U.S. NUCLEAR REGULATORY COMMISSION

Amendment No. 56

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 37, 39, 40, 70 and 71, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	In accordance with the letter dated December 21, 2018,	4. Expiration Date: July 7, 2026
1. National Aeronautics and Space Administration George C. Marshall Space Flight Center		5. Docket No.: 030-03575 Reference No.:
2. NASA, MSFC AS10 Huntsville, AL 35812	3. License number: 01-06571-10 is amended in its entirety to read as follows:	

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license	9. Authorized use
A. Any byproduct material between atomic numbers 3 and 83	A. Any	A. 0.6 millicuries per radionuclide and 2 millicuries total	A. For research and development as defined in 10 CFR 30.4
B. Any byproduct material with Atomic Numbers 84 through 96	B. Any	B. 0.6 microcuries per radionuclide and 2 microcuries total	B. For research and development as defined in 10 CFR 30.4
C. Iron-55	C. Sealed, Plated, or Foil Sources (Amersham, Model IEC.A1; Isotope Products Laboratories, Model AN-55; PHI-055)	C. 10 millicuries per source and 100 millicuries total	C. For research and development as defined in 10 CFR 30.4
D. Cobalt-60	D. Sealed, Plated, or Foil Sources (Isotope Products Laboratories, Model 193; GF-60-D; GF-60-R)	D. 10 millicuries per source and 100 millicuries total	D. For research and development as defined in 10 CFR 30.4
E. Selenium-75	E. Sealed Sources (Isotope Products Laboratories, Model R-75)	E. 10 millicuries per source and 20 millicuries total	E. For research and development as defined in 10 CFR 30.4

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F. Strontium-90	F. Sealed, Plated, or Foil Sources (AEA Technology/QSA Inc., Model SIF.D1; Isotope Products Laboratories, Model BF090)	F. 10 millicuries per source and 500 millicuries total	F. For research and development as defined in 10 CFR 30.4
G. Cadmium-109	G. Sealed or plated sources (Isotope Products Laboratories, Model PHI-109; XFB-3)	G. 10 millicuries per source and 100 millicuries total	G. For research and development as defined in 10 CFR 30.4
H. Barium-133	H. Plated Sources (Isotope Products Laboratories, Model GF-133-D; GF-133-R)	H. 2 millicuries per source and 20 millicuries total	H. For research and development as defined in 10 CFR 30.4
I. Cesium-137	I. Sealed Sources (Isotope Products Laboratories, Model 193; GF-137-D; GF-137-R)	I. 10 millicuries per source and 100 millicuries total	I. For research and development as defined in 10 CFR 30.4
J. Gadolinium-153	J. Sealed Sources (Amersham, Model GDC.CY1)	J. 10 millicuries per source and 100 millicuries total	J. For research and development as defined in 10 CFR 30.4
K. Radium-226	K. Sealed Sources (Isotope Products Laboratories, Model GF-226)	K. 10 microcuries per source and 10 microcuries total	K. For research and development as defined in 10 CFR 30.4
L. Americium-241	L. Sealed Sources (Amersham/QSA, Inc., Model AMC.2084; AMN.PE1; Isotope Products Laboratories, Model AF Series; Monsanto Agricultural Company, Model 2722-BT)	L. 30 millicuries per source and 130 millicuries total	L. For research and development as defined in 10 CFR 30.4
M. Americium-241	M. Foils (AEA, Model AMM.1001H)	M. 10 millicuries per source and 20 millicuries total	M. For research and development as defined in 10 CFR 30.4
N. Curium-244	N. Foils or plated sources (Isotope Products Laboratories, Model AF-210-C; AF-244-C)	N. 2 millicuries per source and 20 millicuries total	N. For research and development as defined in 10 CFR 30.4

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O. Uranium-235	O. Any	O. 350 grams total	O. For research and development as defined in 10 CFR 70.4
P. Uranium	P. Solid	P. 14.6 kilograms total	P. For research and development as defined in 10 CFR 30.4
Q. Uranium- depleted in Uranium-235	Q. Solid	Q. 60 kilograms total	Q. For research and development as defined in 10 CFR 30.4
R. Krypton-85	R. Any	R. 40 curies total	R. For use in Iso Vac Engineering, Inc. Radiflo Model Mark V leak testing devices.

CONDITIONS

10. Licensed material may be used or stored only at the licensee's facilities located at: George C. Marshall Space Fight Center, Huntsville, Alabama, 35812

11. A. The Radiation Safety Officer (RSO) for this license is Philip O. Brown.

    B. Licensed material shall only be used by, or under the supervision of, Philip O. Brown, Mark J. Christi, and Brian Ramsey.

12. The licensee shall not use the licensed material in or on human beings.

13. The licensee shall not use licensed material in field applications where activity is released except as provided otherwise by specific condition of this license.

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14. A. Sealed sources and detector cells shall be tested for leakage and/or contamination at intervals not to exceed the intervals specified in the certificate of registration issued by the U.S. Nuclear Regulatory Commission under 10 CFR 32.210 or by an Agreement State. In the absence of a registration certificate, sealed sources shall be tested for leakage and/or contamination at intervals not to exceed 6 months, or at such other intervals as specified.

B. Notwithstanding Paragraph A of this Condition, sealed sources designed to primarily emit alpha particles shall be tested for leakage and/or contamination at intervals not to exceed 3 months.

C. In the absence of a certificate from a transferor indicating that a leak test has been made within the intervals specified in the certificate of registration issued by the U.S. Nuclear Regulatory Commission under 10 CFR 32.210 or by an Agreement State, prior to the transfer, a sealed source received from another person shall not be put into use until tested and the test results received.

D. Sealed sources need not be tested if they contain only hydrogen-3; or they contain only a radioactive gas; or the half-life of the isotope is 30 days or less; or they contain not more than 100 microcuries of beta- and/or gamma-emitting material or not more than 10 microcuries of alpha-emitting material.

E. Sealed sources need not be tested if they are in storage and are not being used. However, when they are removed from storage for use or transferred to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.

F. The leak test shall be capable of detecting the presence of 185 becquerels (0.005 microcuries) of radioactive material on the test sample. If the test reveals the presence of 185 becquerels (0.005 microcuries) or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission in accordance with 10 CFR 30.50(c)(2), and the source shall be removed immediately from service and decontaminated, repaired, or disposed of in accordance with Commission regulations.

G. Tests for leakage and/or contamination, including leak test sample collection and analysis, shall be performed by the licensee or other persons specifically licensed by the U.S. Nuclear Regulatory Commission or an Agreement State to perform such services.

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H. Records of leak test results shall be kept in units of becquerels (microcuries) and shall be maintained for 3 years.

15. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders by the licensee.

16. The licensee shall conduct a physical inventory every 6 months, or at other intervals approved by the U.S. Nuclear Regulatory Commission, to account for all sealed sources and/or devices received and possessed under the license. Records of inventories shall be maintained for 3 years from the date of each inventory, and shall include the radionuclides, quantities, manufacturer's name and model numbers, and the date of the inventory.

17. Maintenance, repair, cleaning, replacement, and disposal of foils contained in detector cells shall be performed only by the device manufacturer or other persons specifically authorized by the U.S. Nuclear Regulatory Commission or an Agreement State to perform such services.

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18. Except as specifically provided otherwise in this license, the licensee shall conduct its program in accordance with the statements, representations, and procedures contained in the documents, including any enclosures, listed below. This license condition applies only to those procedures that are required to be submitted in accordance with the regulations. The U.S. Nuclear Regulatory Commission's regulations shall govern unless the statements, representations, and procedures in the licensee's application and correspondence are more restrictive than the regulations.

A. Letter dated July 11, 2006 (ML062010457)
B. Letter dated January 14, 2011 (ML110250591)
C. Letter dated May 8, 2013 (ML13141A251)
D. Application dated January 27, 2016 (ML16055A402)
E. Letter received May 26, 2016 (ML16158A454)
F. Letter dated June 28, 2016 (ML16250A457)
G. Letter dated June 29, 2017 (ML17188A176)
H. Letter dated June 6, 2018 (ML18169A315)
I. Letter dated December 21, 2018 (ML19044A385)
J. Letter dated February 20, 2019 (ML19060A263)

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date: March 5, 2019

By: _____
Dennis Lawyer
Region 1