08854
	ORNL: CF-252, TP		ORNL: I-33
22	Case-Western Reserve University 2220 Circle Drive Cleveland, OH 44106	29	Colorado State University Fort Collins, CO 80521
	BNL: MG-28 ORNL: MG-28 (AO)		ORNL: ZR-95
23	Chem-Nuclear Systems, Inc. 220 Stoneridge Drive Columbia, SC 29210	30	Columbia University 538 West 120 Street New York, NY 10027
	ORNL: CO-60, CS-137, SS		BNL: CU-67 ORNL: CSI

TABLE 2. (contd)

31	Consolidated Controls Corp. P.O. Box 726 Springfield, VA 22150 ORNL: H-3, MCP	38	E. I. DuPont de Nemours & Company, Inc. Accounts Payable 549 Albany Street Boston, MA 02118 ORNL: CE-144, CS-137, CSI, GD-153, H-3, I-129, I-129, KR-85, P-33, RU-106, RW, SS, TC-99, ZR-95
32	Continental Oil Company, Inc. Research and Development Department P.O. Box 1267 Ponca City, OK 74601 ORNL: SR-89	39	E. R. Squibb & Sons P.O. Box CM 5303 Princeton, NJ 08540 ORNL: CSI, GD-153
33	Cryogenic Rare Gas Laboratories, Inc. 46 Liberty Street Newark, NJ 07103 ORNL: KR-85	40	E. I. DuPont de Nemours & Company, Inc. Savannah River Plant Aiken, SC 29801 BHL: H-3 ORNL: CF-252, I-129, MIS
34	Cyclotron Corporation 950 Gilman Street Berkeley, CA 94710 ORNL: H-3	41	E. R. Squibb & Sons Radio Pharmaceutical R & D Route 1 via Gate 125 New Brunswick, NJ 08901 LANL: SR-82
35	Detroit Edison Accounts Payable Department P.O. Box 1659 Detroit, MI 48231 ORNL: KR-85	42	EAL Corporation 2030 Wright Avenue Richmond, CA 94804 BNL: CS-137
36	Digital Equipment Corp. 100 Minuteman Road Andover, MA 01810 ORNL: KR-85	43	EETech Electronics Energy and Technology Division of Beatrice Foods Co. 2352 Utah Avenue El Segundo, CA 90245 ORNL: KR-85
37	Duke University Durham, NC 27706 ORNL: H-3, TP		

TABLE 2. (contd)

44	EG&G Idaho, Inc. P.O. Box 1625 Idaho Falls, ID 83415 INEL: RSI ORNL: CE-144, MIS, RU-106, TP, U-238, ZR-95	51	Florida State University Tallahassee, FL 32306 ORNL: CE-144, MIS
45	East Carolina University Purchasing Department Greenville, NC 27834 ORNL: SR-89	52	Frontier Tech 1641 Burnett Drive Xenia, OH 45385 SRP: CF-252
46	Eberline Analytical Corp. P.O. Box 3874 Albuquerque, NM 87190 ORNL: PU-239, SP	53	G. E. Intersil Inc. 10710 North Tantau Avenue Cupertino, CA 95014 ORNL: KR-85
47	Edgerton, Germeshausen and Grier 6456 So. Escondido Avenue Las Vegas, NV 89101 ORNL: CM-244, CO-60, MCP, SR-89, SS, TP	54	GA Technologies P.O. Box 85608 San Diego, CA 92138 ORNL: CS-137, MCP, SR-90, SS
48	Environmental Processing, Inc. 1321 N. Plano Road Richardson, TX 75801 ORNL: KR-85	55	GPU Nuclear Corporation P.O. Box 1018 Reading, PA 19603 ORNL: KR-85, MCP
49	Fairchild MHSI Division P.O. Box 5000 Puyallup, WA 98373 ORNL: KR-85	56	Gamma Industries, Inc. P.O. Box 2543 Baton Rouge, LA 70821 ORNL: IR-192, SS
50	Fairchild Camera & Instrument Corp. Linear Division P.O. Drawer 7282 Mt. View, CA 94042 ORNL: KR-85	57	General Electric Company Lynchburg, VA 24505 ORNL: KR-85
		53	General Electric Company Domestic Products Division Mail Code 399 175 Curtner Avenue San Jose, CA 95125 INEL: CO-60

TABLE 2. (contd)

59	General Electric Company Vallecitos Nuclear Company Vallecitos Road Pleasanton, CA 94566	66	Gulf Nuclear, Inc. 202 Medical Center Webster, TX 77598
	INEL: RSI SRP: CF-252		ONRL: AM-241, CS-137, GD-153, IR-192, MCP
60	General Electric Company P.O. Box 254 San Jose, CA 95103	67	Harris Semiconductor P.O. Box 883 Melbourne, FL 32901
	INEL: RSI ORNL: AM-241, CAP, CO-60, MCP, SS		ORNL: KR-85
61	General Motors Corp. Frigidaire Division Dayton, OH 45501	68	Harvard Medical School Shields Warren Laboratory 50 Binney Street Boston, MA 02115
	ORNL: KR-85		BNL: AT-211 ORNL: MCP
62	General Semiconductor, Inc. 2001 West 10th Place Tempe, AZ 85281	69	Hershey Medical Center Health Physics Hershey, PA 17033
	ORNL: KR-85		BNL: I-131
63	Genicom Corporation One General Electric Drive Waynesboro, VA 22980	70	High Rel Burn-In 2226 Kruse Drive San Jose, CA 95131
	ORNL: KR-85		ORNL: KR-85
64	Georgia Institute of Technology Nuclear Research Center 225 North Avenue, N.W. Atlanta, GA 30332	71	Hunter College 695 Park Avenue New York, NY 10021
	ORNL: TC-99		LANL: CU-67
65	Gollob Analytical Service Corporation 47 Industrial Road Berkeley Heights, NJ 07922	72	Hybritech Incorporated 9850 Distribution Avenue San Diego, CA 92121
	ORNL: C-14, H-3, KR-85		ORNL: GD-153, SS
		73	IBM Research Center Kitchawan Road, RT. 134 Yorktown, NY 10598
			ORNL: CSI, TP

TABLE 2. (contd)

74	ICN Biochemicals, Inc. P.O. Box 19536 Irvine, CA 92714 ORNL: CS-137, H-3, RU-106, SE-75	81	Johns Hopkins Hospital Radiation Safety 615 North Wolfe Street Baltimore, MD 21205 LANL: CU-67 ORNL: CSI, SS
75	Industrial Nuclear Company 1124 Chess Drive Foster City, CA 94404 ORNL: IR-192	82	KMS Fusion, Inc. 3941 S. Research Park Drive P.O. Box 1567 Ann Arbor, MI 48106 ORNL: H-3
76	Iotech, Incorporated 5995 South Syracuse Suite 201 Englewood, CO 80111 ORNL: SS	83	Kaman Instrumentation Corporation P.O. Box 7463 Colorado Springs, CO 80933 ORNL: TP
77	Iowa State University Ames Laboratory Ames, IA 50011 ORNL: NP-237, TP	84	Knolls Atomic Power Laboratory P.O. Box 1072 Schenectady, NY 12301 ORNL: SP
78	Isomedix Inc. 80 South Jefferson Road Whippany, NJ 07981 ORNL: MCP	85	Lamont-Doherty Geological Observatory Palisades, NY 10964 ORNL: SP, TH-230
79	Isotope Products Laboratories 404 South Lake Street Burbank, CA 91502 BNL: H-3 LANL: Y-88 ORNL: CF-252, CS-137, CSI, GD-153, I-129, KR-85, PU-236, PU-239, PU-241, RU-106, SP, TH-230, TP, U-233, U-235, ZR-95	86	Lawrence Livermore National Laboratory Box 808 Livermore, CA 94550 BML: CO-57, MP-237 ORNL: MCP, MIS, PA-231, PM-147, SP, TP
80	Isovac Engineering Company 6220 San Fernando Road Glendale, CA 92104 ORNL: KR-85	87	Littton Industries Guidance and Control Systems 5500 Conoga Avenue Woodland Hills, CA 91367 ORNL: KR-85

TABLE 2. (contd)

88	Long Island Jewish Medical Center New Hyde Park, NY 11042 ONRL: GD-153	95	Massachusetts Institute of Technology Box 69 Cambridge, MA 02139
89	Los Alamos National Laboratory P.O. Box 1663 Los Alamos, NM 87545 BNL: TE-128, U-230, XE-127 LANL: CU-67, TI-44, Y-88 ORNL: AM-243, I-129, MIS, SM-151, SP, SS, TP	96	McDonnell-Douglas Astronautics Company Western Division 5301 Bolsa Avenue Huntington Beach, CA 92647 ORNL: KR-85
90	Lovelace Biomedical and Environmental Research Inst. Building 9217, Area Y Kirtland, NM 87115 LANL: 3E-7	97	Medical Research Foundation, Inc. 181 Upper Riverdale Road Riverdale, GA 30374 ORNL: SS
91	Lovelace Clinic 4800 Gibson Boulevard, S.E. Albuquerque, NM 87108 ORNL: CAP, CE-144, CS-137, CSI, SS	98	Mercer School of Medicine Finance Office 1550 College Street Macon, GA 31207 ORNL: SR-89
92	Mallinckrodt Nuclear P.O. Box 5840 St. Louis, MO 63134 ORNL: TC-99	99	Methodist Hospital 1604 N. Capital Avenue Indianapolis, IN 46202 BNL: XE-127 ORNL: XE-127 (AO)
93	Mallinckrodt, Inc. 2703 Wagner Place Maryland Heights, MO 63043 BNL: XE-127 URNL: SE-75, XE-127 (AO)	100	Micra Corporation 120 Ricefield Lane Hauppauge, NY 11788 ORNL: KR-85
94	Martin Marietta Corporation East Sand Lake Road Orlando, FL 32855 ORNL: KR-85	101	Minnesota Mining Manufacturing Company P.O. Box 3121 St. Paul, MN 55101 ORNL: KR-85, MB-95, SS

TABLE 2. (contd)

102	Monolithic Memories Incorporated 1275 Mission College Boulevard Santa Clara, CA 95050 ORNL: KR-85	110	Neutron Products, Inc. P.O. Box 68 Mt. Ephraim Road Dickerson, MD 20753 INEL: CO-60, RSI ORNL: CO-60, RSI
103	Moravek Biochemicals, Inc. 577 Mercury Lane Brea, CA 92621 ORNL: H-3	111	New England Enzyme Center Radiotherapy 136 Harrison Avenue Boston, MA 02111 BNL: U-238
104	Motorola, Inc. 3501 Ed Bluestein Boulevard Austin, TX 78721 ORNL: KR-85	112	New England Nuclear Corporation Radiopharmaceutical Division 331 Treble Cove Road Billerica, MA 01862 LANL: GE-68, NA-22, Y-88
105	Motorola, Inc. 5005 East McDowell Road Phoenix, AZ 85008 ORNL: KR-85	113	New Jersey College of Medicine and Dentistry 200 Bergen Street Newark, NJ 07103 ORNL: Si, MCP
106	Mount Sinai Hospital Fifth Avenue and 100th Street New York, NY 10029 BNL: AT-211 ORNL: MCP	114	New York Medical College Department of Microbiology Basic Science Building Valhalla, NY 10595 BNL: CU-67
107	National Semiconductor Corporation 2900 Semiconductor Drive Santa Clara, CA 95051 ORNL: KR-85	115	North Carolina Memorial Hospital Division of Nuclear Medicine 2nd Floor, Old Clinic Building Chapel Hill, NC 27514 BNL: XE-127 ORNL: XE-127 (AO)
108	National Semiconductor Corporation 5901 South Calle Santa Cruz Tucson, AZ 85706 ORNL: KR-85	116	North Carolina State University P.O. Box 5935 Raleigh, NC 27607 ORNL: TH-229
109	Naval Medical Command National Capitol Region Building 1, Tower 6 Bethesda, MD 20014 BNL: XE-127		

TABLE 2. (contd)

117	Northern Telecom Electronics, Inc. 1705 Wyatt Drive Santa Clara, CA 95054	125	Potter and Brumfield Princeton, IN 47570
	ORNL: KR-85		ORNL: KR-85
118	Nuclear Pharmacy, Inc. P.O. Box 25141 Albuquerque, NM 87125	126	Precision Monolithics, Inc. 1500 Space Park Drive Santa Clara, CA 95050
	ORNL: MCP, SS		ORNL: KR-85
119	Nuclear Radiation Development, Inc. 2937 Alt Boulevard Grand Island, NY 14072	127	Princeton University Plasma Physics Laboratory P.O. Box 451 Princeton, NJ 08544
	ORNL: AM-241, CAP, H-3		ORNL: MIS
120	Nuclear Sources and Services P.O. Box 14023 Houston, TX 77021	128	Purdue University Pharmacy Annex Lafayette, IN 47907
	ORNL: KR-85		ORNL: MCP
121	Nuclepore Corporation 7035 Commerce Circle Pleasanton, CA 94566	129	RCA Raritan, NJ 08869
	ORNL: TP, U-235		ORNL: KR-85
122	Oak Ridge Associated Universities P.O. Box 117 Oak Ridge, TN 37830	130	Raytheon Company 350 Ellis Street Mountain View, CA 94042
	LANL: GE-68 ORNL: CSI, MIS, SS		ORNL: KR-85
123	Oak Ridge National Laboratory P.O. Box X Oak Ridge, TN 37830	131	Raytheon Company 350 Lowell Street West Andover, MA 01810
	BNL: H-3 LAML: CU-67		ORNL: KR-85
124	Pacific Northwest Laboratory Battelle-Northwest P.O. Box 999 Richland, WA 99352	132	Reactor Experiments, Inc. 963 Terminal Way San Carlos, CA 94070
	BNL: CO-60, CS-137 ORNL: MCP, TP UNC: TM-170		ORNL: NP-237, TH-232, TP, U-235, U-238

TABLE 2. (contd)

133	Kedo Science, Inc. Education Instruments, Inc. 11. Robinson Lane Oxford, CT 06483	141	Science Applications 3 Choke Cherry Road Rockville, MD 20850
	ORNL: SR-90		ORNL: AM-243, TP
134	Rensselaer Polytechnic Institute 110 8th Street Troy, NY 12181	142	Self Powered Lighting, Ltd. 8 Westchester Plaza Elmsford, NY 10523
	LAHL: CU-67 ORNL: CSI		ORNL: H-3, SS
135	Reuter-Stokes, Inc. Edison Park 8499 Darrow Road Twinsburg, OH 44087	143	Shepherd and Associates, J. L. 1614 Victor Boulevard Glendale, CA 91201
	ORNL: TP, U-234, U-235		ORNL: CS-137, MCP
136	Rockwell Hanford Company P.O. Box 769 Richland, WA 99352	144	Signetics Corporation 1275 South 800 East Orem, UT 84057
	ORNL: CAP, CE-144, MP-237, KR-85		ORNL: KR-85
137	Rockwell International Atomic International Division Rocky Flats Plant P.O. Box 464 Golden, CO 80401	145	Signetics Incorporated 811 East Argues Avenue P.O. Box 3409 Sunnyvale, CA 94088-3409
	ORNL: SP		ORNL: KR-85
138	Rockwell International, Corp. P.O. Box 10462 Dallas, TX 75207	146	Siliconix, Inc. Mail Stop 60 2201 Laurelwood Road Santa Clara, CA 95054
	ORNL: KR-85		ORNL: KR-85
139	Safety Light Corporation 4150-A Old Berwick Road Bloomsburg, PA 17815	147	Sloan-Kettering Institute 425 East 68th Avenue New York, NY 10021
	ORNL: H-3, MCP, NI-63, PM-147		ORNL: MCP
140	Sandia Corporation P.O. Box 5800 Albuquerque, NM 87115	148	Solid State Scientific, Inc. 3900 Welsh Road Willow Grove, PA 19090
	ORNL: TP		ORNL: KR-85

TABLE 2. (contd)

149	Source Production and Equipment Company, Inc. 625 Oxley Street Kenner, LA 70062	156	Teledyne Wah Chang Albany Division of Teledyne Ind. Inc. P.O. Box 460 Albany, OR 97321
	ORNL: IR-192		ORNL: ?P, U-233
150	Sperry Systems Management 310.1 Goddard Space Flight Center Greenbelt, MD 20771	157	Texas Instruments, Inc. Science Services Division P.O. Box 5012, Mail Stop 6 Dallas, TX 75222
	ORNL: KR-85		ORNL: KR-85
151	State University of New York at Stony Brook Research Foundation Stony Brook, NY 11790	158	The Medical College of Pennsylvania P.O. Box 18538 Philadelphia, PA 19129
	ORNL: XE-127		ORNL: SR-89, SS
152	State University of New York at Stony Brook University Hospital Stony Brook, NY 11794	159	Tracero Corporation 5763 Underwood Road Pasadena, TX 77507
	BNL: F-18, I-123		ORNL: KR-85
153	State University of New York 3435 Main Street Buffalo, NY 14214	160	Trio Tech International 2040 N. Lincoln Street Burbank, CA 91504
	ORNL: TC-99		ORNL: KR-85
154	Technical Operations South Avenue Burlington, MA 01803	161	U.S. Army Armed Forces Radiobiology Research Institute Defense Nuclear Agency Bethesda, MD 20014
	ORNL: IR-192		ORNL: SR-89
155	Teledyne Isotopes 123 Woodland Avenue Westwood, NJ 07675	162	U.S. Department of Agriculture Grand Forks Human Nutrition Research Center Box 7166 University Station Grand Forks, ND 58202
	BNL: CS-137, TC-99		LANL: CU-67

TABLE 2. (contd)

163	U.S. Department of Agriculture Radiological Safety Staff Room 226, B-001, BARC-West Beltsville, MD 20705	170	U.S. Navy National Naval Medical Center Bethesda, MD 20014
	LANL: CU-67		ORNL: XE-127
164	U.S. Department of Agriculture Research Service P.O. Box 53326 New Orleans, LA 70150	171	UNC Nuclear Industries P.O. Box 490 Richland, WA 99352
	ORNL: CSI		ORNL: MIS
165	U.S. Department of Energy 376 Hudson Street, 5th Floor New York, NY 10014	172	Union Carbide Corporation Nuclear Division Oak Ridge Gaseous Diffusion Plant P.O. Box P Oak Ridge, TN 37830
	ORNL: CE-144		ORNL: SP, U-234
166	U.S. Geological Survey National Center, Room 1447-A 12201 Sunrise Valley Drive Reston, VA 22092	173	Union Carbide Corporation Nuclear Division Y-12 Plant P.O. Box Y Oak Ridge, TN 37830
	ORNL: CM-244		ORNL: CF-252, GD-153, IR-192, MIS, SS
167	U.S. National Bureau of Standards Rec. Room, Bldg 301 Route 270, Quince Orchard Road Gaithersburg, MD 20878	174	Union Carbide Corporation Nuclear Division Oak Ridge National Laboratory P.O. Box X Oak Ridge, TN 37830
	LANL: AL-26		ORNL: CO-60, CSI, EU-152, GD-153, IR-192, MCP, NI-63, NP-237, RU-106, SP, SR-89, SR-90, SS, TP
168	U.S. National Bureau of Standards Connecticut Avenue and Van Ness St. N.W. Washington, DC 20234	175	Unit Process Assemblies, Inc. 53-15 37th Avenue Woodside, NY 11377
	ORNL: CE-144, MIS, TP, U-238		ORNL: SR-90
169	U.S. National Institute of Health 9000 Rockville Pike Bethesda, MD 20205	176	United States Air Force Kirtland Air Force Base Albuquerque, NM 87117
	BNL: CO-60 ORNL: CSI, MCP		BNL: NA-22, TH-230

TABLE 2. (contd)

177	University of California 400 Sproul Hall Berkeley, CA 94720 ORNL: KR-85	184	University of Lowell 1 University Avenue Lowell, MA 01854 ORNL: TP, U-235
178	University of California Davis Medical Center 4301 X Street Sacramento, CA 95817 BNL: CU-67 LANL: CU-67	185	University of Lowell Research Foundation 450 Aiken Street, Lowell, MA 01845 ORNL: PU-239, TP
179	University of California Lawrence Berkeley Laboratory Berkeley, CA 94720 LANL: SR-82 ORNL: CII, H-3, MIS, SP	186	University of Maryland College Park, MD 20742 ORNL: H-3, TP
180	University of Chicago Physical Science Department 1525 E. Hyde Park Boulevard Chicago, IL 60615 ORNL: CSI	187	University of Michigan W. University Building Ann Arbor, MI 48109 ORNL: AM-243
181	University of Chicago Radiation Protection Service HPII, Department 1034 5835 S. Cottage Grove Avenue Chicago, IL 60637 LANL: GE-68	188	University of Nebraska 511 Administration Lincoln, NE 68508 ORNL: RSI
182	University of Connecticut Physics Sciences Building Central Warehouse Storrs, CT 06268 BNL: MG-28	189	University of Nebraska Medical Center Nuclear Pharmacy 42nd and Dewey Street Omaha, NE 68105 LANL: FE-52 ORNL: CSI
183	University of Florida Gainesville, FL 32601 ORNL: PU-239, SP	190	University of New Mexico Los Alamos, NM 87545 LANL: CU-67
		191	University of North Carolina Chemistry Venable 045A Chapel Hill, NC 27514 SNL: MG-28 ORNL: MG-28 (AO)

TABLE 2. (contd)

192	University of Pennsylvania Cerebrovascular Research Center 36th Street & Hamilton Walk Philadelphia, PA 19104	199	V. A. Hospital Nuclear Medicine 1400 V.F.W. Parkway West Roxbury, MA 02132
	BNL: F-18		BNL: XE-127
193	University of Rochester 575 Elmwood Avenue Rochester, NY 14726	200	V. A. Hospital and Medical Center Ann Arbor, MI 48104
	ORNL: TP, U-235		ORNL: CSI
194	University of Southern California Accounts Payable P.O. Box 77967 Los Angeles, CA 90089	201	Washington University Lindell and Skinker St. Louis, MO 63130
	ORNL: MCP		LANL: GE-68 ORNL: CSI
195	University of Texas at Dallas P.O. Box 30365 Dallas, TX 75230	202	West Virginia University Physics Department P.O. Box 6023 Morgantown, WV 26506
	ORNL: GD-153, SR-89		BNL: H-3
196	University of Utah Purchasing Department Salt Lake City, UT 84112	203	Westinghouse Hanford Company P.O. Box 1970 Richland, WA 99352
	ORNL: SP, U-233		ORNL: TP
197	University of Virginia Radiation Safety Officer RWMF, 124 - 11th Street, S.W. Charlottesville, VA 22903	204	Yale University 20 Ashmun Street New Haven, CT 06520
	BNL: XE-127 CRNL: XE-127 (AO)		ORNL: TP
198	University of Wisconsin 750 University Avenue Madison, WI 53706	205	Yale University School of Medicine Section of Cardiology 87-LMP 333 Cedar Street New Haven, CT 06510
	LANL: GE-68 ORNL: CSI		BNL: I-131, IN-111
		206	Zilog, Incorporated 10460 Bugg Road Cupertino, CA 95014
			ORNL: KR-85

TABLE 2. (contd)

FOREIGN

AUSTRALIA

207 Australian AEC
Research Establishment
Lucas Heights, NSW

BNL: XE-127

208 Australian Atomic Energy
Commission
Private Mail Bag
Gutherford, 2232, NSW

ORNL: PA-231, TP, XE-127

209 Royal Children Hospital
Flemington Road
Parkville, Victoria 3052

LANL: CU-67

ORNL: CSI

AUSTRIA

210 International Atomic Energy Agency
Wagramerstrasse 5
P.O. Box 100
A-1400 Vienna

ORNL: TP, U-233

BELGIUM

211 Central Bureau for Nuclear Measurements of the European Communities
B-2440 GEEL, Steenweg maar Retie

ORNL: PU-238, PU-241, TH-230,
TP, U-236

212 Katholieke Universiteit Leuven
Instituut Voor Kern-En
Stralingsfysika
Celestijnendaan 200 D
3030 Leuven

ORNL: I-129

213 Universite de Liege
Centre de Recherches du Cyclotron
Sart Tilman
B-4000 Liege 1

LANL: GE-68

BRAZIL

214 American Consulate
President Wilson 147
Rio de Janeiro

BNL: NI-63

215 Brazilian Center for Physical
Research
Rio de Janeiro

ORNL: GD-153

CANADA

216 Atomic Energy of Canada, Ltd.
Chalk River Nuclear Laboratories
Chalk River, Ontario K0J 1J0

INEL: RSI

ORNL: H-3, KR-85, SP, U-233

217 Atomic Energy of Canada, Ltd.
4004 Westbrook Mall
Vancouver, B. C. V6T 2A8

BNL: XE-127

218 Atomic Energy of Canada, Ltd.
Radiochemical Company
413 March Road
P.O. Box 13500
Kanata, Ontario K2K 1X8

BNL: XE-127

LANL: GE-68

ORNL: CS-127, GD-153, IR-192,
MCP, SR-90, SS, XE-127 (AO)

TABLE 2. (contd)

		<u>FEDERAL REPUBLIC OF GERMANY</u>
219	Atomic Energy of Canada, Ltd. Whitehell Nuclear Research Establishment Pinawa, Manitoba ORNL: CAP, NP-237, TP, U-233	226 AEG-Telefunken Zentravelwaitung Westzone D8752 Grossweizheim Frankfurt am Main ORNL: TP, U-234
220	Hospital for Sick Children Research Institute 555 University Avenue Toronto, Ontario M5G 1X8 ORNL: CSI	227 American Hoechst Corporation P.O. Box 2500 Somerville, NJ 08876 ORNL: KR-85
221	McMaster University Hamilton, Ontario ORNL: I-129	228 Buchler and Company Untermainkai 34 6 Frankfurt M. 1 ORNL: MCP, SR-90
222	Scarborough General Hospital Nuclear Medicine 3050 Lawrence Avenue East Scarborough, Ontario, H1P 2V5 BNL: XE-127 ORNL: XE-127 (AO)	229 Fachbereich Physik der TU-München Strahlenschutzabt. Z 62 James-Franck-Weg D-8046 Garching B. München ORNL: PU-242
223	TRIUMF Safety Group 4004 Westbrook Mall Vancouver, BC V6T-2A3 BNL: AU-198, U-238	230 Forschungsanstalt Karlsruhe Reaktorgelände D-7514 Leopoldshafen ORNL: TC-99
224	University of Saskatchewan Animal & Poultry Science Saskatoon, Saskatchewan S7N 0W0 ORNL: CSI	231 Gesellschaft für Kernforschung mbH. Institut für Angewandte Reaktor Physik Weberstrasse 5 75 Karlsruhe ORNL: AM-243, ZR-95
<u>DENMARK</u>		232 Gesellschaft für Schwerionenforschung Planckstrasse 1 D-6100 Darmstadt ORNL: TH-232, TP, U-236
225	Riso National Laboratory DK-4000 Roskilde ORNL: SS	

TABLE 2. (contd)

233	Kernforschungsanlage Jülich, GmbH. Postfach 1913 D-517 Jülich	240	Compagnie Oris Industrie B.P. 21 91190 Gif-Sur-Yvette
	ORNL: TC-99		ORNL: CSI
234	Max Planck Institute für Kernphysik Saupfercheckweg Heidelberg	241	Office Des Rayonnement Ionisant C/O Gondrand Roissy Airport
	ORNL: SP, U-238		LANL: GE-68
235	Osram GmbH LOG/TRE Postfach 90 06 20 8000 München 90		
	ORNL: KR-85		
236	Sektion Physik Der Universität München Technologisches Labor. 8046 Garching am Coulombwall 1		
	ORNL: TP, U-233, U-235		
<u>FINLAND</u>			
237	uriola Oy Prolab PL 8 . SF-02101 Espoo		
	ORNL: CS-237		
<u>FRANCE</u>			
238	CEA Department Des Radioclements B.P. №. 2 91190 Gif-Sur-Yvette		
	ORNL: CS-137, SR-90, ZR-95		
239	Center D-Etudes Nucleaires DeSaclay Gif-sur-Yvette		
	SRP: CF-252		
<u>ITALY</u>			
242	Instituto Nazionale de Fisica Nucleare Laboratori Nazionali de Legnaro Via Romeo n. 4 35030 Legnaro Padova		
	ORNL: CF-252, TP		
<u>JAPAN</u>			
243	Kyoto University Engineering Research Institute Kyoto		
	ORNL: CAP, PU-239, TP, U-233 U-234, U-235		
244	Power Reactor and Nuclear Fuel Development 9-13, I-Chom. Akasake Minato-ku Tokyo		
	ORNL: SS		
245	Tohoku University Department of Physics Katahira Z Chrome Sendai		
	BNL: B-11		

TABLE 2. (contd)

MEXICO

246 Instituto Nacional de
Investigaciones N
Comercializacion de Radioisotopos
Providencia 1229, DF 03100

ORNL: KR-85

252 mb-Microtec, Inc.
Freiburgstrasse 624
CH-3172 Niederwangen/Berne

ORNL: H-3

UNITED KINGDOM

253 Amersham International, Ltd.
White Lion Road
Amersham
Buckinghamshire
HP7 9LL England

ORNL: CE-144, CM-244, GD-153,
H-3, I-129, KR-85, MCP,
PM-147, RW, SR-90, SS,
TC-99, ZR-95

SRP: CF-252

NETHERLANDS

247 FOM Werkgroep Kilb
c/o Kernfysisch Versneller Instituut
Zernikelaan 25
Groningen

ORNL: CM-244, TP

PHILIPPINES

248 Zilog Philippines, Inc.
8460 Dr. A. Sanatos Ave. Cor.
South Superhighway, Paranaque
Metro Manila

ORNL: KR-85

254 Brandhurst Co., Ltd.
Wellington Road
High Wycombe, Bucks
HP12 3PS England

ORNL: H-3

SOUTH AFRICA

249 South African Atomic Energy Board
Private Bag 256
Pretoria

ORNL: CF-252, TP

255 Hammersmith Hospital
MRC Cyclotron Unit
Ducane Road
London, W12 OHS, England

LANL: SR-82
ORNL: CSI

SWITZERLAND

250 Eidg. Institut fur Reaktorforschung
Wurenlingen

ORNL: H-3, MCP, PM-147, TC-99

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

ORNL: H-3

251 Schweizerisches Institut fur
Nuklearforschung
Neunbrunnenstrasse 85
8050 Zurich

ORNL: H-3

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

ORNL: KR-85

TABLE 2. (contd)

258 Surelite Limited
Priors Court
Priors Haw Road
Weldon, Northants NN171J6
England

ORML: H-3

259 UK Freight Forwarding Office
25 Broadway
New York, NY 10004

ORML: CM-144, I-129, PU-239,
PU-240, PU-241, SP, TH-230,
TP, U-234, U-235, U-236,
U-238

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

TABLE 3. Isotopes Purchased Cross-Referenced to Customer Numbers

Aluminum-26	167	NBS
Americium-241	60 66 119	
Americium-243	89 141 187 231	
Astatine-211	68 106	Ames / At Sosai
Beryllium-7	90	Lovelace Neal, Kirtland, NM
Boron-11	245	
Californium-252	17 21 40 52 59 79 173 239 249 253	
Carbon-14	55	
Cerium-144	38 44 51 91 136 165 168 253	
Cesium-137	23 38 42 54 66 74 79 91 124 143 155 238	
Cobalt-57	86	LLNL
Cobalt-60	4 23 47 58 60 110 110 124 169 174	
Copper-67	6 19 30 71 81 89 114 123 134 162 163 178 178 190	Hughes/EG&G/Oral/Caltech/Univ/Stanford/RPI/Jesca/UC Berkeley/UC San Diego
Curium-244	209	
	7 13 47 166 247 253 259	
Cyclotron Service Irradiations	6 9 17 19 30 38 39 73 79 81 91 113 122 134	
	164 169 174 179 180 189 198 200 201 209 220 224 240 255	
Encapsulation	60 91 119 136 219 243	
Europium-152	174	SUNY/Buffalo
Fluorine-18	152 192	
Gadolinium-153	14 16 38 39 66 72 79 88 173 174 195 215 218 253	Ames/DOE/SLAC/Argonne/INRA/CEA/IN2P3/CERN/EPFL
Germanium-68	9 112 122 181 198 201 213 218 241	Argonne
Gold-198	223	Argonne
Indium-111	205	Argonne/SUNY
Iodine-123	12 152	Argonne
Iodine-129	10 38 40 79 89 95 212 221 253 259	

TABLE 3. (contd)

Iodine-131	69 205
Iridium-192	56 66 75 149 154 173 174 218
Iron-52	189 <i>U. of Nebraska</i>
Iron-55	11 <i>Bemidji State U.</i>
Krypton-85	1 2 3 5 33 35 36 38 43 48 40 50 53 55 57 61 62 63 65 67 70 79 80 87 94 96 100 101 102 104 105 107 108 117 120 125 126 129 130 131 138 144 145 146 148 150 157 159 160 177 206 206 227 235 246 248 253 257
Magnesium-26	22 22 25 25 182 191 191
Misc. Compounds	4 26 31 47 54 55 60 66 78 86 106 113 118 124 128 139 143 147 169 174 194 218 228 250 253
Misc. Quantities	17 40 44 51 86 89 122 127 168 171 173 179
Neptunium-237	77 86 132 136 174 219
Nickel-63	139 174 214
Niobium-95	101
Osmium-191	24
Phosphorus-33	28 38
Plutonium-236	79
Plutonium-238	211
Plutonium-239	46 79 183 185 243 259
Plutonium-240	259
Plutonium-241	79 211 259
Plutonium-242	229
Promethium-147	86 139 250 253
Protactinium-231	86 208
Radioisotopes	38 253
Withdrawn	

TABLE 3. (contd)

TABLE 3. (contd)

Uranium-233	79 156 196 210 216 219 236 243
Uranium-234	135 226 243 259
Uranium-235	79 121 132 135 184 193 236 243 259
Uranium-236	211 232 259
Uranium-238	44 89 111 132 168 223 234 259
Xenon-127	8 17 20 89 89 93 93 99 99 109 115 115 151 170 197 197 199 207 208 217 218 218 222 222
Yttrium-88	79 89 112
Zirconium-95	29 38 44 79 136 231 238 253

4. GEOGRAPHIC LOCATIONS OF RADIOISOTOPE CUSTOMERS

TABLE 4. Geographic Locations of Customers by Customer Number

DOMESTIC

Arizona

61 105 108

California

5	18	19	26	34	42	43	50	53	54	58	59	60	70	72	74	75
79	80	86	87	95	102	103	107	117	121	126	130	132	143	145	146	160
177	178	179	194	206												

Colorado

12 29 76 83 137

Connecticut

133 182 204 205
S-90 N-28 TP I-131, In-111

District of Columbia

168 Ce-144, NBS MIS, TP, 4-238

Florida

51 67 94 183

Georgia

2 8 64 97 98

Idaho

10 44

Illinois

7 9 180 181

Indiana

99 125 128 125 Xe-127 Xe-127(AO)
K-99/KA-85

128-2 MCP

Iowa

77 Iowa State Building

Louisiana

56 149 164

Maryland

81 109 110 141 150 161 163 167 169 170 186

Massachusetts

K-99/KA-85 1 15 16 24 36 38 68 95 111 112 131 154 184 185 199

Michigan

35 82 187 200

TABLE 4. (contd)

Minnesota	
11	101
Missouri	
92	93 201
Nebraska	
188	189
Nevada	
47	
New Hampshire	
14	
New Jersey	
25	28 33 39 41 65 78 113 127 129 155
New Mexico	
46	89 90 91 118 140 176 190
New York	
6	17 27 30 71 73 84 88 100 106 114 119 134 142 147 151 152
	153 165 175 193
North Carolina	
37	45 115 116 191
North Dakota	
162	
Ohio	
3	4 13 22 52 61 135
	KAB
Oklahoma	
32	..
Oregon	
155	
Pennsylvania	
21	55 69 139 148 158 192
South Carolina	
23	40
Tennessee	
122	123 172 173 174

TABLE 4. (contd)

Texas

20 48 66 104 120 138 157 159 195

Utah

144 196

Virginia

31 57 63 166 197

Washington

49 124 136 171 203

West Virginia

202

Wisconsin

198

FOREIGN

AUSTRALIA

207 208 209

AUSTRIA

210

BELGIUM

211 212 213

BRAZIL

214 215

CANADA

216 217 218 219 220 221 222 223 224

DENMARK

225

FEDERAL REPUBLIC OF GERMANY

226 227 228 229 230 231 232 233 234 235 236

FINLAND

237

FRANCE

238 239 240 241

ITALY

242

TABLE 4. (contd)

JAPAN
243 244 245

MEXICO
246

NETHERLANDS
247

PHILIPPINES
248

SOUTH AFRICA
249

SWITZERLAND
250 251 252

UNITED KINGDOM
253 254 255 256 257 258 259

5. RADIOISOTOPE SALES AND TRANSFERS - FY 1985

TABLE 5. Radioisotope Sales and Transfers - FY 1985

Isotope	Sup-plier	Domestic			Foreign			DOE			Total					
		Ship	Quantity	Unit	\$	Value	Ship	Quantity	Unit	\$	Value	Ship	Quantity	Unit	\$	Value
Aluminum-26	L	1	0.50	µCi	0	0	---	0	0	---	0	1	0.50	µCi	0	
Americium-241	O	12	278.00	g	405782	0	---	0	0	---	0	12	273.00	g	405782	
Americium-243	O	2	1.20	mg	200	1	---	100	1	---	0	4	1.20	mg	300	
Astatine-211	B	7	13.50	mCi	0	0	---	0	0	---	0	7	13.50	mCi	0	
Beryllium-7	L	0	---	µCi	0	0	---	0	2	150.00	mCi	3529	2	150.00	mCi	3529
Boron-11	B	0	---	mCi	0	1	---	0	0	---	0	1	---	µCi	0	
Californium-252	O	6	3.60	µg	60	2	1.40	µg	20	0	7840.00	µg	0	8	7845.00	µg
Californium-252	S	2	5.08	mg	55370	4	27.04	mg	304630	0	---	mg	0	6	32.12	mg
Carbon-14	O	1	300.00	mCi	750	0	---	0	0	---	0	1	300.00	mCi	750	
Cerium-144	O	6	2505.00	mCi	16400	1	20.00	mCi	240	4	60.40	mCi	1080	11	2585.40	mCi
Cesium-137	B	4	0.44	µCi	0	0	---	0	0	---	0	4	0.44	mCi	0	
Cesium-137	O	14	41135.50	µCi	5683	14	297589.30	µCi	30937	0	---	µCi	0	28	338724.00	µCi
Cobalt-57	E	1	3.00	mCi	0	0	---	0	0	---	0	1	3.00	mCi	0	
Cobalt-60	B	2	91.00	µCi	0	0	---	0	0	---	0	2	91.00	µCi	0	
Cobalt-60	I	3	698954.00	µCi	349477	0	---	0	0	---	0	3	698954.00	µCi	349477	
Cobalt-60	O	2	23743.00	µCi	107395	0	---	0	1	29680.00	µCi	90130	3	53423.00	µCi	
Copper-67	B	4	2738.00	µCi	0	0	---	0	0	---	0	4	2738.00	µCi	0	
Copper-67	L	28	1076.81	µCi	3717	1	10.00	µCi	250	14	328.59	µCi	250	43	1414.59	µCi
Curium-244	O	3	14.90	mg	1470	6	1501.00	mg	150160	2	---	mg	100	11	1516.50	mg
CS1	B	12	360.00	0	0	---	0	0	---	0	12	360.00	0	0	0	
CS1-B	O	2	535.00	0	0	---	0	2	10.00	0	2130	4	545.00	0	14971	
CS1-L	O	40	5732.00	0	0	---	7875	14	600.00	0	15242	61	6422.00	0	178806	
Encapsulation	O	5	723000.00	0	221993	1	---	262840	58	---	190596	64	723000.00	0	675431	
Europium-152	O	0	---	mCi	0	0	---	0	1	10.00	mCi	414	1	10.00	mCi	414
Fluorine-18	B	6	122.00	mCi	0	0	---	0	0	---	0	6	122.50	mCi	0	

TABLE 5. (contd)

Isotope	Supplier	Ship	Domestic				Foreign				DOE				Total			
			Quantity	Unit	\$ Value	Ship	Quantity	Unit	\$ Value	Ship	Quantity	Unit	\$ Value	Ship	Quantity	Unit	\$ Value	
Gadolinium-153	O	71	129.32	Ci	690182	23	33.52	Ci	180409	6	3.01	Ci	16390	98	165.85	Ci	886981	
Germanium-68	L	5	165.00	mCi	10362	3	80.00	mCi	5075	5	45.03	mCi	6690	13	290.03	mCi	22127	
Gold-198	B	0	---	mCi	0	1	---	mCi	0	0	---	mCi	0	1	---	mCi	0	
Indium-111	B	4	27.00	mCi	0	0	---	mCi	0	0	---	mCi	0	4	27.00	mCi	0	
Iodine-123	B	1	3.00	mCi	0	0	---	mCi	0	0	---	mCi	0	1	3.80	mCi	0	
Iodine-123	L	1	16.00	mCi	0	0	---	mCi	0	0	---	mCi	0	1	16.00	mCi	0	
Iodine-129	O	9	3636.00	mg	21566	9	4380.00	mg	24280	4	1185.00	mg	7110	22	9201.00	mg	52956	
Iodine-131	B	7	22.69	mCi	0	0	---	mCi	0	0	---	mCi	0	7	22.69	mCi	0	
Iridium-192	O	135	544238.00	Ci	711429	1	4165.00	Ci	5414	5	1040.00	Ci	2418	141	549443.00	Ci	719261	
Iron-52	L	2	441.73	mCi	2600	0	---	mCi	0	0	---	mCi	0	2	461.73	mCi	2600	
Iron-55	O	1	80.00	mCi	300	0	---	mCi	0	0	---	mCi	0	1	80.00	mCi	300	
Krypton-85	O	218	5005.56	Ci	368078	12	376.00	Ci	26491	0	---	Ci	0	230	5381.56	Ci	394569	
Krypton-85E	O	10	562.00	Ci	191601	3	743.00	Ci	45290	0	---	Ci	0	13	705.00	Ci	236899	
Magnesium-28	B	13	6.19	mCi	4400	0	---	mCi	0	0	---	mCi	0	8	6.19	mCi	4400	
Magnesium-28	O	8	1300.00	mCi	4290	0	---	mCi	0	0	---	mCi	0	8	1300.00	mCi	4290	
Misc. Compounds	O	14	11.20		3159	0	---		0	3	6.00		1482	17	17.20		4641	
Misc. Isotopes	B	15	---		655	2	---		60	0	---		0	17	---		715	
Misc. Services	O	2	---		440	0	---		0	11	---		29295	13	---		29735	
Neptunium-237	B	1	44.00	mCi	0	0	---	mCi	0	0	---	mCi	0	1	44.00	mCi	0	
Neptunium-237	O	1	200.00	mg	90	1	1000.00	mg	445	4	51250.00	mg	18445	6	52450.00	mg	18980	
Neptunium-2370	O	0	---	mg	0	1	1000.00	mg	630	0	---	mg	0	1	1000.00	mg	630	
Nickel-63	B	0	---	mCi	0	1	10.00	mCi	0	1	---	mCi	0	1	10.00	mCi	0	
Nickel-63	O	0	---	mCi	0	29	20000.00	mCi	60000	1	0.50	mCi	200	30	20000.50	mCi	60200	
Niobium-95	O	6	39.00	mCi	4355	0	---	mCi	0	0	---	mCi	0	6	39.00	mCi	4355	

TABLE 5. (contd)

Isotope	Supplier	Domestic				Foreign				DOE				Total			
		Ship	Quantity	Unit	\$ Value	Ship	Quantity	Unit	\$ Value	Ship	Quantity	Unit	\$ Value	Ship	Quantity	Unit	\$ Value
Osmium-191	B	1	500.00	mCi	0	0	---	mCi	0	0	---	mCi	0	1	500.00	mCi	0
Phosphorus-33	0	6	1398.00	mCi	28724	0	---	mCi	0	0	---	mCi	0	6	1398.00	mCi	28724
Plutonium-236	0	1	---	µCi	2150	0	---	µCi	0	0	---	µCi	0	1	---	µCi	2150
Plutonium-238	0	0	---	mg	0	1	200.00	mg	890	0	---	mg	0	1	200.00	mg	890
Plutonium-239	0	4	415.00	mg	375	2	1010.00	mg	606	0	---	mg	0	6	1425.00	mg	981
Plutonium-240	0	0	---	mg	0	1	10.00	mg	30	0	---	mg	0	1	10.00	mg	30
Plutonium-241	0	1	0.50	mg	4	2	1010.00	mg	8080	0	---	mg	0	3	1010.50	mg	8084
Plutonium-242	0	0	---	mg	0	1	20.00	mg	317	0	---	mg	0	1	20.00	mg	317
Promethium-147	0	0	---	Ci	0	6	18203.00	Ci	80453	1	1085.00	Ci	3892	7	19288.00	Ci	84345
Protactinium-231	0	0	---	mg	0	1	5.00	mg	415	1	6.00	mg	287	2	11.00	mg	702
RW	0	1	7.00		210	3	600.00		18000	0	---		0	4	607.00		18210
Reactor Serv. Ir B	24	---			10206	0	---		0	0	---		0	24	---		10206
Reactor Serv. Ir O	3	-248000.00			408135	0	---		0	0	---		0	3	-248000.00		408135
Reactor Serv. Ir I	4	---			0	1	---		0	0	---		0	5	---		0
Ruthenium-103	0	0	--	mCi	0	0	---	mCi	0	2	6.00	mCi	0	2	6.00	mCi	714
Ruthenium-107	0	11	57.70	mCi	6799	0	---	mCi	0	2	1.50	mCi	400	13	59.20	mCi	7199
Ruthenium-97	8	1	1.00	mCi	0	0	---	mCi	0	0	---	mCi	0	1	1.00	mCi	0
Samarium-151	0	0	---	g	0	0	---	g	0	1	1000.50	g	445	1	1000.50	g	445
Selenium-75	0	20	16394.70	mCi	15652	0	---	mCi	0	0	---	mCi	0	20	16394.70	mCi	15652
Sodium-22	B	1	---	mCi	0	0	---	mCi	0	0	---	mCi	0	1	---	mCi	0
Sodium-22	1	426.00	mCi	7054	0	---	mCi	0	0	---	mCi	0	1	426.00	mCi	7054	
Special Process.	0	1	2.00		2406	0	---		700	8	258.00		19568	9	260.00		22674

TABLE 5. (contd)

Isotope	Sup-plier	Domestic				Foreign				DOE				Total			
		Ship	Quantity	Unit	\$ Value	Ship	Quantity	Unit	\$ Value	Ship	Quantity	Unit	\$ Value	Ship	Quantity	Unit	\$ Value
Special Serv.	0	137	-4705.00		348713	3	---		126150	5	1.50		36076	145	-4704.00		510939
Strontium-82	L	7	2165.00	mCi	32038	1	200.00	mCi	0	2	400.00	mCi	6100	1	2765.00	mCi	38138
Strontium-89	0	12	29034.08	Ci	41644	0	---	Ci	0	0	-29480.00	Ci	-88040	14	-645.92	Ci	-46396
Strontium-90	0	4	350.00	Ci	600	13	5.00	Ci	.00	1	---	Ci	0	18	355.00	Ci	1200
Target Prep.	0	7	---		144488	0	---		41525	16	---		80119	23	37.00		266132
Technetium-99	B	1	---	mCi	0	0	---	mCi	0	0	---	mCi	0	1	---	mCi	0
Technetium-99	0	20	87000.00	mg	5046	25	485000.00	mg	28214	0	---	mg	0	46	572000.00	mg	33260
Tellurium-128	B	1	5.00	mCi	0	0	---	mCi	0	0	---	mCi	0	1	5.00	mCi	0
Titanium-44	L	0	---	mCi	0	0	---	mCi	0	3	1.02	mCi	0	3	1.02	mCi	0
Thorium-229	0	1	---	ug	283	0	---	ug	0	0	---	ug	0	1	---	ug	283
Thorium-230	0	2	13.00	mg	302	2	630.00	mg	14647	0	---	mg	0	4	643.00	mg	14949
Thorium-232	0	2	250.00	mg	20	1	430000.00	mg	120	0	---	mg	0	3	480250.00	mg	140
Thulium-170	U	0	---	Ci	0	0	---	Ci	0	2	32.30	Ci	800	2	32.30	Ci	800
Tritium	B	4	3.60	Ci	0	0	---	Ci	0	0	---	Ci	0	4	3.60	Ci	0
Tritium	0	149	542191.00	Ci	60127	37	846188.00	Ci	960012	4	11708.00	Ci	8799	190	1400087.00	Ci	1569238
Uranium-233	0	2	220.00	mg	567	77	9306300.00	ug	3196174	1	25.00	mg	10	10	9306545.00	mg	3196751
Uranium-234	0	2	200.00	mg	8600	3	4110.00	mg	176730	1	6.00	mg	152	5	4316.00	mg	185482
Uranium-235	0	19	708950.10	mg	35110	4	3200.00	mg	430	0	---	mg	0	23	712150.10	mg	35540
Uranium-236	0	0	---	mg	0	3	5800.00	mg	2960	0	---	mg	0	3	5800.00	mg	2960
Uranium-238	B	5	301.90	mCi	6	1	0.01	mCi	0	0	---	mCi	0	6	301.91	mCi	0
Uranium-238	0	3	700.00	mg	31	1	200.00	mg	20	2	4000.00	mg	80	6	4900.00	mg	131

TABLE 5. (contd)

Isotope	Supplier	Domestic				Foreign				DOE				Total			
		Ship	Quantity	Unit	\$ Value	Ship	Quantity	Unit	\$ Value	Ship	Quantity	Unit	\$ Value	Ship	Quantity	Unit	\$ Value
Xenon-127	B	19	12788.45	mCi	2468	10	1918.00	mCi	1534	0	---	mCi	0	29	14706.45	mCi	4002
Xenon-127	L	0	---	mCi	0	0	---	mCi	0	7	31660.00	mCi	40660	7	31660.00	mCi	40660
Xenon-127	O	12	9730.00	mCi	31975	3	365.00	mCi	1980	2	300.00	mCi	1370	17	10395.00	mCi	35325
Yttrium-88	L	10	1482.60	mCi	47703	0	---	mCi	0	9	575.10	mCi	0	19	2057.70	mCi	47703
Zirconium-95	O	4	315.00	mCi	7626	5	39.00	mCi	1145	1	25.00	mCi	800	10	379.00	mCi	9571
TOTAL		1189			5139688	262			5766886	209			497/35	1660			11404309

Notes: Letters in second column indicate supplier by first letter of laboratory name (A = ANL, B = BNL, I = INEL, L = LANL, O = ORNL, S = SRP, U = UNC).

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