

**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, 39, 40, and 70, 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 application dated <b>October 11, 2012,</b>
1. The Curators of the University of Missouri	3. License number 24-00513-38 is renewed in its entirety to read as follows:
2. University of Missouri - St. Louis 1 University Boulevard (102 PTB) St. Louis, MO 63121-4400	4. Expiration date <b>April 30, 2023</b>
	5. Docket No. 030-32694 Reference No.

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
A. Carbon-14	A. Any	A. 30 millicuries
B. Hydrogen-3	B. Any non-volatile	B. 30 millicuries
C. Iodine-125	C. Any non-volatile	C. 20 millicuries
D. Calcium-45	D. Any	D. 5 millicuries
E. Molybdenum-99	E. Any	E. 10 millicuries
F. Phosphorus-32	F. Any	F. 120 millicuries
G. Phosphorus-33	G. Any	G. 20 millicuries
H. Sulfur-35	H. Any	H. 80 millicuries
I. Americium-241	I. Electroplated Needle (Rod; Isotope Products Laboratories Model 449-66-3)	I. One source not to exceed 10 microcuries

9. Authorized Use:

A. through I. To be used for research and development as defined in 10 CFR 30.4, including metabolic labeling, use as tracers for isotope uptake studies by microorganisms (e.g., yeast cells), in vitro experiments, instrument calibration, and student instruction, as described in the application dated October 11, 2012.

CONDITIONS

10. Licensed material shall be used only at the licensee's facilities located at the University of Missouri – St. Louis, 8001 Natural Bridge Road, St. Louis, Missouri.

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**Amendment No. 28**

11. The Radiation Safety Officer for this license is Steven D. Struck.
12. Licensed material listed in Items 6-9 above shall be used by, or under the supervision of the following individuals for the materials indicated:

<u>Authorized Users</u>	<u>Material and Use</u>
Teresa Thiel, Ph.D.	Carbon-14, hydrogen-3, molybdenum-99, phosphorus-32, phosphorus-33, and sulfur-35.
Elizabeth A. Kellogg, Ph.D.	Phosphorus-32 and sulfur-35.
Wendy Olivas, Ph.D.	Hydrogen-3, phosphorus-32, and sulfur-35.
Patricia Parker, Ph.D.	Phosphorus-32.
Cynthia Dupureur, Ph.D.	Carbon-14, hydrogen-3, phosphorus-32, and sulfur-35.
Marc Spingola, Ph.D.	Carbon-14, hydrogen-3, iodine-125, phosphorus-32, and sulfur-35.
Mindy Steiniger, Ph.D.	Phosphorus-32 and sulfur-35.
Xuemin (Sam) Wang, Ph.D.	Carbon-14, hydrogen-3, calcium-45, phosphorus-32, and sulfur-35.
Lisa Schechter, Ph.D.	Phosphorus-32 and sulfur-35.
Steven D. Struck	Americium-241.

13. A. Sealed sources 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 (NRC) under 10 CFR 32.210 or by an Agreement State.
- B. 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 NRC 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.
- C. 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 ten years without being tested for leakage and/or contamination.
- D. The leak test shall be capable of detecting the presence of 0.005 microcurie (185 becquerels) of radioactive material on the test sample. If the test reveals the presence of 0.005 microcurie (185 becquerels) or more of removable contamination, a report shall be filed with the NRC 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.

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- E. Tests for contamination shall be performed by persons specifically licensed by the Commission or an Agreement State to perform such services. In addition, the licensee is authorized to collect leak test samples but not perform the analysis: analysis of leak test samples must be performed by persons specifically licensed by the Commission or an Agreement State to perform such services.
- F. Records of leak test results shall be kept in units of microcuries and shall be maintained for three years.
14. The licensee shall conduct a physical inventory every six months, or at other intervals approved by the NRC, to account for all sources and/or devices received and possessed under the license. Records of inventories shall be maintained for five years from the date of each inventory, and shall include the quantities and kinds of byproduct material, manufacturer's name and model numbers, location of the sources and/or devices, and the date of the inventory.
15. Sealed sources containing licensed material shall not be opened or sources removed from source holders by the licensee.
16. The licensee is authorized to hold radioactive material with a physical half-life of less than or equal to 120 days for decay-in-storage before disposal in ordinary trash provided:
- A. Before disposal as ordinary trash, the waste shall be surveyed at the container surface with the appropriate survey instrument set on its most sensitive scale and with no interposed shielding to determine that its radioactivity cannot be distinguished from background. All radiation labels shall be removed or obliterated.
- B. A record of each such disposal permitted under this license condition shall be retained for three years. The record must include the date of disposal, the date on which the byproduct material was placed in storage, the radionuclides disposed, the survey instrument used, the background dose rate, the dose rate measured at the surface of each waste container, and the name of the individual who performed the disposal.
17. The licensee shall not use licensed material in or on human beings.
18. The licensee shall not use licensed material in field applications where activity is released except as otherwise provided by specific condition of this license.
19. The licensee is authorized to transport licensed material only in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."

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20. 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. The 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.

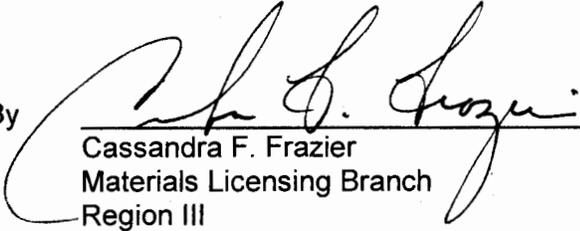
- A. Application dated October 11, 2012; and
- B. Letter dated February 28, 2013.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

'APR 15 2013

Date \_\_\_\_\_

By

  
Cassandra F. Frazier  
Materials Licensing Branch  
Region III