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**LIST OF DOE RADIOISOTOPE CUSTOMERS WITH  
SUMMARY OF RADIOISOTOPE SHIPMENTS, FY 1984**

D. A. Baker

August 1985

Prepared for  
the U.S. Department of Energy  
under Contract DE-AC06-76RLO 1830

Pacific Northwest Laboratory  
Richland, Washington 99352

This document is

**PUBLICLY RELEASABLE**

*Larry E. Williams*  
Authorizing Official

Date: *06/13/2007*

**MASTER**

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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 1984.



## 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  
UNC Nuclear Industries, Inc.

## PREVIOUS REPORTS

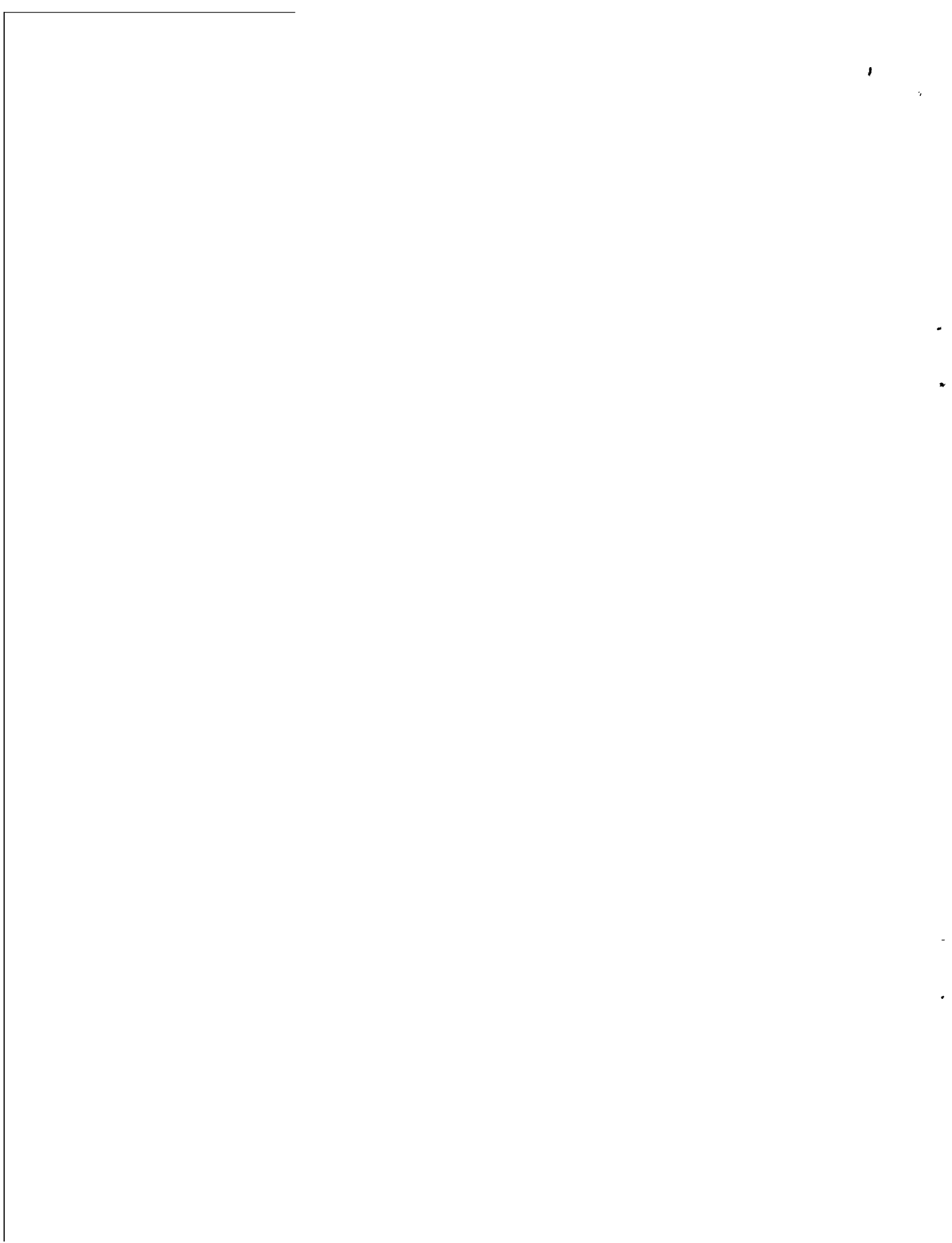
Previous reports in this series are:

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)	

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.





## 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 Contacts, 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 to the right 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 1984. Table 5 summarizes the FY-1984 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.



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2

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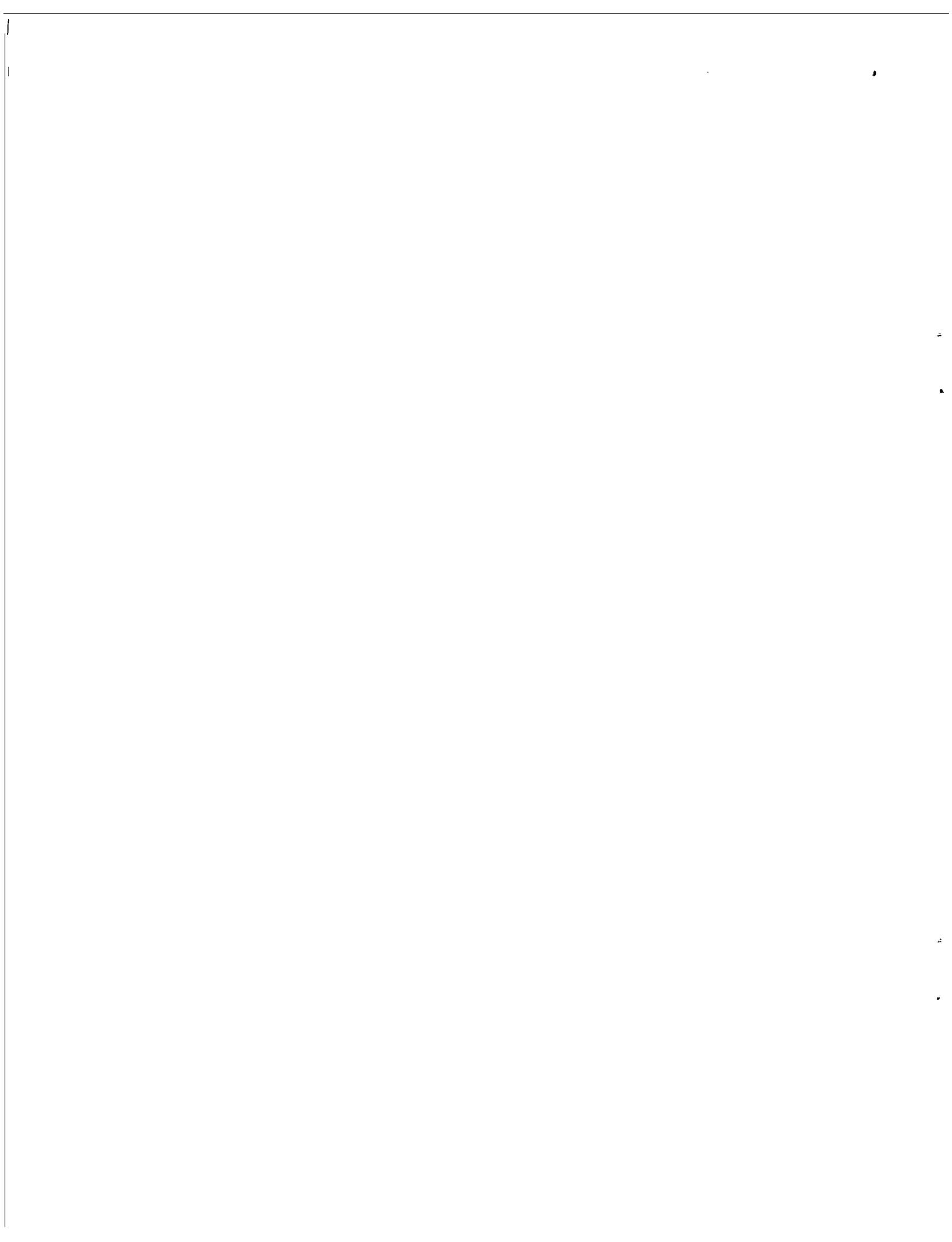


## LIST OF ABBREVIATIONS

AG-105	Silver-105	CSI-86	Cyclotron Service Irradiations by ORNL 86-inch cyclotron
AL-26	Aluminum-26	CU-65	Copper-65
AM-241	Americium-241	CU-67	Copper-67
AM-243	Americium-243	DU	Depleted Uranium
AT-211	Astatine-211	E	Enriched
AU-195	Gold-195	ES-253	Einsteinium-253
BA-140	Barium-140	EU	Enriched Uranium
BE-7	Beryllium-7	EU-152	Europium-152
BK-249	Berkelium-249	F-18	Fluorine-18
BR-77	Bromine-77	FE-52	Iron-52
BR-82	Bromine-82	FE-55	Iron-55
C-11	Carbon-11	FE-59	Iron-59
C-14	Carbon-14	FP	Fission Products
CA-47	Calcium-47	g	gram
CAP	Encapsulation	GA-67	Gallium-67
CD-109	Cadmium-109	GD-148	Gadolinium-148
CE-139	Cerium-139	GD-153	Gadolinium-153
CE-144	Cerium-144	GE-68	Germanium-68
CF-249	Californium-249	H-3	Hydrogen-3 (tritium)
CF-252	Californium-252	HF-172	Hafnium-172
Ci	Curie	HO-163	Holmium-163
CM-243	Curium-243	I-123	Iodine-123
CM-244	Curium-244	I-129	Iodine-129
CM-248	Curium-248	I-131	Iodine-131
CO-57	Cobalt-57	IN-111	Indium-111
CO-58	Cobalt-58	IR-192	Iridium-192
CO-60	Cobalt-60	kCi	kilocurie
CS-137	Cesium-137	kg	kilogram
CSI	Cyclotron Service Irradiations	KR-85	Krypton-85
CSI-B	Cyclotron Service Irradiations by Brookhaven	KR-85E	Enriched Krypton-85
CSI-L	Cyclotron Service Irradiations by Los Alamos	LU-172	Lutetium-172
		LU-173	Lutetium-173

MCP	Miscellaneous Compound Preparations	RSI	Reactor Service Irradiations
μCi	microcurie	RU-97	Ruthenium-97
μg	microgram	RU-103	Ruthenium-103
mCi	millicurie	RU-106	Ruthenium-106
mg	milligram	RW	Withdrawn radioisotopes prepared under special approval
MG-28	Magnesium-28	5e-75	Selenium-75
MI	Miscellaneous Isotopes	5i-31	Silicon-31
MIS	Miscellaneous Quantities	5i-32	Silicon-32
MS	Miscellaneous Services	SM-151	Samarium-151
NA-22	Sodium-22	SN-117	Tin-117
NA-24	Sodium-214	SP	Special Processing
NB-95	Niobium-95	5r-82	Strontium-82
NI-63	Nickel-63	5r-89	Strontium-89
NP-237	Neptunium-237	5r-90	Strontium-90
NP-237H	High Purity NP-237	SS	<b>Special Services</b>
NP-2370	Oxide of NP-237	TR-158	Terbium-158
NU	Natural Uranium	TC-99	Technetium
os-191	Osmium-191	TH-229	Thorium-229
P-33	Phosphorus-33	TH-230	Thorium-230
PA-231	Protactinium-231	TH-232	Thorium-232
PD-109	Protactinium-109	TH-234	Thorium-234
PM-147	Promethium-147	t1-44	Titanium-44
PO-208	Polonium-208	TM-167	Thulium-167
PU-236	Plutonium-236	TM-170	Thulium-170
PU-237	Plutonium-237	TP	Target Preparations
PU-238	Plutonium-238	U-233	Uranium-233
PU-239	Plutonium-239	U-234	Uranium-234
PU-240	Plutonium-240	U-235	Uranium-235
PU-241	Plutonium-241	U-236	Uranium-236
PU-242	Plutonium-242	U-238	Uranium-238
RB-81	Rubidium-81	V-48	Vanadium-48
RB-83	Rubidium-83	v-54	Vanadium-54
RB-86	Rubidium-86	XE-127	Xenon-127

Y-87      Yttrium-87  
Y-88      Yttrium-88  
ZN-65     Zinc-65  
ZR-95     Zirconium-95





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

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

<u>Isotope Supplier</u>	<u>Supplier Code</u>	<u>Facility Contact</u>	<u>Isotopes or Service</u>
Argonne National Laboratory	ANL	R. B. Perry Special Materials Division Argonne National Laboratory 9700 S. Cass Ave. Argonne, IL 60439 FIS 972-3425 Commercial (312) 972-3425	F-18 (CSI)
Brookhaven National Laboratory	BNL	K. S. Dahms Isotopes and Special Materials Group Brookhaven National Laboratory Upton, NY 11973 FIS 666-4051 Commercial (516) 282-4051	AT-211, CD-109, CM-244 CO-60, CS-137, CSI, CU-67, F-18, FE-52, GE-68, I-123, I-131, MG-28, MI, OS-191, PD-109, RSI, RU-103, RU-106, SI-32, SN-117, SR-82, SR-90, U-238, XE-127, ZN-65
Hanford Engineering Development Laboratory	HEDL	W. R. Brooksher, Manager Safeguards and Security Westinghouse Hanford Company P.O. Box 1970 Richland, WA 99352 FIS 444-9927 Commercial (509) 376-9927	No Isotopes Produced in FY 1984
Idaho National Engineering Laboratory	INEL	R. E. Korenke EG&G Idaho, Inc. P.O. Box 1625 Idaho Falls, ID 83415 FIS 583-4466 Commercial (208) 526-4466	RSI, Co-60

Table 1. (Contd)

<u>Isotope Supplier</u>	<u>Supplier Code</u>	<u>Facility Contact</u>	<u>Isotopes or Service</u>
Los Alamos National Laboratory	LANL	K. E. Peterson Group INC-3, Mail Stop 5519 Los Alamos National Laboratory Los Alamos, NM 87545 FTS 843-4675 Commercial (505) 667-4675	AG-105, AL-26, BE-7, BR-77, BR-82, CD-109, CE-139, CU-67, FE-52, GE-68, HO-163, NA-22, RB-86, SR-82, V-48, 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, CA-47, CAP, CE-144, CF-249, CF-252, CM-244, CO-60, CS-137, CSI, EU-152, FE-55, GD-153, H-3, I-129, IR-192, KR-85, KR-85E, MCP, MG-28, MS, NB-95, NP-237H, NP-2370, OS-191, P-33, PA-231, PM-147, PU-236, PU-237, PU-238, PU-239, PU-240, PU-241, PU-242, RU-101, RU-106, RU-107, RW, SE-75, SM-151, SP, SR-89, SR-90, SS, TC-99, TH-229, TH-230, TH-232, TH-239, 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 375-28041 Commercial (509) 375-2804	No Isotopes produced in FY 1984 other than a very small amount of AM-241 shipped to Hanford Engineering Development Laboratory

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. Larrick, 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

DOMESTIC CUSTOMERS

1	AT&T Technologies P.O. Box 1409 Lawrence, MA 01842	ORNL: KR-85
2	AT&T Technologies Incorporated 777 North Blue Parkway Lees Summit, MO 64063	ORNL: KR-85
3	Accu Labs 11385 W. 48th Avenue Wheat Ridge, CO 80033	ORNL: AM-243
4	Advanced Medical Systems, Inc. 621 Factory Row Geneva, OH 44041	ORNL: CO-60, MCP, RW, SS
5	Advanced Micro Devices, Inc. P.O. Box 453 Sunnyvale, CA 94086	ORNL: KR-85
6	Albert Einstein College of Medicine 1300 Morris Park Avenue Bronx, NY 10461	LANL: CU-67 ORNL: CSI
7	Alpha Nuclear Laboratories, Inc. 9982 Monroe Drive Suite 405 Dallas, TX 75220	ORNL: TH-239
8	Alpha Test 1996 Lundy Avenue San Jose, CA 95131	ORNL: KR-85
9	Amersham Corporation Arlington Heights, IL 60005	ORNL: GD-153, KR-85
10	Argonne National Laboratory 9700 South Cass Ave. Argonne, IL 60439	ORNL: CF-252, H-3, NB-95, TH-230, TP
11	Automation Industries, Inc. P.O. Box 245 Phoenixville, PA 19460	ORNL: IR-192
12	Baltimore City Hospital Gerontology Research Center 4940 Eastern Avenue Baltimore, MD 21224	BNL: MG-28

Table 2. (Contd)

13	Battelle Memorial Institute 505 King Highway Columbus, OH 43201	ORNL: MIS
14	Bendix Corporation, The 2000 East Bannister Road Kansas City, MO 64131	ORNL: SR-90, SS
15	Benedict Nuclear Pharmaceuticals, Inc. 1313 Washington Avenue Golden, CO 80401	BNL: 1-123
16	Best Industries, Incorporated P.O. Box 681 Washington, DC 20044	ORNL: CS-137
17	Bicron Corporation 12345 Kinsman Road Newbury, OH 44065	BNL: CM-244
18	Brigham & Women's Hospital 10 Vining Street Boston, MA 02115	BNL: I-123 ORNL: CSI
19	Brookhaven National Laboratory Isotopes & Special Metals Group Upton, Long Island, NY 11973	LANL: XE-127 ORNL: CSI, RU-101
20	California Institute of Technology 391 South Holliston Pasadena, CA 91125	LANL: AL-26
21	California State University 800 North State College Fullerton, CA 92624	LANL: CU-67 ORNL: CSI
22	California State University Department of Chemistry 18111 Northridge Street Northridge, CA 91330	LANL: V-48
23	Calm VA-1 (525) P.O. Box 2971 Austin, TX 78769	ORNL: XE-12 (a)
24	Case-Western Reserve University 2220 Circle Drive Cleveland, OH 44106	BNL: MG-28 ORNL: MG-28

(a) Xenon-127 listed for ORNL created at BNL or LASL.

Table 2. (Contd)

25	Chevron Research Company 555 Market Street San Francisco, CA 94120	ORNL: KR-85
26	Children's Hospital Medical Center Radiation Control 20 Blackfan Street Boston, MA 02115	BNL: 1-123
27	Children's Medical Center 300 Longwood Avenue Boston, MA 02115	BNL: I-123, OS-191 ORNL: CSI, OS-191
28	Colgate Palmolive Research Center 909 River Road Piscataway, NJ 08854	ORNL: P-33
29	Columbia University P.O. Box 21 Irvington, NY 10533	ORNL: H-3, TP
30	Columbia University 630 West 168 Street New York, NY 10032	BNL: CU-67, PD-109, RU-103, SN-117
31	Combustion Engineering, Inc. Box 400 Windsor, CT 06095	ORNL: NP-237, TP, U-238
32	Continental Oil Company, Inc. Research and Development Department P.O. Box 1267 Ponca City, OK 74601	ORNL: SR-89
33	Cray Research, Inc. Hwy. 178 No. Industrial Park Chippewa Falls, WI 54729	ORNL: KR-85
34	Cryogenic Rare Gas Laboratories, Inc. 46 Liberty Street Newark, NJ 07103	ORNL: KR-85
35	Detroit Edison Accounts Payable Department P.O. Box 1659 Detroit, MI 48231	ORNL: KR-85
36	Duke University Durham, NC 27706	ORNL: H-3, TP



Table 2. (Contd)

37	E. I. DuPont de Nemours & Company, Inc. NEN Products Accounts Payable 549 Albany Street Boston, MA 02118	ORNL: CE-144, CSI, GD-153, H-3, I-129, KR-85, P-33, RW, TC-99, ZR-95
38	E. I. DuPont de Nemours & Company, Inc. Savannah River Plant Aiken, SC 29801	ORNL: CF-252, MIS, PU-237, ZR-95
39	E. R. Squibb & Sons P.O. Box CN 5303 Princeton, NJ 08540	ORNL: CSI
40	E. R. Squibb & Sons Radio Pharmaceutical R & D Route 1 via Gate 125 New Brunswick, NJ 08901	BNL: SR-82 LANL: SR-82
41	EAL Corporation 2030 Wright Avenue Richmond, CA 94804	BNL: SR-90
42	EG&G Idaho, Inc. P.O. Box 1625 Idaho Falls, ID 83415	INEL: RSI ORNL: CE-144, SP, TP, U-238
43	East Carolina University Purchasing Department Greenville, NC 27834	ORNL: SR-89
44	Edgerton, Germeshausen and Grier 6456 So. Escondido Avenue Las Vegas, NV 89101	ORNL: CO-60, MCP
45	Electric Power Research Institute P.O. Box 10412 Palo Alto, CA 94303	ORNL: CSI
46	Fairchild Camera & Instrument Corp. Accounts Payable 33309 First Way South Federal Way, WA 98063-9701	ORNL: KR-85
47	Fairchild Camera & Instrument Corp. Bipolar Division Accounts Payable P.O. Drawer 7283 Mt. View, CA 94942	ORNL: KR-85

Table 2. (Contd)

48	Fairchild Camera & Instrument Corp. Linear Division P.O. Drawer 7282 Mt. View, CA 94042	ORNL: KR-85
49	Fairchild Camera & Instrument Corp. Discrete Division 4300 Redwood Highway San Rafael, CA 94903	ORNL: KR-85
50	Fairchild Semiconductor 333 Western Avenue Portland, ME 04016	ORNL: KR-85
51	Fermi National Accelerator Laboratory Batavia, IL 60510	BNL: RU-106, U-238
52	Ford Aerospace and Communications Corporation Aeronautic Division Ford Road Newport Beach, CA	ORNL: KR-85
53	G. E. Intersil Inc. Accounts Payable 10710 North Tantau Avenue Cupertino, CA 95014	ORNL: KR-85
54	GA Technologies P.O. Box 85608 San Diego, CA 92138	ORNL: CS-137, SR-90, SS
55	GPU Nuclear Corporation P.O. Box 1018 Reading, PA 19603	ORNL: SS
56	Gamma Industries, Inc. P.O. Box 2543 Baton Rouge, LA 70821	ORNL: IR-192, SS
57	Gearhart Industries P.O. Box 1936 Fort Worth, TX 76101	ORNL: TH-232, TP
58	General Electric Company Domestic Products Division Mail Code 399 175 Curtner Avenue San Jose, CA 95125	INEL: RSI

Table 2. (Contd)

59	General Electric Company Development Center P.O. Box B Schenectady, NY 12301	ORNL: CF-252, TP
60	General Electric Company Lynchburg, VA 24502	ORNL: KR-85
61	General Electric Company P.O. Box 98 Mattydale, NY 13211	ORNL: KR-85
62	General Electric Company Vallecitos Nuclear Company Vallecitos Road Pleasanton, CA 94566	INEL: RSI SRP: CF-252
63	General Electric Company P.O. Box 254 San Jose, CA 95103	ORNL: MCP, SS, TP, U-234
64	General Semiconductor, Incorporated 2001 West 10th Place Tempe, AZ 85281	ORNL: KR-85
65	Genicom Corporation One General Electric Drive Waynesboro, VA 22980	ORNL: KR-85
66	George Washington Medical Center Walter G. Ross Hall 2300 I Street, N.W. Washington, DC 20037	BNL: I-123
67	Georgia Institute of Technology Nuclear Research Center 225 North Avenue, N.W. Atlanta, GA 30332	ORNL: KR-85, TC-99
68	Georgia Power Company Accounting Department P.O. Box 4,545 Atlanta, GA 30302	ORNL: KR-85
69	Gollob Analytical Service Corporation 47 Industrial Road Berkeley Heights, NJ 07922	ORNL: H-3, KR-85
70	Gulf Nuclear, Inc. 202 Medical Center Webster, TX 77598	ORNL: AM-241, CS-137, GD-153, IR-192, MCP

Table 2. (Contd)

71	Harris Semiconductor P.O. Box 883 Melbourne, FL 32901	ORNL: KR-85
72	Harvard Medical School Shields Warren Laboratory 50 Binney Street Boston, MA 02115	BNL: AT-211
73	Honeywell 1150 East Cheyenne Mountain Boulevard Colorado Springs, CO 80906	ORNL: KR-85
74	Hughes Aircraft Company P.O. Box 92907 Los Angeles, CA 90009	ORNL: KR-85
75	Hughes Aircraft Company Accounts Payable P.O. Box 1079 El Segundo, CA 90245	ORNL: KR-85
76	Hybritech Incorporated 9850 Distribution Avenue San Diego, CA 92121	LANL: Y-88 ORNL: CSI, SS
77	IBM Research Center Kitchawan Road, RT. 134 Yorktown, NY 10598	LANL: CU-67
78	ICN-NB Company 26201 Miles Road Cleveland, OH 44128	ORNL: CS-137, H-3, I-129, RU-106, SE-75, SR-90
79	INTEL Corporation P.O. Box 35900 Phoenix, AR 85069	ORNL: KR-85
80	INTEL Corporation 3065 Bowers Avenue Santa Clara, CA 95051	ORNL: KR-85
81	Indiana University - Purdue University at Indianapolis 630 W. New York Street Indianapolis, IN 46202	ORNL: CSI
82	Industrial Nuclear Company 1123 Chess Drive Foster City, CA 94404	ORNL: IR-192

Table 2. (Contd)

83	Isomedix Inc. P.O. Box 177 25 Eastmans Road Parsippany, NJ 07054	ORNL: CS-137, MCP
84	Isotope Products Laboratories 404 South Luke Street Burbank, CA 91502	BNL: CD-109, SI-32 LANL: Y-88 ORNL: CE-144, CF-252, CM-244, CS-137, CSI, I-129, KR-85, MCP, PM-147, PU-239, RU-106, SE-75, SP, SR-90, TH-230, TP, U-235, ZR-95
85	Isovac Engineering Company 6220 San Fernando Road Glendale, CA 92104	ORNL: KR-85
86	Johns Hopkins Hospital Radiation Safety 615 North Wolfe Street Baltimore, MD 21205	BNL: 1-123 ORNL: RW
87	Johns Hopkins Medical Institutions Divisions of Nuclear Medicine 622 North Washington Street Baltimore, MD 21205	BNL: 1-123 LANL: CU-67
88	Johns Hopkins University Baltimore, MD 21218	ORNL: CSI
89	KMS Fusion, Inc. 3941 South Research Park Drive P.O. Box 1567 Ann Arbor, MI 48106	ORNL: H-3
90	Kaman Instrumentation Corporation P.O. Box 7463 Colorado Springs, CO 80933	ORNL: H-3, TP
91	Kyocera International, Inc. 8611 Balboa Avenue San Diego, CA 92123	ORNL: KR-85
92	LSI Avionic Systems Corporation 43 Fairfield Place West Caldwell, NJ 07006	ORNL: KR-85

Table 2. (Contd)

93	Lawrence Livermore National Laboratory Box 808 Livermore, CA 94550	ORNL: CE-144, CF-252, H-3, PA-231, PM-147, PU-240, PU-241, RU-106, SP, TC-99, TH-232, TP
94	Leach Corporation Relay Division 5915 Avalon Boulevard Los Angeles, CA 90003	ORNL: KR-85
95	Litton Industries Guidance and Control Systems 5500 Conoga Avenue Woodland Hills, CA 91367	ORNL: KR-85
96	Lixi Inc. 1438 Brook Drive Downers Grove, IL 60515	ORNL: GD-153
97	Lockheed Engineering & Management Services Company 1830 Nasa Road 1 Houston, TX 77258	ORNL: SR-89
98	Los Alamos National Laboratory P.O. Box 1663 Los Alamos, NM 87545	BNL: CU-67, ZN-65 LANL: AG-105, BR-77, BR-82, CE-139, CU-67, V-48 ORNL: CE-144, CF-249, CF-252, CSI, I-129, PU-237, SS, TH-230
99	Lovelace Biomedical and Environmental Research Institute Building 9217, Area Y Kirtland, NM 87115	LANL: BE-7
100	Lovelace Clinic 4800 Gibson Boulevard, S.E. Albuquerque, NM 87108	ORNL: CE-144, CSI, NP-237, SS
101	Loyola Medical Center Nuclear Medicine 2160 South First Avenue Maywood, IL 60153	BNL: 1-123
102	Loyola University Medical Center 2160 South First Avenue Maywood, IL 60153	ANL: F-18 ORNL: CSI

Table 2. (Contd)

103	Malinckrodt, Inc. 2703 Wagner Place Maryland Heights, MO 63043	BNL: XE-127 ORNL: SE-75, XE-127
104	Marubeni America Corporation 14 Henderson Drive West Caldwell, NJ 07006	ORNL: PU-242, U-233
105	Massachusetts General Hospital Physics Research Laboratory Fruit Street Boston, MA 02114	BNL: F-18
106	Massachusetts Institute of Technology Box 69 Cambridge, MA 02139	ORNL: CE-144, TH-229, TH-230, TP, U-238
107	Mayo Foundation 200 1st Street, S.W. Rochester, MN 55905	ORNL: CA-47
108	Medical Research Foundation, Inc. Neely Nuclear Research Center 900 Atlantic Drive, N.W. Atlanta, GA 30318	ORNL: CSI
109	Mercer School of Medicine Finance Office 1550 College Street Macon, GA 31207	ORNL: SR-89
110	Methodist Hospital 1604 N. Capitol Avenue Indianapolis, IN 46202	BNL: XE-127 ORNL: XE-127
111	Micra Corporation 120 Ricefield Lane Hauppauge, NY 11788	ORNL: KR-85
112	Mini-Dose Laboratories, Inc. 1825 Emerson Street Denver, CO 80218	ORNL: CSI
113	Minnesota Mining Manufacturing Company P.O. Box 3121 St. Paul, MN 55101	ORNL: GD-153, NB-95, SS

Table 2. (Contd)

114	Monolithic Memories Incorporated 1275 Mission College Boulevard Santa Clara, CA 95050	ORNL: KR-85
115	Monsanto Company P.O. Box 1311 Texas City, TX 77591	ORNL: CO-60, KR-85
116	Monsanto Research Corporation Dayton, OH	SRP: CF-252
117	Monsanto Research Corporation Mound Laboratory P.O. Box 32 Mamisburg, OH 45342	ORNL: SP
118	Moravek Biochemicals, Inc. 577 Mercury Lane Brea, CA 92621	ORNL: H-3
119	Mostek P.O. Box 169 1215 West Crosby Road Carrollton, TX 75006	ORNL: KR-85
120	Motorola, Inc. 3501 Ed Bluestein Boulevard Austin, TX 78721	ORNL: KR-85
121	Motorola, Inc. 5005 East McDowell Road Phoenix, AZ 85008	ORNL: KR-85
122	Mount Sinai Hospital Fifth Avenue and 100th Street New York, NY 10029	ORNL: MCP
123	Mount Sinai Medical Center 4300 Alton Road Miami Beach, FL 33139	ORNL: CSI
124	NL Erco/NL Industries, Inc. 15702 West Hardy Road Suite 240 Houston, TX 77060	ORNL: KR-85
125	NIS Corporation Park West II Cliff Nine Road Pittsburg, PA 15275	ORNL: SP



Table 2. (Contd)

126	National Semiconductor Corporation 2900 Semiconductor Drive Santa Clara, CA 95051	ORNL: KR-85
127	National Semiconductor Corporation 5901 South Calle Santa Cruz Tucson, AZ 85706	ORNL: KR-85
128	Naval Medical Command National Capitol Region Building 1, Tower 6 Bethesda, MD 20014	BNL: XE-127
129	Neutron Products, Inc. P.O. Box 68 Mt Ephraim Road Dickerson, MD 20753	INEL: CO-60
130	New England Nuclear Corporation 331 Treble Cove Road North Billerica, MA 01862	BNL: GE-68 LANL: CU-67, NA-22, Y-88
131	New York Medical College Department of Microbiology Basic Science Building Valhalla, NY 10595	BNL: CU-67
132	New York University Medical Center 550 First Avenue New York, NY 10016	ORNL: CE-144
133	North Carolina Memorial Hospital Division of Nuclear Medicine 2nd Floor, Old Clinic Building Chapel Hill, NC 27514	BNL: XE-127 ORNL: XE-127
134	Northwestern University 619 Clark Street Evanston, IL 60201	ORNL: MIS
135	Nuclear Radiation Development, Inc. 2937 Alt Eloulevard Grand Island, NY 14072	ORNL: AM-241, CAP, H-3
136	Nuclear Sources and Services P.O. Box 14023 Houston, TX 77021	ORNL: AM-241, KR-85

Table 2. (Contd)

137	<b>Oak</b> Ridge Associated Universities P.O. Box 117 Oak Ridge, TN 37830	LANL: BE-7, GE-68 ORNL: CF-252, CS-137, CSI, MIS, SS
138	Oak Ridge National Laboratory P.O. Box X Oak Ridge, TN 37830	BNL: I-123
139	Ohio State University Research Foundation 1314 Kinnear Road Columbus, OH 43212	ORNL: SR-89
140	Pacific Northwest Laboratory Battelle-Northwest P.O. Box 999 Richland, WA 99352	BNL: CO-60, CS-137 ORNL: AM-241, CAP, MCP, PM-147, PU-247, SM-151, TC-99, TP UNC: TM-170
141	Pathfinder Laboratories, Inc. 11542 Fort <del>Mills</del> St. Louis, MO 63141	ORNL: H-3
142	Post, Buckley, Schuh & Jernigan, Inc. 889 North Orange Avenue Orlando, FL 32801	ORNL: SP
143	Potter and Brumfield Princeton, IN 47570	ORNL: KR-85
144	Princeton University James Forrestal Campus Princeton, NJ 08540	ORNL: KR-85
145	Purdue University Pharmacy <b>Annex</b> Lafayette, IN 47907	ORNL: SE-75
146	RCA Raritan, NJ 08869	ORNL: KR-85
147	Radium Chemical Company, Inc. 161 East 42nd Street <del>New</del> York, NY 10036	ORNL: H-3
148	Raytheon Company 350 Ellis Street Mountain View, CA 94042	ORNL: KR-85

Table 2. (Contd)

149	Raytheon Company 350 Lowell Street West Andover, MA 01810	ORNL: KR-85
150	Reactor Experiments, Inc. 963 Terminal Way San Carlos, CA 94070	ORNL: NP-237, PU-239, TP, U-235, U-238
151	Reuter-Stokes Electronics Components 18530 South Miles Parkway Warrensville Heights Cleveland, OH 44128	ORNL: TP, U-234, U-235
152	Reynolds Electric Engineering Company P.O. Box 14400 Las Vegas, NV 89114	ORNL: PU-242, SP
153	Rockwell Hanford Company P.O. Box 769 Richland, WA 99352	ORNL: AM-243, CE-144, EU-152, PU-236, TP, ZR-95
154	Rockwell International Atomics International Division Rocky Flats Plant P.O. Box 464 Golden, CO 80401	BNL: U-238 ORNL: CSI
155	Safety Light Corporation 4150-A Old Berwick Road Bloomsburg, PA 17815	ORNL: H-3
156	Sandia Corporation P.O. Box 5800 Albuquerque, NM 87115	ORNL: SP
157	Saunders-Roe Saunders-Roe Developments, Incorporated P.O. Box 5536 2580 Landmark Drive Winston-Salem, NC 27103	ORNL: SP
158	Science Applications 3 Choke Cherry Road Rockville, MD 20850	ORNL: 1-129
159	Self Powered Lighting, Ltd. 8 Westchester Plaza Elmsford, NY 10523	ORNL: H-3

Table 2. (Contd)

160	Shepherd and Associates, J. L. 1614 Victor Boulevard Glendale, CA 91201	ORNL: CS-137, MCP
161	Signetics Corporation 1275 South 800 East Orem, UT 84057	ORNL: KR-85
162	Signetics Incorporated 811 East Argues Avenue P.O. Box 3409 Sunnyvale, CA 94088-3409	ORNL: KR-85
163	Siliconix, Inc. Mail Stop 60 2201 Laurelwood Road Santa Clara, CA 95054	ORNL: KR-85
164	Sloan-Kettering Cancer Center 411 East 67th Avenue New York, NY 10021	BNL: FE-52 LANL: GE-68
165	Sloan-Kettering Institute 425 East 68th Street New York, NY 10021	ORNL: CSI
166	Sloan-Kettering Via E. R. Squibb Route 1 Via Gate 125 New Brunswick, NJ 08901	LANL: SK-82
167	Sloan-Kettering and University of Texas Via E. R. Squibb & Sons Route 1 Via Gate 125 New Brunswick, NJ 08901	LANL: SR-82
168	Source Production and Equipment Company, Inc. 625 Oxley Street Kenner, LA 70062	ORNL: IR-192
169	Sperry Computer Systems Accounts Payable P.O. Box 8128 Roseville, MN 55113	ORNL: KR-85
170	Sprague Electric Company North Adams, MA 01247	ORNL: GD-153

Table 2. (Contd)

171	State University of New York at Stony Brook Research Foundation Stony Brook, NY 11790	ORNL: XE-127
172	State University of New York at Stony Brook University Hospital Stony Brook, NY 11794	BNL: XE-127
173	TRW Systems Group One Space Park Redondo Beach, CA 90277	ORNL: KR-85
174	TYCO Laboratories General Nucleonics Division 2811 Metropolitan Place Pomona, CA 91767	ORNL: KR-85
175	Technical Operations South Avenue Burlington, MA 01803	ORNL: IR-192
176	Teledyne Isotopes 123 Woodland Avenue Westwood, NJ 07675	ORNL: PU-236
177	Texas A and M Research Foundation P.O. Box H College Station, TX 77843	ORNL: PU-238
178	Texas Instruments, Inc. Science Services Division P.O. Box 5012, Mail Stop 6 Dallas, TX 75222	ORNL: KR-85
179	The Wistr Institute Thirty-Sixth Street at Spruce Philadelphia, PA 19104	BNL: 1-123, 1-131
180	Tracero Corporation P.O. Box 192 S. Houston, TX 77587	ORNL: KR-85
181	Trio Tech International 2040 N. Lincoln Street Burbank, CA 91504	ORNL: KR-85

Table 2. (Contd)

182	Tufts University School of Medicine New England Enzyme Center 136 Harrison Avenue Boston, MA 02111	BNL: TH-234
183	U.S. Army Armed Forces Radiobiology Research Institute Defense Nuclear Agency Bethesda, MD 20014	ORNL: SR-89
184	U.S. Department of Agriculture Radiological Safety Staff Room 226, B-001, BARC-West Beltsville, MD 20705	LANL: CU-67
185	U.S. Department of Agriculture Research Service P.O. Box 53326 New Orleans, LA 70150	ORNL: CSI
186	U.S. Department of Agriculture Grand Forks Human Nutrition Research Center Box 7166 University Station Grand Forks, ND 58202	LANL: CU-67
187	U.S. Department of Energy 376 Hudson Street, 5th Floor New York, NY 10014	ORNL: SS
188	U.S. National Bureau of Standards Rec. Room, Bldg 301 Route 270, Quince Orchard Road Gaithersburg, MD 20878	BNL: XE-127
189	U.S. National Bureau of Standards Connecticut Avenue and Van Ness St. N.W. Washington, DC 20234	ORNL: MIS
190	U.S. National Institute of Health 9000 Rockville Pike Bethesda, MD 20205	BNL: F-18, FE-52 LANL: CU-67 ORNL: CSI, MCP, MG-28

Table 2. (Contd)

191	U.S. Navy National Naval Medical Center Bethesda, MD 20014	ORNL: XE-127
192	U.S. Navy Naval Electronics Lab Center 271 Catalina Boulevard San Diego,, CA 92152	ORNL: PU-237
193	U.S. Navy Naval Research Laboratory Washington, DC 20390	ORNL: CM-244, TP
194	U.S. Public Health Environment Accounting Operations Office Research Triangle Park Durham, NC	ORNL: SP
195	U.S. Test-ing Company, Inc. 2800 George Washington Way Richland, WA 99352	ORNL: PU-237
196	Union Carbide Corporation Nuclear Division Oak Ridge Gaseous Diffusion Plant P.O. Box P Oak Ridge,, TN 37830	ORNL: RW
197	Union Carbide Corporation Nuclear Division Oak Ridge National Laboratory P.O. Box X Oak Ridge,, TN 37830	ORNL: CAP, CE-144, CS-137, CSI, FE-55, H-3, 1-129, KR-85, MCP, NP-237, P-33, PA-231, PU-240, RU-106, RU-107, RW, SP SR-90, SS, TC-99, TP, ZR-95
198	Union Carbide Corporation Nuclear Division Y-12 Plant P.O. Box Y Oak Ridge,, TN 37830	ORNL: GD-153, IR-192, PU-242, SS
199	Unit Process Assemblies, Inc. 53-15 37th Avenue Woodside, NY 11377	ORNL: SR-90
200	University for Medicine and Dentistry Building 16-R 1609 100 Bergen Street Newark, NJ 07103	BNL: 1-123

Table 2. (Contd)

201	University of California Lawrence Berkeley Laboratory Berkeley, CA 94720	BNL: CM-244, I-123, SR-82 LANL: SR-82 ORNL: CSI, H-3, TP
202	University of California Davis Medical Center 4301 X Street Sacramento, CA 95817	BNL: CU-67 LANL: BR-77, CU-67
203	University of California Davis Laboratory for Energy Related Health Research Davis, CA 95616	ORNL: SP
204	University of California 400 Sproul Hall Berkeley, CA 94720	ORNL: H-3, TP
205	University of California Parnassus Avenue San Francisco, CA 94143	ORNL: SR-89
206	University of Chicago Physical Science Department 1525 E. Hyde Park Boulevard Chicago, IL 60615	ORNL: CA-47, CSI
207	University of Chicago Radiation Protection Service HP11, Department 1034 5835 S. Cottage Grove Avenue Chicago, IL 60637	LANL: GE-68
208	University of Cincinnati Purchasing Department Cincinnati, OH 45221	ORNL: CE-144, RU-106, ZR-95
209	University of Connecticut Physical Sciences Building Central Warehouse Storrs, CT 06268	BNL: MG-28 ORNL: MG-28
210	University of Florida Gainesville, FL 32601	ORNL: SP, TH-230
211	University of Indiana University Hospital 926 W. Michigan Street Indianapolis, IN 46207	BNL: I-123



Table 2. (Contd)

212	University of Kansas Medical Center 39th and Rainbow Blvd Kansas City, KS 66103	BNL: I-123 ORNL: CSI
213	University of Lowell Research Foundation 450 Aiken Street Lowell, MA 01845	ORNL: PU-239, SP, TP
214	University of Maryland College Park, MD 20742	ORNL: H-3, TP
215	University of Mass. Medical Center Department; of Nuclear Medicine 55 North Lake Avenue Worcester,, MA 01605	ORNL: RU-107
216	University of Michigan N. University Building Ann Arbor,, MI 48109	BNL: 1-123 LANL: GE-68 ORNL: CSI, SS
217	University of Minnesota W-172 Boynton Health Services 410 Church Street Minneapolis, MN 55455	LANL: Y-88
218	University of Nebraska Medical Center Nuclear Pharmacy 42nd and Dewey Street Omaha, NE 68105	LANL: FE-52
219	University of New Mexico Radiation Safety Office Medical Building 3 #137 Albuquerque, NM 87131	LANL: BR-77
220	University of North Carolina Chemistry Venable 045A Chapel Hill, NC 27514	BNL: MG-28 ORNL: U-236
221	University of Oklahoma Purchasing Department Health Sciences Center/Nuclear Pharmacy Service Center Building Oklahoma City, OK 73190	ORNL: SE-75

Table 2. (Contd)

222	University of Oklahoma Norman, OK 73069	ORNL: H-3, TP
223	University of Pennsylvania Cerebrovascular Research Center 36th Street & Hamilton Walk Philadelphia, PA 19104	BNL: F-18
224	University of South Carolina Department of Physics and Astronomy Columbia, SC 29298	LANL: RB-86
225	University of Southern California Accounts Payable P.O. Box 77967 Los Angeles, CA 90089	ORNL: MCP
226	University of Texas at Dallas P.O. Box 30365 Dallas, TX 75230	ORNL: CA-47, SR-89
227	University of Utah Purchasing Department Salt Lake City, UT 84112	ORNL: PU-237
228	University of Virginia Radiation Safety Officer RWMF, 124 - 11th Street, S.W. Charlottesville, VA 22903	BNL: XE-127 ORNL: CF-252, TP, XE-127
229	University of Wisconsin 750 University Avenue Madison, WI 53706	LANL: SR-82 ORNL: H-3
230	V. A. Hospital Chief, Supply Service Bldg. 1, Room 6137 Hines, IL 60141	BNL: MG-28
231	V. A. Hospital Wilshire and Sawtelle Boulevards Los Angeles, CA 90073	ORNL: CA-47
232	V. A. Hospital Nuclear Medicine 1400 V.F.W. Parkway West Roxbury, MA 02132	BNL: XE-127

Table 2. (Contd)

233	V. A. Hospital and Medical Center Ann Arbor, M 48104	BNL: 1-123 ORNL: CSI
234	V. A. Hospital, Hines Calm 361 1615 East Woodward Street Austin, TX 78772	ORNL: CA-47, MG-28
235	Vanderbilt University Business Managers Office Nashville,, TN 37203	ORNL: PU-239
236	Warner-Lambert Research Institute 170 Tabor Road Morris Plains, N 07950	ORNL: MCP
237	Washington University Lindell and Skinker St. Louis,, MO 63130	LANL: BR-77, GE-68 ORNL: CSI
238	Westinghouse Electric Company, Inc. Bettis Atomic Power Laboratory P.O. Box 79 West Mifflin, PA 15122	ORNL: MIS, NP-237, TP, U-238
239	Westinghouse Electric Company, Inc. P.O. Box 284 Elmira, NY 14902	ORNL: TP, U-234, U-235, U-238
240	Westinghouse Hanford Company P.O. Box 1970 Richland, WA 99352	ORNL: MIS
241	Zilog, Incorporated 10460 Bubb Road Cupertino, CA 95014	ORNL: KR-85

Table 2. (Contd)

FOREIGN

AUSTRALIA

- |     |   |  |
|-----|---|--|
| 242 | Australian AEC<br>Research Establishment<br>Lucas Heights, NSW                      | BNL: XE-127                                |
| 243 | Australian Atomic Energy<br>Commission<br>Private Mail Bag<br>Sutherland, 2232, NSW | ORNL: NP-237, TC-99, TH-230,<br>TP, XE-127 |
| 244 | University of Queensland<br>St. Lucia, Q.4067                                       | ORNL: CSI                                  |

AUSTRIA

- |     |  |                                    |
|-----|--|------------------------------------|
| 245 | International Atomic Energy Agency<br>Wagramerstrassa 5<br>P.O. Box 100<br>A-1400 Vienna | ORNL: PU-239, PU-240, TP,<br>U-236 |
|-----|--|------------------------------------|

BELGIUM

- |     |  |  |
|-----|--|--|
| 246 | Central Bureau for Nuclear Measure-<br>ments of the European Communities<br>B-2440 GEEL, Steenweg maar Retie | ORNL: CAP, NP-237, PU-236,<br>PU-240, TP |
| 247 | Universite de Liege<br>Centre de Recherches du Cyclotron<br>Sart Tilman<br>B-4000 Liege 1                    | LANL: GE-68, SR-82,<br>ORNL: CSI, OS-191 |

CANADA

- |     |   |  |
|-----|---|--|
| 248 | Acute Care Hospital<br>Department of Medicine<br>2211 Westbrook Mall<br>Vancouver, British Columbia | BNL: MG-28   |
| 249 | Atomic Energy of Canada, Ltd.<br>Chalk River Nuclear Laboratories<br>Chalk River, Ontario K0J 1J0   | INEL: RSI<br>LANL: AL-26<br>ORNL: CSI, H-3, SP, TP |
| 250 | Atomic Energy of Canada, Ltd.<br>4004 Westbrook Mall<br>Vancouver, British Columbia<br>V6T 2A8      | BNL: XE-127<br>LANL: CD-109                        |

Table 2. (Contd)

251	Atomic Energy of Canada, Ltd. Radiochemical Company 413 March Road P.O. Box 113500 Kanata, Ontario K2K 1X8	ORNL: CS-137, CSI, IR-192, MCP, SR-90
252	Atomic Energy of Canada, Ltd Whiteshell Nuclear Research Establishment Pinawa, Manitoba	ORNL: I-129
253	Department of Physics University of Toronto 60 St. George Street Toronto, Ontario M5S 1A7	ORNL: TH-230
254	Fisheries and Oceans Freshwater Institute 502 University Crescent Winnipeg, Manitoba R3T 2N6	LANL: AL-26 ORNL: CSI
255	Hospital for Sick Children Research Institute 555 University Avenue Toronto, Ontario M5G 1X8	LANL: CU-67
256	McGill University Montreal 2, P.Q.	ORNL: SR-90
257	McMaster University Hamilton, Ontario	ORNL: H-3
258	National Research Council Montreal Road Laboratories Ottawa, Ontario	ORNL: PA-231, TP
259	Scarborough General Hospital Nuclear Medicine 3050 Lawrence Avenue East Scarborough, Ontario, H1P 2V5	BNL: XE-127 ORNL: XE-127
260	University of Alberta Edmonton, Alberta, T6G 2H1	ORNL: H-3
261	University of British Columbia Vancouver 8, British Columbia	ORNL: MG-28
262	University of Saskatchewan Animal & Poultry Science Saskatoon, Saskatchewan S7N 0W0	LANL: CU-67

Table 2. (Contd)

FEDERAL REPUBLIC OF GERMANY

263	AEG-Telefunken Zentravelwaltung Westzone D8752 Grossweizhein Frankfurt am Main	ORNL: U-234
264	American Hoechst Corporation P.O. Box 2500 Somerville, NJ 08876	ORNL: KR-85
265	Buchler and Company Frankfurter Str. 294 Braunschweig	ORNL: I-129
266	Buchler and Company Untermainkai 34 6 Frankfurt M. 1	ORNL: MCP, SR-90
267	EURATOM Transuranium Institute P.O. Box 452 75 Karlsruhe	ORNL: CAP, NP-237, TH-230
268	Gesellschaft fur Kernforschung mbH. Institute fur Angewandte Reaktor Physik Weberstrasse 5 75 Karlsruhe	ORNL: AM-243, CAP, MCP, NP-237, TP
269	Kernforschungsanlage Julich, GmbH. Postfach 1913 D-517 Julich	ORNL: TC-99
270	Max Planck Institute fur Chemie Saarstrasse 23, Mainz	ORNL: CS-137

FRANCE

271	CEA Department Des Radioelements B.P. No. 2 91190 Gif-Sur-Yvette	ORNL: CSI, TH-230
272	Center D-Etudes Nucleaires DeSaclay Gif-sur-Yvette	SRP: CF-252
273	Office Des Rayonnement Ionisant C/O Gondrand Roissy Airport	LANL: GE-68
274	University of Bordeaux Le Haut-Vigneau 33170 Gradignan	BNL: SR-90

Table 2. (Contd)

ITALY

275 CNEN-Laboratorio Dati Nucleari ORNL: CF-252, TP  
c/o Laboratorio FRAE via Biancafarina  
Fossatone Di Medicina  
Bologna

JAPAN

276 Japan Atomic Energy ORNL: CAP, CM-244, NP-237,  
Research Institute PU-238, PU-239, PU-240,  
Tokai Research Establishment PU-241, PU-242, SP,  
Tokai-Mura, Naka-Gun, Ibaraki-Ken TH-232, TP, U-235, U-238

277 Japan Radioisotope Association ORNL: H-3, TP  
Hon-Komagome 2 Chome 28  
Bunkyo-Ku  
Tokyo

278 Kyoto University ORNL: TH-230, TH-232, TP,  
Engineering Research Institute U-233  
Kyoto

279 Sumitomo Corporation of America ORNL: SS  
345 Park Avenue  
14th Floor  
New York, NY 10022

NETHERLANDS

280 Byk Mallinckrodt Cii B. V. ORNL: RU-107  
Westeiduinweg 3  
1754 Z. G. Petten

281 Reactor Centrum Nederland ORNL: I-129  
Petten N. H.

NEW ZEALAND

282 Government of New Zealand ORNL: TH-229  
Department of Health  
P. O. Box 5013  
Wellington

NORWAY

283 Institutt for Energiteknikk ORNL: CM-244, TP  
P.O. Box 40  
2007 Kjeller





Table 2. (Contd)

UNITED KINGDOM (Contd)

293	Hammersmith Hospital MRC Cyclotron Unit Ducane Road London, W12 OHS, England	ORNL: CSI
294	MRC Cyclotron Unit-Hammersmith Hospital Ducane Road London W12 OHS	LANL: GE-68, SR-82
295	Saunders Roe Developments, Ltd North Hyde Road Hayes, Middlesex, England	ORNL: H-3
296	Semi-Conductor Devices, Ltd 59-61 Wong Chuk Hang Road Aberdeen, Hong Kong	ORNL: KR-85
297	St. Thomas's Hospital Medical School <b>University</b> of London Lambeth Palace Road London SE1 7EH, England	BNL: MG-28 ORNL: MG-28
298	UK Freight. Forwarding Office 25 Broadway New York, NY 10004	ORNL: AM-243, SM-151, TP
299	University of Leeds Leeds 2, England	ORNL: TH-230, U-233, U-236

**TABLE 3. Isotopes Purchased Cross-Referenced to Customer Numbers**

Aluminum-26	20 249 254
Americium-241	70 135 136 140
Americium-243	3 153 268 298
Astatine-211	72
Beryllium-7	99 137 291
Bromine-77	98 202 219 237
Bromine-82	98
Cadmium-109	84 250
Calcium-47	107 206 226 231 234
Californium-252	10 38 59 62 84 93 98 116 137 228 272 275 290
Cerium-139	98
Cerium-144	37 42 84 93 98 100 106 132 153 197 208 290
Cesium-137	16 54 70 78 83 84 137 140 160 197 251 270
Cobalt-60	4 44 115 129 140
Copper-67	6 21 30 77 87 98 130 131 184 186 190 202 255 262
Curium-244	17 84 193 201 276 283
Cyclotron Service Irradiations	6 18 19 21 27 37 39 45 76 81 84 88 98 100 102 108 112 123 137 154 165 185 190 197 201 206 212 216 233 237 244 247 249 251 254 271 290 293
Encapsulation	135 140 197 246 267 268 276 290
Europium-152	153
Flourine-18	102 105 190 223
Gadolinium-153	9 37 70 96 113 170 198 290
Germanium-68	130 137 164 207 216 237 247 273 294
Holmium-163	286

**Table 3.** (Contd)

Iodine-123	15 18 26 27 66 86 87 101 138 179 200 201 211 212 216 233
Iodine-129	37 78 84 98 158 197 252 265 281
Iodine-131	179
Iridium-192	11 56 70 82 168 175 198 251
Iron-52	164 190 218
Iron-55	197
Krypton-85 (including KR-85E)	1 2 5 8 9 25 33 34 35 37 46 47 48 49 50 52 53 60 61 64 65 67 68 69 71 73 74 75 79 80 84 85 91 92 94 95 111 114 115 119 120 121 124 126 127 136 143 144 146 148 149 161 162 163 169 173 174 178 180 181 197 241 264 285 290 296
Magnesium-28	12 24 190 209 220 230 234 248 261 297
Misc. Compound Preparations (MCP)	4 44 63 70 83 84 122 140 160 190 197 225 236 251 266 268 290
Misc. Quantities (MIS)	13 38 134 137 189 240
Neptunium-237	31 100 150 197 238 243 246 290 267 268 276
Niobium-95	10 113
Osmium-191	27, 247
Palladium-109	30
Phosphorus-33	28 37 197 290
Plutonium-236	153 176 246
Plutonium-237	38 98 140 192 195 227
Plutonium-238	177 277
Plutonium-239	84 150 213 235 245 276
Plutonium-240	93 197 245 246 276
Plutonium-241	93 276

Table 3. (Contd)

Plutonium-242	104 152 198 276
Promethium-147	84 93 140 290
Protactinium-231	93 197 259
Radisotopes Withdrawn (RW)	37 86 197 290
Reactor Service Irradiations (RSI)	42 58 62 249
Rubidium-86	224
Ruthenium-103	30
Ruthenium-106	51 78 84 93 197 208 290
Ruthenium-107	197 215 280
Samarium-151	140 298
Selenium-75	78 84 103 145 221
Silicon-32	84
Silver-105	98
Sodium-22	130
Special Processing (SP)	42 84 93 117 125 142 152 156 157 194 197 203 210 213 249 276 284'
Special Services (SS)	4 14 54 55 56 63 76 98 100 113 137 187 197 198 216 279 290
Strontium-82	40 166 167 201 229 247 294
Strontium-89	32 43 97 109 139 183 205 226
Strontium-90	14 41 54 78 84 197 199 251 256 266 274
Target Prep.	10 29 31 36 42 57 59 63 84 90 93 106 140 150 151 153 193 197 201 204 213 214 222 228 238 239 243 245 246 249 258 268 275 276 277 278 283 298
Technetium-99	37 67 93 140 197 243 269 287 289 290
Thorium-229	106 282
Thorium-230	10 84 98 106 210 243 253 267 271 278 299

Table 3. (Contd)

Thorium-232	57	93	276	278										
Thorium-234	182													
Thulium-170	140													
Tin-117	30													
Tritium	10	29	36	37	69	78	89	90	93	118	135	141	147	
	155	159	197	201	204	214	222	229	249	257	260	277		
	285	288	290	292	295									
Uranium-233	104	278	299											
Uranium-234	63	150	239	263										
Uranium-235	84	149	150	239	276									
Uranium-236	220	245	299											
Uranium-238	31	42	51	106	150	154	238	239	276					
Vanadium-48	22	98												
Xenon-127	19	23	103	110	128	133	171	172	188	191				
	228	232	242	243	250	259	287							
Yttrium-88	76	84	130	217										
Zinc-65	98													
Zirconium-95	37	38	84	153	197	208	290							

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

4. GEOGRAPHIC LOCATIONS OF RADIOISOTOPE CUSTOMERS

TABLE 4. Geographic Locations of Customers by Customer Number

DOMESTIC

Arizona

64 121 127

Arkansas

79

California

5 8 20 21 22 25 41 45 47 48 49 52 53 54 58 62 63  
74 75 76 80 82 84 85 91 93 94 95 114 118 126 148 150 160  
162 163 173 174 181 192 201 202 203 204 205 225 231 241

Colorado

3 15 73 90 112 154

Connecticut

31 209

District of Columbia

16 66 189 193

Florida

71 123 142 210

Georgia

67 68 108 109

Idaho

42

Illinois

9 10 51 96 101 102 134 206 207 230

**Indiana**

81 110 143 145 211

Kansas

212

Louisiana

56 168 185

Maine

50

Maryland

12 86 87 88 128 129 158 183 184 188 190 191 214



Table 4 (Contd)

Massachusetts

1 18 26 27 37 72 105 106 130 149 170 175 182 213 215 232

Michigan

35 89 216 233

Minnesota

107 113 169 217

Missouri

2 14 103 141 237

Nebraska

218

Nevada

44 152

New Jersey

28 34 39 40 69 83 92 104 144 146 166 167 176 200 236

New Mexico

98 99 100 156 219

New York

6 19 29 30 59 61 77 111 122 131 132 135 147 159 164 165 171  
172 187 199 239

North Carolina

36 43 133 157 194 220

North Dakota

186

Ohio

4 13 17 24 78 116 117 139 151 208

Oklahoma

32 221 222

Pennsylvania

11 55 125 155 179 223 238

South Carolina

38 224

Tennessee

137 138 196 197 198 235

Table 4. (Contd)

Texas	7	23	57	70	97	115	119	120	124	136	177	178	180	226	234
Utah	161	227													
Virginia	60	65	228												
Washington	46	140	153	195											
Wisconsin	33	229													

FOREIGN

AUSTRALIA	242	243	244												
AUSTRIA	245														
BELGIUM	246	247													
CANADA	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262
FEDERAL REPUBLIC OF GERMANY	263	264	265	266	267	268	269	270							
FRANCE	271	272	273	274											
ITALY	275														
JAPAN	276	277	278	279											
NETHERLANDS	280	281													
NEW ZEALAND	282														
NORWAY	283														

Table 4. (Contd)

PORTUGAL

284

SWITZERLAND

285 286 287 288

UNION OF SOUTH AFRICA

289

UNITED KINGDOM

290 291 292 293 294 295 296 297 298 299

TABLE 5. Radioisotope Sales and Transfers - FY 1984

Isotope	Supplier	Domestic				Foreign				DOE				Total			
		Ship	Quantity	Unit	\$ Value	Ship	Quantity	Unit	\$ Value	Ship	Quantity	Unit	\$ Value	Ship	Quantity	Unit	\$ Value
Aluminum-26	L	1	0.38	uCi	0	2	0.05	uCi	1775	0	---	0	3	0.43	uCi	1775	
Americium-241	0	15	453.00	g	683840	0	---		0	2	3.00	g	2830	17	456.00	g	686670
Americium-243	0	1	---		100	2	133.00	mg	13300	1	5.00	mg	0	4	138.00	mg	13400
Astatine-211	B	12	23.50	mCi	0	0	---		0	0	---	0	12	23.50	mCi	0	
Beryllium-7	L	0	---		0	1	20.00	mCi	600	3	107.50	mCi	1400	4	127.50	mCi	2000
Bromine-77	L	12	594.75	mCi	2200	0	---		0	12	562.00	mCi	0	24	1156.75	mCi	2200
Bromine-82	L	0	---		0	0	---		0	3	66.42	mCi	0	3	66.42	mCi	0
Cadmium-109	B	1	425.00	mCi	5665	0	---		0	0	---	0	1	425.00	mCi	5665	
Cadmium-109	L	0	---		0	1	1.00	Ci	14100	0	---	0	1	1.00	Ci	14100	
Calcium-47	0	5	1.40	mCi	2520	0	---		0	-1	-1000.00	mCi	-165	4	-998.60	mCi	2355
Californium-252	0	6	1.00	ug	60	1	---		10	6	88.60	ug	0	13	89.60	ug	70
Californium-252	S	10	23.53	mg	263994	4	23.95	mg	270708	0	---		0	14	47.48	mg	534702
Cerium-139	L	0	---		0	0	---		0	1	94.00	uCi	0	1	94.00	uCi	0
Cerium-144	0	13	3565.10	mCi	21599	1	100.00	mCi	1100	6	239.00	mCi	2450	20	3904.10	mCi	25149
Cesium-137	B	1	2.90	uCi	0	0	---		0	0	---	0	1	2.90	uCi	0	
Cesium-137	0	20	86352.50	Ci	32124	2	0.01	Ci	200	4	30.02	Ci	800	26	86382.53	Ci	33124
Cobalt-60	B	1	0.20	mCi	0	0	---		0	0	---	0	1	0.20	mCi	0	
Cobalt-60	I	2	580960.00	Ci	290480	0	---		0	0	---	0	2	580960.00	Ci	290480	
Cobalt-60	0	1	71562.00	Ci	96898	0	---		0	1	29680.00	Ci	89930	2	101242.00	Ci	296800
Copper-67	B	6	110.00	mCi	0	0	---		0	0	---	0	6	110.00	mCi	0	
Copper-67	L	37	3415.81	mCi	3526	12	1520.90	mCi	0	22	835.04	mCi	900	71	5771.75	mCi	4426
CSI-BNL	0	20	1556.00		46818	0	---		0	5	50.00		5078	25	1606.00		51896
CSI-LANL	0	17	6283.00		292450	6	1218.00		29868	6	474.50		12441	29	7975.50		334759
Curium-244	B	3	160.00	mCi	0	0	---		0	0	---	0	3	160.00	mCi	0	
Curium-244	0	1	10.00	mg	1000	4	1001.00	mg	100100	2	50.00	mg	5000	7	1061.00	mg	106100

51

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
Cyclotron SI	B	36	1080.00		0	0	---	0	0	---	0	36	1080.00		0		
Encapsulation	0	3	---		299575	3	2.00	260125	39	---	119819	45	2.00		679519		
Europium-152	0	0	---		0	0	---	0	1	10.00	mCi	550	1	10.00	mCi	550	
Flourine-18	B	17	432.50	mCi	0	0	---	0	0	---	0	17	432.50	mCi	0		
Flourine-18	A	9	---		1755	0	---	0	0	---	0	9	---		1755		
Gadolinium-153	0	64	78475.00	mCi	408244	8	2921.00	mCi	15189	5	5000.00	mCi	26000	77	86396.00	mCi	449433
Cermanium-68	B	4	1316.00	mCi	17973	0	---	0	0	---	0	4	1316.00	mCi	17973		
Germanium-68	L	4	75.50	mCi	3130	3	128.10	mCi	4675	1	5.00	mCi	275	8	208.60	mCi	8080
Holmium-163	L	0	---		0	1	1.00	mCi	0	0	---	0	1	1.00	mCi	0	
Iodine-123	B	40	1973.80	mCi	9108	0	---	0	0	---	0	40	1973.80	mCi	9108		
Iodine-129	0	12	4792.70	mg	26525	4	997.00	mg	4733	3	500.00	mg	2750	19	6289.70	mg	34008
Iodine-131	B	2	403.00	mCi	0	0	---	0	0	---	0	2	403.00	mCi	0		
Iridium-192	0	166	5860.02	kCi	935783	3	9.90	kCi	24617	5	1.17	kCi	6786	174	5871.09	kCi	967186
Iron-52	B	4	457.00	mCi	2528	0	---	0	0	---	0	4	457.00	mCi	2528		
Iron-52	L	1	409.80	mCi	0	0	---	0	0	---	0	1	409.80	mCi	0		
Iron-55	0	0	---		0	0	---	0	1	1.00	mCi	200	1	1.00	mCi	200	
Krypton-85	0	230	5702.07	Ci	411535	8	203.00	Ci	14413	0	-340.00	Ci	-18700	238	5565.07	Ci	407248
Krypton-85E	0	7	178000.00	mCi	53458	1	50000.00	mCi	18250	0	---	0	8	228000.00	mCi	71708	
Magnesium-28	B	17	1496.27	mCi	6314	6	2.99	mCi	1078	0	---	0	23	1499.26	mCi	7392	
Magnesium-28	0	11	4100.00	mCi	12020	5	900.00	mCi	3040	3	1000.00	mCi	3000	19	6000.00	mCi	18060
Misc. Compounds	0	9	6.00	MIS	1746	0	---	0	3	3.00	MIS	807	12	9.00	MIS	2553	
Misc. Isotopes	B	14	---		450	0	---	0	0	---	0	14	---		450		
Misc. Services	0	0	---		405	0	---	0	4	---	25467	4	---		25872		
Neptunium-237H	0	3	101250.00	mg	516	6	113000.00	mg	50285	0	---	0	9	214250.00	mg	50801	

52

**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
Neptunium-237	0	0	---		0	0	---		0	2	450.00	mg	110	2	450.00	mg	110
Niobium-95	0	12	69.00	mCi	7452	0	---		0	1	2.00	mCi	216	13	71.00	mCi	7668
Osmium-191	B	8	6630.00	mCi	0	0	---		0	0	---		0	8	6630.00	mCi	0
Osmium-191	0	9	---	MIS	0	5	---		MIS	0	---		0	14	---	MIS	0
Palladium-109	B	4	3870.00	mCi	0	0	---		0	0	---		0	4	3870.00	mCi	0
Phosphorus-33	0	6	712.00	mCi	11842	1	100.00	mCi	2000	1	25.00	mCi	1100	8	837.00	mCi	14942
Plutonium-236	0	1	---		1520	1	---		6260	1	6.00	uCi	5340	3	6.00	uCi	13120
Plutonium-237	0	0	---		580	0	---		0	3	2.00	uCi	5724	3	2.00	uCi	6304
Plutonium-238	0	1	---		100	0	10.00	mg	44	0	---		0	1	10.00	mg	144
Plutonium-239	0	4	28670.14	g	516	1	20.20	g	12120	0	---		0	5	28690.34	g	12636
Plutonium-240	0	0	---		0	4	5030.00	mg	15090	3	7086.60	mg	0	7	12116.60	mg	15090
Plutonium-241	0	0	---		0	0	10.00	mg	80	1	---		0	1	10.00	mg	80
Plutonium-242	0	0	---		0	4	1005.00	mg	15969	2	1.00	mg	0	6	1006.00	mg	15969
Promethium-147	0	1	1.00	Ci	200	5	6000.00	Ci	24600	2	250.00	Ci	548	8	6251.00	Ci	25348
Protactinium-2310	0	---			0	1	2.00	mg	166	5	136.00	mg	6815	6	138.00	mg	6981
RW	0	5	656.60	MIS	44401	3	600.00	MIS	18000	2	11.00	MIS	400	10	1267.60	MIS	62801
Reactor SI	B	10	---		4894	0	---		0	0	---		0	0	---		4894
Reactor SI	l	2	---		0	1	---		0	1	---		0	4	---		0
Rubidium-86	L	1	268.00	uCi	0	0	---		0	0	---		0	1	268.00	uCi	0
Ruthenium-103	B	1	0.10	mCi	0	0	---		0	0	---		0	1	0.10	mCi	0
Ruthenium-103	0	1	2.00	mCi	216	5	100.00	mCi	10800	3	13.00	mCi	1404	9	115.00	mCi	12420
Ruthenium-106	B	1	125.00	mCi	0	0	---		0	0	---		0	1	125.00	mCi	0
Ruthenium-106	0	10	88.10	mCi	9704	1	40.00	mCi	4320	2	4.00	mCi	524	13	132.10	mCi	14548
Samarium-151	0	0	---		0	2	2.00	g	200	1	---		200	3	2.00	g	400

5  
3

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
Selenium-75	O	19	24550.00	mCi	20350	0	---		0	0	---		0	19	24550.00	mCi	20350
Silicon-32	B	1	1.00	mCi	0	0	---		0	0	---		0	1	1.00	mCi	0
Silver-105	L	O	---		0	0	---		0	1	0.63	mCi	0	1	0.63	mCi	0
Sodium-22	L	2	1240.00	mCi	5490	0	---		0	0	---		0	2	1240.00	mCi	5490
Special Proces.	O	32	---		7457	1	---		18705	6	30.00	MIS	11060	39	30.00	MIS	37222
Special Services	O	73	3760.00	MIS	221160	4	105.00	MIS	5640	7	2.50	MIS	29919	84	3867.50	MIS	256719
Strontium-82	B	4	699.00	mCi	8609	0	---		0	0	---		0	4	699.00	mCi	8609
Strontium-82	L	13	5701.89	mCi	44400	4	548.64	mCi	1600	5	1131.88	mCi	4450	22	7382.41	mCi	50450
Strontium-89	O	11	0.04	Ci	4720	1	0.01	Ci	216	2	29680.00	Ci	90470	14	29680.05	Ci	95406
Strontium-90	B	2	1.00	mCi	0	0	---	mCi	0	0	---	mCi	0	2	1.00	mCi	0
Strontium-90	O	7	50158.20	mCi	1200	2	0.30	mCi	400	3	710002.00	mCi	400	12	760160.50	mCi	2000
Target Prep.	O	4	---		59699	0	---		59075	18	---		247029	22	---		365803
Technetium-99	O	8	25000.00	mg	1450	7	107000.00	mg	6590	5	45230.00	mg	1978	20	177230.00	mg	10018
Thorium-229	O	2	1.00	ug	566	1	5.00	ug	375	0	---		0	3	6.00	ug	941
Thorium-230	O	4	14.00	mg	848	5	-259929.00	mg	1660	2	6.00	mg	0	11	-259909.00	mg	2508
Thorium-232	O	5	2790.00	g	697	1	280.00	g	465	0	3.00	g	0	6	3073.00	g	1162
Thorium-234	B	1	50.00	g	0	0	---		0	0	---		0	1	50.00	g	0
Thulium-170	U	0	---		0	0	---		0	2	30.00	Ci	800	2	30.00	Ci	800
Tin-117	B	1	1.50	mCi	0	0	---		0	0	---		0	1	1.50	mCi	0
Tritium	O	160	510878.20	Ci	564712	44	949380.00	Ci	1044188	3	10105.00	Ci	11255	207	1470363.20	Ci	1620155
Uranium-233	O	0	---		0	4	10201.00	mg	26318	0	---		0	4	10201.00	mg	26318
Uranium-234	O	4	5900.00	mg	206500	1	2000.00	mg	70000	0	---		0	5	7900.00	mg	276500
Uranium-235	O	9	446040.00	mg	21920	1	20000.00	mg	2800	0	---		0	10	466040.00	mg	24720

5.4

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
Uranium-236	O	1	4.00	mg	6	2	1001.00	mg	451	0	---		0	3	1005.00	mg	457
Uranium-238	B	3	1281.35	mCi	0	0	---		0	0	---		0	3	1281.35	mCi	0
Uranium-238	O	5	-13300.00	mg	19225	0	20000.00	mg	2000	2	393.00	mg	0	7	7093.00	mg	21225
Vanadium-48	L	2	21.70	mCi	0	0	---		0	1	0.50	mCi	0	3	22.20	mCi	0
Xenon-127	B	68	42220.20	mCi	52997	7	1353.00	mCi	1518	0	---		0	75	43573.20	mCi	54515
Xenon-127	L	O	---		0	0	---		0	4	32.22	Ci	0	4	32.22	Ci	0
Xenon-127	O	29	29700.00	mCi	97190	8	2200.00	mCi	10300	4	600.00	mCi	2700	41	32500.00	mCi	110190
Yttrium-88	L	6	52.41	mCi	2100	0	---		0	0	---		0	6	52.41	mCi	2100
Zinc-65	B	6	245.00	mCi	2538	0	---		0	0	---		0	6	245.00	mCi	2538
Zirconium-95	O	3	38.00	mCi	1210	2	15.00	mCi	416	4	146.00	mCi	3942	9	199.00	mCi	5568
TOTAL		1400			5360808	213			2190532	236			624072	1849			8175412

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).

All isotopes shipped from LANL (CSI-L) and BNL (CSI-B) are billed from ORNL and included in Cyclotron Service Irradiations.

All isotopes from BNL without dollar amounts are produced by chemical separation.

Negative quantities reflect credit for previous sale for ORNL shipped, Calcium-47, Krypton-85, Thorium-230, and Uranium-238.

Shipments of Xenon-127 indicated from ORNL actually shipped from either BNL or LANL.



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