EXPORT LICENSE

NRC FORM 250



United States of America

Nuclear Regulatory Commission Washington, D.C. 20555

NRC LICENSE NO.: PXB6.28

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NRC DOCKET NO.: 11006027

LICENSE EXPIRES: January 31, 2028

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).

Alpha-Omega Services, Inc. 9156 Rose Street Bellflower, CA 90706 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: AMD 28	ULTIMATE DESTINATIONS: Canada and Japan

DESCRIPTION OF 10 CFR PART 110, APPENDIX P, BYPRODUCT MATERIALS TO BE EXPORTED, INCLUDING CONDITIONS AND NOTES (NOTE: SEE PAGE 9 FOR DEFINITIONS OF CATEGORY 1 AND CATEGORY 2)

Export to Canada, of Category 1 quantities of Co-60 (not to exceed 244.2 TBq per shipment), contained in sealed sources for use in medical teletherapy devices, 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 PXB6.27-R amending its authority by adding three additional parties to the list of "Other U.S. Part(ies) to Export."

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:

Mohamed K. Shams, Acting Deputy Director Office of International Programs

DE ISSUANCE: August 28, 2019

DATE OF ISSUANCE:

CONDITIONS FOR CATEGORY 1 EXPORTS

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;
- The NRC receives and considers the consent from the importing country's regulatory authority pursuant to 10 CFR §110.42(e)(3); and
- 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.

<u>ULTIMATE CONSIGNEE(S) IN FOREIGN COUNTRY(IES):</u>

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

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

- Adventist Health Systems/Sunbelt Inc. Florida Hospital Plaza 2501 N. Orange Avenue Orlando, FL 32803
- Alexian Brothers Medical Center 800 West Biesterfield Road Elk Grove Village, IL 60007
- Anchorage Radiation Oncology Management, Inc. d/b/a Anchorage Radiation Therapy Center 2841 Debarr Road, Suite 100 Anchorage, AK 99508
- 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
- Baylor All Saints Medical Center Fort Worth 1400 Eight Avenue Fort Worth, TX 76104

- Akron General Medical Center 762 South Cleveland Massillon Road Montrose, OH 44333
- 4. Alpha-Omega Services, Inc. 1282 Big Woods-Starks Road Vinton, LA 70668
- Augusta University Medical Center 1120 15th Street Augusta, GA 30912
- Baptist Hospital of Miami, Inc. Department of Radiation Oncology 8900 North Kendall Drive Miami, FL 33176
- Billings Clinic
 2800 Tenth Avenue North
 Billings, MT 59101

- BRFHH Shreveport, LLC
 DBA University Health Shreveport
 1541 Kings Highway
 Shreveport, LA 71130
- Center for Advanced Medicine Long Island Jewish Medical Center 450 Lakeville Road Lake Success, NY 11042
- Central Mississippi Medical Center Radiation Oncology Department 1850 Chadwick Drive Jackson, MS 39204
- Chippenham and Johnston-Willis Hospitals, Inc., d/b/a CJW Medical Center Johnston-Willis Campus, Chippenham Campus 7101 Jahnke Road Richmond, VA 23235
- Cooper Health System
 Robert Wood Johnson Medical School at Camden
 3 Cooper Plaza
 Camden, NJ 08103
- Covenant Health System
 DBA Joe Arrington Cancer Research &
 Treatment Center
 4101 22nd Place
 Lubbock, TX 79410
- 23. Doctors Hospital, Inc. d/b/a Doctors Hospital 5000 University Drive Coral Gables, FL 33146
- 25. Gamma Knife Center of the Pacific 2226 Liliha Street, Level B2 Honolulu, HI 96817
- Good Samaritan Hospital
 1225 Wilshire Boulevard
 Los Angeles, CA 90017
- 29. Harborview Medical Center 325 9th Avenue Gamma Knife Suite Seattle, WA 98133

- 12. Bryan Medical Center 2300 South 16th Street Lincoln, NE 68502
- Central DuPage Hospital Association Northwestern Medicine Cancer Center Central DuPage Hospital 4405 Weaver Parkway Warrenville, IL 60555
- Chippenham and Johnston-Willis Hospitals, Inc. d/b/a CJW Medical Center, Johnston-Willis Campus 1401 Johnston-Willis Drive Richmond, VA 23235
- Columbia-Presbyterian Medical Center Gamma Knife Suite Basement Level Room GK2, Children's Hospital of New York Presbyterian Hospital 630 West 168th Street New York, NY 10032
- 20. Covenant Health System Covenant Gamma Southwest 3603 21st Street Lubbock, TX 79410
- 22. Deaconess Medical Center Gamma Knife Gamma Knife Suite, Basement Floor Room 117 910 West Fifth Avenue Spokane, WA 99204
- 24. Fort Sanders Regional Gamma Knife Center 1915 White Avenue Knoxville, TN 37916
- 26. GE-Hitachi Nuclear Energy Americas, LLC Vallecitos Nuclear Center 6705 Vallecitos Road Pleasanton, CA 94586
- 28. Hackensack University Medical Center John Theurer Cancer Center 92 2nd St.
 Hackensack, NJ 07601

- HCA Health Services of Oklahoma, Inc. d/b/a
 OU Medical Center
 Presbyterian Hospital
 700 N.E. 13th Street
 Oklahoma City, OK 73104
- Holy Spirit Cancer Center Gamma Knife Center 880 Century Drive Mechanicsburg, PA 17055
- 34. Intermountain Medical Center
 Jon and Karen Huntsman Cancer Center
 Gamma Knife Room, 5121 South
 Cottonwood Street
 Murray, UT 84157
- 36. John F. Kennedy Medical Center 65 James Street Edison, NJ 08818
- 38. Kettering Medical Center 3535 Southern Boulevard Kettering, OH 45429
- 40. Legacy Health System 1130 North West 22nd Avenue, Suite LL50 Portland, OR 97210
- Lewis Hall Singletary Oncology Center at John D. Archbold Memorial Center 919 S. Broad Street Thomasville, GA 31792
- Lovelace Medical Center
 601 Dr. Martin Luther King, Jr. NE Albuquerque, NM 87102
- 46. Mayo Clinic Hospital-RochesterSt. Mary's Campus1216 2nd St. NWRochester, MN 55905
- 48. Medical College of Wisconsin Froedtert Memorial Lutheran Hospital 9200 West Wisconsin Avenue Milwaukee, WI 53226
- 50. Memorial Hermann Healthcare System d/b/a Hermann Hospital 6411 Fannin Avenue Houston, TX 77030

- 31. Hoag Memorial Hospital Presbyterian One Hoag Drive Newport Beach, CA 92658
- 33. Indiana University Health Methodist Hospital 1701 N. Senate Blvd Indianapolis, IN 46202
- 35. Jewish Hospital, LLC. 4777 East Galbraith Road Cincinnati, OH 45236
- 37. Karmanos Cancer Center
 Gershenson Radiation Oncology Center
 Room 379
 4100 John R. Street
 Detroit, MI 48201
- 39. Larkin Community Hospital, Inc. 6129 Southwest 70th Street South Miami, FL 33143
- 41. Lehigh Valley Health Network 1240 South Cedar Crest Boulevard Allentown, PA 18103
- 43. Los Robles Regional Medical Center 2200 Lynn Road Thousand Oaks, CA 91360
- 45. Marshall Clinic St. Joseph's Hospital 611 St. Joseph Avenue Marshfield, WI 54449
- 47. Mayo Clinic Jacksonville 4500 San Pablo Road Jacksonville, FL 32224
- 49. Medical University of South Carolina 171 Ashley Avenue Charleston, SC 29425
- 51. Mercy Health Center 4300 West Memorial Road Oklahoma City, OK 73120

- 52. Methodist Healthcare System of San Antonio LTD Methodist Hospital 7700 Floyd Curl Drive San Antonio, TX 78229
- 54. Nebraska Methodist Hospital 8303 Dodge Street Omaha, NE 68114
- 56. New York University Hospitals Center Arnold and Marie Schwartz Health Care Center Gamma Knife Suite, 550 First Avenue New York, NY 10016
- Northwest Hospital Gamma Knife Center Building 310, Ground Floor, Suite G-5 1560 North 115th Street Seattle, WA 98133
- 60. Palmetto Health Richland 7 Medical Park Columbia, SC 29203
- 62. Piedmont Hospital Radiation Oncology Services 1968 Peachtree Road N.W. Atlanta, GA 30309
- 64. Providence Portland Medical Center North Pavilion 4805 NE Glisan Street Portland, OR 97213
- 66. Puget Sound Radiosurgery Gamma Knife Suite, Room 103, St. Joseph's Medical Center 1802 South Yakima Tacoma, WA 98405
- 68. Rhode Island Hospital 593 Eddy Street Providence, RI 02903
- 70. Rocky Mountain Gamma Knife Center, LLC 1635 Aurora Court Aurora. CO 80045
- 72. Sacred Heart Health System, Inc. d/b/a Sacred Heart Hospital of Pensacola 5151 North 9th Avenue Pensacola, FL 32504

- 53. Mid-Michigan Gamma Knife Facility4000 Wellness DriveRoom 160Midland, MI 48670
- Neurologic & Orthopedic Institute of Chicago 4501 N. Winchester Chicago, IL 60640
- 57. Northern Westchester Hospital Center 400 East Main Street Mount Kisco, NY 10549
- 59. Northwestern Memorial Hospital Galter Pavilion201 E. Huron Street Chicago, IL 60611
- 61. Penn State Milton S. Hershey Medical Center 500 University Drive Hershey, PA 17033
- 63. Pitt County Memorial Hospital d/b/a Vidant Medical Center 2100 Stantonsburg Road Greenville, NC 27835
- 65. Puerto Rico Medical Services Administration Puerto Rico Medical Center, Centro Medico de Rio Piedras First Floor, Central Building, Carr 22 Barrio Monacillos San Juan, PR 00935
- 67. Research Medical Center Midwest Gamma Knife Center 2316 E. Meyer Blvd. Kansas City, MO 64132
- 69. Robert Wood Johnson University Center Gamma Knife Suite10 Plum Street New Brunswick City, NJ 08901
- 71. Roswell Park Cancer Institute Elm & Carlton Street Buffalo, NY 14263
- 73. Sacred Heart Medical Center 1255 Hilyard Street Eugene, OR 97401

- 74. Saint Francis Medical Center 530 NE Glen Oak Avenue Peoria, IL 61637
- San Diego Gamma Knife Center
 9834 Genesee Avenue, Suite 110
 La Jolla, CA 92037
- 78. St. Joseph's Hospital 5665 Peachtree Dunwoody Road Atlanta, GA 30342
- 80. St. Lukes The Woodlands Hospital 17200 St. Luke's Way The Woodlands, TX 77384
- 82. Sunrise Diagnostic Center 3006 South Maryland Parkway Las Vegas, NV 89109
- 84. Sutter Gamma Knife Center 2801 K St., Suite 110 Sacramento, CA 95816
- 86. Swedish Medical Center 799 East Hampden Ave. Suite 100 Englewood, CO 80113
- Tenet Good Samaritan, Inc.
 1309 North Flagler Drive
 West Palm Beach, FL 33401
- 90. The Cleveland Clinic Foundation 9500 Euclid Avenue Cleveland, OH 44195
- 92. The Ohio State University
 Radiation Medicine Department, Arthur G.
 James Cancer Hospital and
 Richard J. Solove Research Institute, 300
 West 10th Avenue.
 Columbus, OH 43210
- 94. The Regents of the University of California U.C. Davis Medical Center 2315 Stockton Blvd. Sacramento, CA 95817
- 96. The University of Texas MD Anderson Cancer Center 1515 Holcombe Boulevard Houston, TX 77030

- 75. San Antonio Community Hospital 999 San Bernardino Road Upland, CA 91786
- 77. South Nassau Communities Hospital One Healthy Way Oceanside, NY 11572
- St. Joseph's Hospital and Medical Center 350 West Thomas Road Phoenix, AZ 85013
- 81. St. Vincent Medical Center 2 Shircliff Way Jacksonville, FL 32204
- 83. SUNY Upstate Medical University 750 East Adams Street Syracuse, NY 13210
- 85. Sutter Medical Center Sacramento Sutter Gamma Knife Center 2801 K Street, Suite 110 Sacramento, CA 95816
- 87. Temple University Hospital 3401 N. Broad Street Philadelphia, PA 19140
- 89. Texas Health Presbyterian Hospital Dallas 8200 Walnut Hill Lane Dallas, TX 75231
- 91. The Methodist Hospital DBA Houston Methodist 6551 Bertner Avenue Houston, TX 77030
- 93. The Regents of the University of California San Francisco Medical Center 505 Parnassus Ave, Room L56 San Francisco, CA 94143
- 95. The Swedish Radiosurgery Center Suite A10 James Tower 550 17th Avenue Seattle, WA 98122
- 97. The Valley Hospital Luckow Pavilion 1 Valley Health Plaza Paramus, NJ 07652

- 98. Thomas Jefferson University and Hospitals 900 Walnut Street Philadelphia, PA 19107
- 100. UAB Highlands Hospital 1201 11th Avenue South Birmingham, AL 35205
- University of Arkansas for Medical Science
 4301 West Markham Street
 Little Rock, AR 72205
- 104. University of Kentucky
 Markey Cancer Center, Roach Bldg.,
 Room CC049
 800 Rose Street
 Lexington, KY 40536
- 106. University of Minnesota Medical CenterRoom 1-285500 SE Harvard StreetMinneapolis, MN 55455
- 108. University of Pennsylvania Pennsylvania Hospital Campus 800 Spruce Street Philadelphia, PA 19107
- 110. University of Pittsburgh Presbyterian University Hospital 230 Lothrop Street, Room F-185 Pittsburgh, PA 15213
- 112. University of Texas Southwestern Medical Center at Dallas 5151 Harry Hines Blvd. Suite G49 Dallas, TX 75390
- 114. USC University Hospital 1540 Alcazar Street Los Angeles, CA 90033
- 116. Washington Hospital Center110 Irving Street, NWWashington, DC 20010
- 118. Washington University in St. Louis 4921 Parkview Place St. Louis, MO 63108

- 99. Tufts New England Medical Center 800 Washington Street Boston, MA 02111
- University Hospitals of Cleveland
 11100 Euclid Avenue
 Cleveland, OH 44106
- University of Iowa Medical Center
 Hawkins Drive
 Iowa City, IA 52242
- 105. University of Maryland Medical System
 Gamma Knife Suite, South Hospital B Wing
 22 South Greene Street
 Baltimore, MD 21201
- University of Mississippi Medical Center
 350 West Woodrow Wilson Avenue
 Jackson, MS 39216
- 109. University of Pittsburgh Presbyterian University Hospital 230 Lothrop Street, Room G-102 Pittsburgh, PA 15213
- 111. University of Pittsburgh Presbyterian University Hospital 230 Lothrop Street, Room F-179 Pittsburgh, PA 15213
- 113. University of Virginia Health Services
 Foundation
 Lars Leksell Center for Gamma Surgery
 Building 1143; Room G411
 1215 Lee Street
 Charlottesville, VA 22908
- 115. Wake Forest Baptist Health Radiation Oncology Department, Comprehensive Cancer Center Medical Center Boulevard Winston-Salem, NC 27157
- 117. Washington Hospital Healthcare System 2500 Mowry Ave.
 Fremont, CA 94538
- 119. West Virginia University Hospital, Inc., Ruby Memorial Hospital, Mary Babb, Randolph Cancer Center, and Health Sciences Center South Building, Medical Center Drive Morgantown, WV 26506

120. William Beaumont Hospital Department of Radiation Oncology 3601 W. Thirteen Mile Road Royal Oak, MI 48073 121. Yale-New Haven Hospital 20 York Street New Haven, CT 06519

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 (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) ¹	Terabequerels (TBq)	Curies(Ci) ¹
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 ² (Pu-238)	60	1,600	0.6	16
Plutonium-239/Beryllium ² (Pu-239/Be)	60	1,600	0.6	16
Promethium-147 (Pm-147)	40,000	1,100,000	400	11,000
Radium-2263 (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 TBg (i.e., metric) values of Table 1.

R1 = activity for radionuclides or source number 1

AR1 = activity limit for radionuclides or source number 1

R1 = activity for radionuclides or source number 1
R2 = activity for radionuclides or source number 2
RN = activity for radionuclides or source number n
$$\sum_{1}^{n} \left[\begin{array}{c} R_{1} \\ AR_{1} \end{array} + \begin{array}{c} R_{2} \\ AR_{2} \end{array} + \begin{array}{c} R_{n} \\ AR_{2} \end{array} \right] \geq 1$$

¹ 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.

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

³ Discrete sources of Radium-226.