

EXPORT AND IMPORT LICENSE

NRC FORM 250P



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

NRC LICENSE NO.: PCB131.00

LICENSE EXPIRES: July 31, 2011

Page 1 of 3

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 import and/or export the byproduct materials listed below, subject to the terms and conditions herein. This license is only valid if the licensee maintains the requisite NRC or Agreement State domestic licenses.

<p align="center">LICENSEE</p> <p>Halliburton Energy Services Attn: Cindy Dorris 2107 City West Boulevard, Building 4 Houston, TX 77042</p> <p>APPLICANT'S REFERENCE: HES2636</p>	<p align="center">ULTIMATE FOREIGN CONSIGNEE(S)</p> <p>[REDACTED]</p>
<p align="center">INTERMEDIATE FOREIGN AND/OR DOMESTIC CONSIGNEE(S)</p> <p>Halliburton Worldwide Limited (for JAFZA Warehouse) Jebel Ali Free Zone South Dubai, 20336 United Arab Emirates</p>	<p align="center">OTHER PARTY(IES) TO EXPORT/IMPORT</p> <p>Halliburton Energy Services 3000 N. Sam Houston Parkway East Building M, Room M1F21 Houston, TX 77032-3219</p> <p>(Authorized Recipient with Material Possession License)</p>

COUNTRY(IES) OF ULTIMATE DESTINATION: Iraq and the United States

**CONDITIONS, NOTES, AND DESCRIPTIONS OF 10 CFR PART 110, APPENDIX P,
 BYPRODUCT MATERIALS TO BE EXPORTED AND/OR IMPORTED**

(NOTE: SEE PAGE 2 FOR DEFINITIONS OF CATEGORY 1 AND CATEGORY 2)

Export and import, to and from Iraq, of Category 2 quantities of Am-241, Am-241/Be, Co-60, Cf-252, Cs-137 and Th-232 (<5 mCi) contained in sealed sources for use in oil and gas well logging operations, are authorized. When combined for shipping, these sources may aggregate to a Category 2 quantity. **See Page 3 for total number of sources and maximum activity levels for each source.**

Sealed sources will remain in the custody of either Halliburton Worldwide limited Services or its subsidiaries in Iraq at all times, and when not in use, will be stored in a secure facility controlled either by Halliburton Energy Services or its subsidiaries in these countries.

Licensee is responsible for compliance with all applicable import, export, and other domestic regulatory requirements, including all terms and conditions of domestic materials license(s). 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(h) at least **24 hours prior to shipment**. See Page 2 for Mandatory Pre-shipment Notifications.

Licensee shall submit by February 1 of each year one copy of a report of all Americium shipments during the previous calendar year. The report must include: (1) a description of the material, including quantity; (2) approximate shipment dates; and (3) a list of recipient countries, end users, and intended use keyed to the items shipped.

License expiration date is based on established limits.

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 of the other provisions of said Act, now or hereafter in effect and to all valid rules and regulations of NRC.

THIS LICENSE IS INVALID UNLESS SIGNED BELOW
 BY AUTHORIZED NRC REPRESENTATIVE

NAME AND TITLE: Scott Moore

Scott Moore, Deputy Director
 Office of International Programs

DATE OF ISSUANCE: July 15, 2010

MANDATORY PRE-SHIPMENT NOTIFICATIONS PER 10 CFR PART 110.50(b)(4)

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(b)(4) 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 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
- R_N = activity for radionuclides or source number n AR_N = 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.

LICENSE CONDITIONS (CONT'D)

ISOTOPE	TOTAL MAXIMUM ACTIVITY OF ALL SOURCES FOR EACH ISOTOPE	TOTAL NUMBER OF SOURCES	END USE
Cs-137			Tool and Instrument calibration
Cs-137			Well Logging
Th-232			Tool and Instrument Calibration
Am-241			Tool and Instrument calibration
Am-241/Be			Well Logging
Cs-137			Density Verification
Cs-137			Density Verification
Am-241			Tool and Instrument calibration
Co-60			Density Verification; Marker Bead Assembly
Am- 241			Tool and Instrument calibration
Co-57			Density Verification
Am-241/Be			Well Logging
Am-241/Be			Well Logging
Am-241/Be			Well Logging
Th-232			Tool and Instrument Calibration
Th-232			Tool and Instrument Calibration
Am-241/Be			Well Logging
Am-241/Be			Well Logging
Cf-252			Tool and Instrument Calibration
Cs-137			Well Logging
Am-241/Be			Well Logging
Am-241/Be			Tool and Instrument Calibration

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