

# EXPORT LICENSE

NRC FORM 250

**NRC LICENSE NO.: PXB6.40**

Page 1 of 9

**NRC DOCKET NO.: 11006027**

**LICENSE EXPIRES: March 31, 2032**



**United States of America**  
Nuclear Regulatory Commission  
Washington, D.C. 20555

Pursuant to the Atomic Energy Act of 1954, as amended, and the regulations issued by the Nuclear Regulatory Commission (NRC) pursuant thereto, and in reliance on statements and representations heretofore made by the applicant/licensee, this license is hereby issued authorizing the licensee to export of the byproduct materials listed below, subject to the terms and conditions herein. This license is only valid if the licensee or 'Other Party (ies) to Export' maintain the requisite NRC or Agreement State domestic license(s).

**LICENSEE**

Alpha-Omega Services, Inc.  
1282 Bigwoods-Starks Road  
Vinton, LA 70668

Attn: Carl Tunnell

**ULTIMATE CONSIGNEE(S) IN FOREIGN COUNTRY(IES)**

See following page(s)

**INTERMEDIATE CONSIGNEE(S) IN FOREIGN COUNTRY(IES)**

None

**OTHER U.S. PARTY(IES) TO EXPORT**

See following page(s)

**APPLICANT'S REFERENCE:** Amendment 40

**ULTIMATE DESTINATIONS:** See following page.

**DESCRIPTIONS OF 10CFR PART 110, APPENDIX P,  
BYPRODUCT TO BE EXPORTED, INCLUDING CONDITIONS AND NOTES**  
(NOTE: SEE PAGE 2 FOR DEFINITIONS OF CATEGORY 1 AND CATEGORY 2)

Export to Canada and Sweden, of Category 1 quantities of Co-60 (not to exceed 244.2 TBq per shipment), contained in sealed sources for final disposition, is authorized. For Category 1 exports, see conditions on Page 2.

Export to Japan, of Category 2 quantities of Ir-192, contained in sealed sources for use in medical brachytherapy devices, is authorized.

Licensee is responsible for compliance with all applicable export, and other domestic regulatory requirements, including all terms and conditions of domestic material possession licenses.

Licensee, if not already submitted with your application, must submit pertinent documentation required by 10 CFR § 110.32(g) at least 24 hours prior to shipment. See Page 9 for Mandatory Advanced Notifications. This license replaces

This license replaces PXB6.39 amends its authority by: 1) adding two additional U.S. Party(ies) and; 2) correct an address of a U.S. Party(ies).

Neither this license nor any right under this license shall be assigned or otherwise transferred in violation of the provisions of the Atomic Energy Act of 1954, as amended.

This license is subject to the right of recapture or control by Section 108 of the Atomic Energy Act of 1954, as amended, and to all the other provisions of said Acts, now or hereafter in effect and to all valid rules and regulations of the Nuclear Regulatory Commission.

**THIS LICENSE IS INVALID UNLESS SIGNED BELOW  
BY AUTHORIZED NRC REPRESENTATIVE**

NAME AND TITLE: David L. Skeen  
DATE OF ISSUANCE: September 9, 2022

Digitally signed by David L. Skeen  
Date: 2022.09.09 14:11:29  
-04'00'

**David L. Skeen, Deputy Director  
Office of International Programs**

**EXPORT LICENSE**

**CONDITIONS**

Licensee is prohibited from shipping 10 CFR Part 110 Appendix P Category 1 quantities of Co-60 to Canada for which government-to-government consent has not yet been requested, received and processed until the following actions are taken:

1. The licensee submits a consent request to the NRC with pertinent details for a specific shipment or series of shipments on the NRC Form 7, which notifies the NRC to request and obtain consent for the specified transaction(s) from the importing country's regulatory authority;
2. The NRC receives and considers the consent from the importing country's regulatory authority pursuant to 10 CFR §110.42(e)(3); and
3. The NRC has informed the licensee in writing, that the consent request has been granted and it is authorized to ship the materials to the ultimate consignee(s) specified on the NRC Form 7 consent request.

**ULTIMATE CONSIGNEE(S) IN FOREIGN COUNTRY(IES) Continued:**

1. **For export of 10 CFR Part 110 Appendix P, Category 1 quantities of Co-60**

Nordion (Canada) Inc.  
447 March Road  
Ottawa, Ontario K2K 1X8  
Canada

2. **For export of 10 CFR Part 110 Appendix P, Category 2 quantities of Ir-192**

Japan Radioisotope Association (JRIA)  
28-45 Honkomagome 2-Chome  
Bunkyo-Ku, Tokyo 113-8941  
Japan

3. **For export of 10 CFR Part 110 Appendix P, Category 1 quantities of Co-60**

Studsvik Nuclear AB  
Atomvagen 1  
611 82 Nykoping  
Sweden

**OTHER U.S.PARTY(IES) TO EXPORT Continued:**

1. Adventist Health Systems/Sunbelt Inc.  
Florida Hospital Plaza  
2501 N. Orange Avenue  
Orlando, FL 32803

2. Akron General Medical Center  
762 South Cleveland Massillon Road  
Montrose, OH 44333

3. Alexian Brothers Medical Center  
800 West Biesterfield Road  
Elk Grove Village, IL 60007

4. Alpha-Omega Services, Inc.  
1282 Big Woods-Starks Road  
Vinton, LA 70668

5. Anchorage Radiation Oncology Management, Inc.  
d/b/a Anchorage Radiation Therapy Center  
2841 Debarr Road, Suite 100  
Anchorage, AK 99508

6. Augusta University Medical Center  
1120 15th Street  
Augusta, GA 30912

7. Aurora Health Care Metro, Inc.  
d/b/a Aurora St. Luke's Medical Center,  
Room 115, Gamma Knife Department  
2900 West Oklahoma Avenue  
Milwaukee, WI 53215

8. Avera McKennan - Avera Radiation Oncology  
Avera Cancer Institute  
Prairie Center 1000 East 23rd St.  
Suite 100, Room 2  
Sioux Falls, SD 57105

**OTHER U.S.PARTY(IES) TO EXPORT Continued:**

9. Baptist Hospital of Miami, Inc.  
Department of Radiation Oncology  
8900 North Kendall Drive  
Miami, FL 33176
10. Baylor All Saints Medical Center Fort Worth  
1400 Eighth Avenue  
Fort Worth, TX 76104
11. Billings Clinic  
2800 Tenth Avenue North  
Billings, MT 59101
12. Bryan Medical Center  
2300 South 16th Street  
Lincoln, NE 68502
13. Center for Advanced Medicine  
Long Island Jewish Medical Center  
450 Lakeville Road  
Lake Success, NY 11042
14. Central DuPage Hospital Association  
Northwestern Medicine Cancer Center Central  
DuPage Hospital  
4405 Weaver Parkway  
Warrenville, IL 60555
15. Chesapeake Regional Riverside &  
University of Virginia Radiosurgery Center  
500 J Clyde Morris Boulevard  
Newport News, VA 23601
16. Chippenham and Johnston-Willis Hospitals, Inc.  
d/b/a CJW Medical Center, Johnston-Willis  
Campus  
1401 Johnston-Willis Drive  
Richmond, VA 23235
17. Chippenham and Johnston-Willis Hospitals,  
Inc., d/b/a CJW Medical Center  
Johnston-Willis Campus, Chippenham  
Campus  
7101 Jahnke Road  
Richmond, VA 23235
18. Cooper Health System  
Robert Wood Johnson Medical School at Camden  
3 Cooper Plaza  
Camden, NJ 08103
19. Covenant Health System  
Covenant Gamma Southwest  
3603 21st Street  
Lubbock, TX 79410
20. Dignity Health d/b/a  
St. Joseph's Hospital and Medical Center  
350 West Thomas Road  
Phoenix, AZ 85013
21. Doctors Hospital, Inc.  
d/b/a Doctors Hospital  
5000 University Drive  
Coral Gables, FL 33146
22. Emory Saint Joseph's Hospital  
5665 Peachtree Dunwoody Road, NE  
Atlanta, GA 30342
23. Fort Sanders Regional Gamma Knife Center  
1915 White Avenue  
Knoxville, TN 37916
24. Gamma Knife Center of the Pacific  
2226 Liliha Street, Level B2  
Honolulu (Island of Oahu), HI 96817
25. GE-Hitachi Nuclear Energy Americas, LLC  
Vallecitos Nuclear Center  
6705 Vallecitos Road  
Pleasanton, CA 94586
26. GKMD, Inc.  
Deaconess Medical Center  
Gamma Knife Suite  
Basement Floor, Room 117  
910 West 5th Ave.  
Spokane, WA 99204
27. Good Samaritan Hospital  
1225 Wilshire Boulevard  
Los Angeles, CA 90017
28. Hackensack University Medical Center  
John Theurer Cancer Center  
92 2nd St.  
Hackensack, NJ 07601

**OTHER U.S.PARTY(IES) TO EXPORT Continued:**

- |   |  |
|---|--|
| 29. Harborview Medical Center<br>325 9th Avenue<br>Gamma Knife Suite<br>Seattle, WA 98133   | 30. Hoag Memorial Hospital Presbyterian<br>One Hoag Drive<br>Newport Beach, CA 92658   |
| 31. Holy Spirit Cancer Center<br>Gamma Knife Center<br>880 Century Drive<br>Mechanicsburg, PA 17055   | 32. Indiana University Health Methodist Hospital<br>1701 N. Senate Blvd<br>Indianapolis, IN 46202                                      |
| 33. Intermountain Medical Center<br>Jon and Karen Huntsman Cancer Center<br>Gamma Knife Room, 5121 South<br>Cottonwood Street<br>Murray, UT 84157 | 34. Jewish Hospital, LLC.<br>4777 East Galbraith Road<br>Cincinnati, OH 45236  |
| 35. John F. Kennedy Medical Center<br>65 James Street<br>Edison, NJ 08818   | 36. Karmanos Cancer Center<br>Gershenson Radiation Oncology Center,<br>Room 379<br>4100 John R. Street<br>Detroit, MI 48201            |
| 37. Kettering Medical Center<br>3535 Southern Boulevard<br>Kettering, OH 45429  | 38. Larkin Community Hospital, Inc.<br>6129 Southwest 70th Street<br>South Miami, FL 33143   |
| 39. Legacy Health System<br>1130 North West 22nd Avenue, Suite LL50<br>Portland, OR 97210   | 40. Lehigh Valley Health Network<br>1240 South Cedar Crest Boulevard<br>Allentown, PA 18103  |
| 41. Lewis Hall Singletary Oncology Center<br>at John D. Archbold Memorial Center<br>919 South Broad Street<br>Thomasville, GA 31792               | 42. Los Robles Regional Medical Center<br>2200 Lynn Road<br>Thousand Oaks, CA 91360  |
| 43. Lovelace Medical Center<br>601 Dr. Martin Luther King, Jr. NE<br>Albuquerque, NM 87102  | 44. Marshfield Medical Center<br>611 St. Joseph Avenue<br>Marshfield, WI 54449   |
| 45. Mayo Clinic Hospital-Rochester<br>SMC Mary Brigh Building<br>1216 2nd St. SW<br>Rochester, MN 55902   | 46. Mayo Clinic Jacksonville<br>4500 San Pablo Road<br>Jacksonville, FL 32224  |
| 47. Medical College of Wisconsin<br>Froedtert Memorial Lutheran Hospital<br>9200 West Wisconsin Avenue<br>Milwaukee, WI 53226                     | 48. Medical University of South Carolina<br>171 Ashley Avenue (MUSC)<br>Charleston, SC 29425   |
| 49. Memorial Hermann Healthcare System<br>d/b/a Hermann Hospital<br>6411 Fannin Avenue<br>Houston, TX 77030                                       | 50. Mercy Health - St. Vincent Medical Center,<br>LLC<br>Perrysburg Cancer Center<br>12623 Eckel Junction Road<br>Perrysburg, OH 43552 |

**OTHER U.S.PARTY(IES) TO EXPORT Continued:**

- |  |  |
|--|--|
| 51. Mercy Health Center<br>4300 West Memorial Road<br>Oklahoma City, OK 73120  | 52. Merit Health Central, Central Mississippi<br>Medical Center<br>Radiation Oncology Department<br>1850 Chadwick Drive<br>Jackson, MS 39204   |
| 53. Methodist Childrens Hospital<br>DBA Joe Arrington Cancer Center<br>4101 22nd Place<br>Lubbock, TX 79410                        | 54. Methodist Healthcare System of San Antonio<br>LTD<br>Methodist Hospital<br>7700 Floyd Curl Drive<br>San Antonio, TX 78229  |
| 55. Mid-Michigan Gamma Knife Facility<br>4000 Wellness Drive<br>Room H-1405<br>Midland, MI 48670                                   | 56. Nebraska Methodist Hospital<br>8303 Dodge Street<br>Omaha, NE 68114  |
| 57. Neurologic & Orthopedic Institute of Chicago<br>4501 N. Winchester<br>Chicago, IL 60640  | 58. New York Presbyterian Hospital, Columbia<br>University Medical Center<br>Gamma Knife Suite, Columbia-Presbyterian<br>Medical Center<br>630 West 168th Street<br>New York, NY 10032 |
| 59. Northern Westchester Hospital Center<br>400 East Main Street<br>Mount Kisco, NY 10549  | 60. Northside Hospital Forsyth<br>1200 Northside Forsyth Drive<br>Cumming, GA 30041  |
| 61. Northwest Hospital Gamma Knife Center<br>Building 310, Ground Floor, Suite G-5<br>1560 North 115th Street<br>Seattle, WA 98133 | 62. Northwestern Memorial Hospital<br>Galter Pavilion<br>201 E. Huron Street<br>Chicago, IL 60611  |
| 63. NYU Langone Hospitals<br>Tisch Hospital<br>550 First Ave.<br>New York, NY 10016  | 64. Ochsner Clinic Foundation<br>Ochsner Medical Center<br>Department of Radiation Oncology<br>1514 Jefferson Highway<br>New Orleans, LA 70121   |
| 65. OSF Healthcare System<br>St. Francis Medical Center<br>530 NE Glen Oak Avenue<br>Peoria, IL 61637                              | 66. OU Medical Center<br>Presbyterian Tower<br>700 N.E. 13th Street<br>Oklahoma City, OK 73104   |
| 67. Our Lady of the Lake Hospital Inc.<br>dba Thomas J. Moran Imaging Center<br>4950 Essen Lane<br>Baton Rouge, LA 70809           | 68. Peace Health Sacred Heart Medical Center<br>3333 RiverBend Drive<br>Springfield, OR 97477  |
| 69. Penn State Milton S. Hershey Medical Center<br>500 University Drive<br>Hershey, PA 17033                                       | 70. Piedmont Hospital Atlanta<br>1968 Peachtree Road N.W.<br>Atlanta, GA 30309   |

**OTHER U.S.PARTY(IES) TO EXPORT Continued:**

- |  |   |
|--|---|
| 71. Pitt County Memorial Hospital<br>d/b/a Vidant Medical Center<br>2100 Stantonsburg Road<br>Greenville, NC 27835                   | 72. Prisma Health Richland Hospital<br>7 Medical Park<br>Columbia, SC 29203   |
| 73. Providence Portland Medical Center<br>North Pavilion<br>4805 NE Glisan Street<br>Portland, OR 97213                              | 74. Puerto Rico Medical Services Administration<br>Puerto Rico Medical Center, Centro Medico<br>de Rio Piedras<br>First Floor, Central Building, Carr 22 Barrio<br>Monacillos<br>San Juan, PR 00935 |
| 75. Puget Sound Radiosurgery<br>Gamma Knife Suite, Room 103, St. Joseph's<br>Medical Center<br>1802 South Yakima<br>Tacoma, WA 98405 | 76. Research Medical Center<br>Midwest Gamma Knife Center<br>2316 E. Meyer Blvd.<br>Kansas City, MO 64132   |
| 77. Rhode Island Hospital<br>593 Eddy Street<br>Providence, RI 02903   | 78. Robert Wood Johnson University Hospital<br>Gamma Knife Suite<br>10 Plum Street<br>New Brunswick City, NJ 08901  |
| 79. Roswell Park Cancer Institute Corp.<br>Elm & Carlton Street<br>Buffalo, NY 14263   | 80. Sacred Heart Health System, Inc.<br>d/b/a Sacred Heart Hospital of Pensacola<br>5151 North 9th Avenue<br>Pensacola, FL 32504  |
| 81. San Antonio Community Hospital<br>999 San Bernardino Road<br>Upland, CA 91786  | 82. San Diego Gamma Knife Center<br>9834 Genesee Avenue, Suite 110<br>La Jolla, CA 92037  |
| 83. South Nassau Communities Hospital<br>One Healthy Way<br>Oceanside, NY 11572  | 84. St. Lukes The Woodlands Hospital<br>17200 St. Luke's Way<br>The Woodlands, TX 77384   |
| 85. St. Vincent Medical Center<br>2 Shircliff Way<br>Jacksonville, FL 32204  | 86. Sunrise Hospital Medical Center<br>3006 South Maryland Parkway<br>Las Vegas, NV 89109   |
| 87. SUNY Upstate Medical University<br>750 East Adams Street<br>Syracuse, NY 13210   | 88. Sutter Gamma Knife Center<br>2801 K St., Suite 110<br>Sacramento, CA 95816  |
| 89. Swedish Medical Center<br>799 East Hampden Ave. Suite 100<br>Englewood, CO 80113   | 90. Temple University<br>The Health Science Center Campus<br>Broad and Ontario Streets<br>Philadelphia, PA 19140  |
| 91. Tenet Good Samaritan, Inc.<br>1309 North Flagler Drive<br>West Palm Beach, FL 33401  | 92. Tenet Hospitals Limited<br>DBA The Hospitals of Providence Sierra<br>Campus<br>Gamma Knife Suite,<br>625 Medical Center Drive<br>El Paso, TX 79902  |

**OTHER U.S.PARTY(IES) TO EXPORT Continued:**

- |  |   |
|--|---|
| 93. Texas Health Presbyterian Hospital Dallas<br>8200 Walnut Hill Lane<br>Dallas, TX 75231   | 94. The Cleveland Clinic Foundation<br>10201 Carnegie Avenue<br>Cleveland, OH 44195   |
| 95. The Methodist Hospital<br>DBA Houston Methodist<br>6551 Bertner Avenue<br>Houston, TX 77030  | 96. The Ohio State University<br>Radiation Medicine Department, Arthur G.<br>James Cancer Hospital and<br>Richard J. Solove Research Institute,<br>300 West 10th Avenue<br>Columbus, OH 43210 |
| 97. The Regents of the University of California<br>San Francisco Medical Center<br>UCSF Medical Center<br>Parnassus Ave<br>San Francisco, CA 94143 | 98. The Regents of the University of California<br>U.C. Davis Medical Center<br>2315 Stockton Blvd.<br>Sacramento, CA 95817   |
| 99. The Swedish Radiosurgery Center<br>Suite A10 James Tower<br>550 17th Avenue<br>Seattle, WA 98122   | 100. The University of Texas<br>MD Anderson Cancer Center<br>1515 Holcombe Boulevard<br>Houston, TX 77030   |
| 101. The Valley Hospital Luckow Pavilion<br>1 Valley Health Plaza<br>Paramus, NJ 07652   | 102. Thomas Jefferson University and<br>Hospitals 900 Walnut Street<br>Philadelphia, PA 19107   |
| 103. Tufts Medical Center<br>800 Washington Street<br>Boston, MA 02111   | 104. UAB Highlands Hospital<br>1201 11th Avenue South<br>Birmingham, AL 35205   |
| 105. University Health Shreveport, LLC.<br>d/b/a Ochsner LSU Health Shreveport<br>1541 Kings Highway<br>Shreveport, LA 71103                       | 106. University Hospitals of Cleveland<br>11100 Euclid Avenue<br>Cleveland, OH 44106  |
| 107. University of Arkansas for Medical Science<br>4301 West Markham Street<br>Little Rock, AR 72205   | 108. University of Colorado Hospital Authority<br>1635 Aurora Court<br>Aurora, CO 80045   |
| 109. University of Iowa Medical Center<br>200 Hawkins Drive<br>Iowa City, IA 52242   | 110. University of Kentucky<br>Markey Cancer Center, Roach Bldg.,<br>Room CC049<br>800 Rose Street<br>Lexington, KY 40536   |
| 111. University of Maryland Medical System<br>Gamma Knife Suite, South Hospital B Wing<br>22 South Greene Street<br>Baltimore, MD 21201            | 112. University of Miami<br>Sylvester Cancer Center West<br>1400 NW 12th Avenue<br>Miami, FL 33136  |
| 113. University of Minnesota Medical Center<br>Room 1-285<br>500 SE Harvard Street<br>Minneapolis, MN 55455  | 114. University of Mississippi Medical Center<br>350 West Woodrow Wilson Avenue<br>Jackson, MS 39216  |



**OTHER U.S.PARTY(IES) TO EXPORT Continued:**

- |   |   |
|---|---|
| 115. University of Pennsylvania<br>Pennsylvania Hospital Campus<br>800 Spruce Street<br>Philadelphia, PA 19107              | 116. University of Pittsburgh<br>Presbyterian University Hospital<br>230 Lothrop Street, Room F-185<br>Pittsburgh, PA 15213   |
| 117. University of Pittsburgh<br>Presbyterian University Hospital<br>230 Lothrop Street, Room G-102<br>Pittsburgh, PA 15213 | 118. University of Pittsburgh<br>Presbyterian University Hospital<br>230 Lothrop Street, Room F-179<br>Pittsburgh, PA 15213   |
| 119. University of Texas Southwestern<br>Medical Center at Dallas<br>6201 Harry Hines Blvd.<br>Dallas, TX 75390             | 120. University of Virginia Physicians Group<br>University of Virginia Lars Leksell Center of<br>Gamma Surgery, Primary Care Center<br>Building 1143; Room G411, 1215 Lee Street<br>Charlottesville, VA 22908 |
| 121. USC University Hospital<br>1540 Alcazar Street<br>Los Angeles, CA 90033  | 122. North Carolina Baptist Hospital<br>Outpatient Comprehensive Cancer Center<br>Medical Center Boulevard<br>Winston-Salem, NC 27157   |
| 123. Washington Hospital Center<br>110 Irving Street, NW<br>Washington, DC 20010  | 124. Washington Hospital Healthcare System<br>2500 Mowry Ave.<br>Fremont, CA 94538  |
| 125. Washington University in St. Louis<br>Barnes-Jewish Hospital<br>4921 Parkview Place<br>St. Louis, MO 63110             | 126. West Virginia University Hospital, Inc.,<br>Ruby Memorial Hospital, Mary Babb,<br>Randolph Cancer Center,<br>and Health Sciences Center South Building,<br>Medical Center Drive<br>Morgantown, WV 26506  |
| 127. William Beaumont Hospital<br>Department of Radiation Oncology<br>3601 W. Thirteen Mile Road<br>Royal Oak, MI 48073     | 128. Yale-New Haven Hospital<br>20 York Street<br>New Haven, CT 06510   |



# **MANDATORY ADVANCED NOTIFICATIONS PER 10 CFR PART 110.50(c)**

The following Advanced Notifications must be made to both the NRC and, in case of exports, the government of the importing country in advance of each shipment:

Mandatory Advanced Notifications to the NRC are to be emailed to [hoo.hoc@nrc.gov](mailto:hoo.hoc@nrc.gov) (preferred method) or faxed to the NRC at 301-816-5151. In the subject line of the email or on the fax cover page include: "10 CFR 110.50(c) Notification." For technical assistance, use the same e-mail address or call 301-287-9056.

Mandatory Advanced Notifications to the government of the importing country must be emailed or faxed to the appropriate foreign government authorities. To locate the point-of-contact for international Advanced Notifications see: <http://www-ns.iaea.org/downloads/rw/imp-export/import-export-contact-points.pdf>. In the subject line of the email or on the fax cover page include: "NOTIFICATION TO THE IMPORTING STATE PRIOR TO SHIPMENT OF CATEGORY 1 OR 2 RADIOACTIVE SOURCES." For technical assistance or for countries not listed, contact the Office of International Programs' export/import staff at 301-287-9056.

**Table 1: Appendix P to Part 110 Category 1 and Category 2 Radioactive Material Threshold Limits**

Radioactive Material	Category 1		Category 2	
	Terabequerels (TBq)	Curies (Ci) <sup>1</sup>	Terabequerels (TBq)	Curies (Ci) <sup>1</sup>
Americium-241 (Am-241)	60	1,600	0.6	16
Americium-241/Beryllium (Am-241/Be)	60	1,600	0.6	16
Californium-252 (Cf-252)	20	540	0.2	5.4
Curium-244 (Cm-244)	50	1,400	0.5	14
Cobalt-60 (Co-60)	30	810	0.3	8.1
Cesium-137 (Cs-137)	100	2,700	1.0	27
Gadolinium-153 (Gd-153)	1,000	27,000	10.0	270
Iridium-192 (Ir-192)	80	2,200	0.8	22
Plutonium-238 <sup>2</sup> (Pu-238)	60	1,600	0.6	16
Plutonium-239/Beryllium <sup>2</sup> (Pu-239/Be)	60	1,600	0.6	16
Promethium-147 (Pm-147)	40,000	1,100,000	400	11,000
Radium-226 <sup>3</sup> (Ra-226)	40	1,100	0.4	11
Selenium-75 (Se-75)	200	5,400	2.0	54
Strontium-90 (Y-90)	1,000	27,000	10.0	270
Thulium-170 (Tm-170)	20,000	540,000	200	5,400
Ytterbium-169 (Yb-169)	300	8,100	3.0	81

## **Calculation of Shipments Containing Multiple Sources or Radionuclides:**

The "sum of fractions" methodology for evaluating combinations of radionuclides being transported is to be used when import or export shipments contain multiple sources or multiple radionuclides. The threshold limit values used in a sum of the fractions calculation must be the metric values (i.e., TBq).

I. If multiple sources and/or multiple radionuclides are present in an import or export shipment, the sum of the fractions of the activity of each radionuclide must be determined to verify the shipment is less than the Category 1 or 2 limits of Table 1, as appropriate. If the calculated sum of the fractions ratio, using the following equation, is greater than or equal to 1.0, then the import or export shipment exceeds the threshold limits of Table 1 and the applicable security provisions of this part apply.

II. Use the equation below to calculate the sum of the fractions ratio by inserting the actual activity of the applicable radionuclides or of the individual sources (of the same radionuclides) in the numerator of the equation and the corresponding threshold activity limit from the Table 1 in the denominator of the equation. Ensure the numerator and denominator values are in the same units and all calculations must be performed using the TBq (i.e., metric) values of Table 1.

R1 = activity for radionuclides or source number 1      AR1 = activity limit for radionuclides or source number 1  
R2 = activity for radionuclides or source number 2      AR2 = activity limit for radionuclides or source number 2  
RN = activity for radionuclides or source number n      ARN = activity limit for radionuclides or source number n

$$\sum_{i=1}^n \left[ \frac{R_1}{AR_1} + \frac{R_2}{AR_2} + \frac{R_n}{AR_n} \right] \geq 1$$

<sup>1</sup> The values to be used to determine whether a license is required are given in TBq. Curie (Ci) values are provided for practical usefulness only and are rounded after conversion.

<sup>2</sup> The limits for exports of Pu-238 and Pu-239/Be can be found in § 110.21.

<sup>3</sup> Discrete sources of Radium-226.