NRC FORM 250P (4/10)

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

NRC LICENSE NO.: **PXB143.00**

LICENSE EXPIRES: September 29, 2015

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LICENSEE

The Curators of the University of Missouri
Attn: John Ernst
University of Missouri Research Reactor
1513 Research Park
Columbia, MO 65211

APPLICANT'S REFERENCE: Application Dated 09/22/2010

ULTIMATE FOREIGN CONSIGNEE(S)

Listed on Page 3

(Manufacturers and Distributors of Medical Devices)

INTERMEDIATE FOREIGN AND/OR DOMESTIC CONSIGNEE(S)

Listed on Page 3

(Freight Forwarders)

OTHER PARTY(IES) TO IMPORT AND/OR EXPORT

NONE

COUNTRY(IES) OF ULTIMATE DESTINATION: Belgium, The Netherlands

CONDITIONS, NOTES, AND DESCRIPTIONS OF 10 CFR PART 110, APPENDIX P, BYPRODUCT AND SOURCE MATERIALS TO BE EXPORTED AND/OR IMPORTED
(NOTE: SEE PAGE 2 FOR DEFINITIONS OF CATEGORY 1 AND CATEGORY 2)

Export to Belgium and the Netherlands of Category 2 quantities of Ir-192 for the manufacture of medical devices for the treatment of cancer in humans, is authorized.

Licensee is responsible for compliance with all applicable import, export, and other domestic regulatory requirements, including all terms and conditions of your other NRC licenses. Licensee, if not already submitted with your application, must submit information required by 10 CFR §110.32(d) and pertinent documentation required by 10 CFR §110.32(g) at least **24 hours prior to shipment**. See Page 2 for Mandatory Pre-shipment Notifications.

License expiration date is based on applicant's request.

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.

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THIS LICENSE IS INVALID UNLESS SIGNED BELOW BY AUTHORIZED NRC REPRESENTATIVE

NAME AND TITLE: Scott W. Moore, Deputy Director
Office of International Programs

DATE OF ISSUANCE: October 4, 2010

MANDATORY PRE-SHIPMENT NOTIFICATIONS PER 10 CFR PART 110.50(c)

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

Prior Shipment 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 301-816-5100.

Prior Shipment 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 Prior Shipment 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 301-415-2344.

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-226[3] (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 radionuclides 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
R2 = activity for radionuclides or source number 2
RN = activity for radionuclides or source number n

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

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

[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 Pu-238 and Pu-239/Be in this table apply for imports to the U.S. The limits for exports of Pu-238 and Pu-239/Be can be found in § 110.21.

[3] Discrete sources of Radium-226.

INTERMEDIATE FOREIGN AND/OR DOMESTIC CONSIGNEE(S): Cont'd

1. DHL Global Forwarding NV/SA (Belgium) (Acting for MDS Nordion S.A.)
   Building 765
   B – 1931 Brucargo
   Belgium

   (Freight Forwarder)

2. Kuehne + Nagel N.V. (Acting for Mallinckrodt Medical – dba Covidien Pharmaceuticals)
   Lloydstraat 35
   Rotterdam NL-3024 EA
   The Netherlands

   (Freight Forwarder)

ULTIMATE FOREIGN CONSIGNEE(S): Cont'd

1. MDS Nordion S.A.
   Avenue de L'Esperance 1
   Fleurus 6220
   Belgium

   (Manufacturer and Distributor of Medical Devices)

2. Mallinckrodt Medical – dba Covidien Pharmaceuticals
   Westerduinweg 3
   Petten 1755 ZG
   The Netherlands

   (Manufacturer and Distributor of Medical Devices)