U.S. NUCLEAR REGULATORY COMMISSION **Amendment No. 18**

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 letter dated **May 2, 2013**,
1. Missouri State University	3. License number 24-11585-04 is amended in its entirety to read as follows:
2. 901 South National Avenue Springfield, MO 65897	4. Expiration date June 30, 2016
	5. Docket No. 030-18583 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. Nickel-63	A. Plated Source (Hewlett Packard Model 18803-60520 or 18803A Detector Cells)	A. 2 sources not to exceed 15 millicuries each
B. Phosphorus-32	B. Any	B. 10 millicuries
C. Carbon-14	C. Any	C. 25 millicuries
D. Iodine-129	D. Any	D. 100 microcuries
E. Iodine-125	E. Any	E. 10 millicuries
F. Lead-210	F. Sand Matrix	F. 0.3 microcuries
G. Americium-241	G. Sand Matrix	G. 0.03 microcuries
H. Cadmium-109	H. Sand Matrix	H. 0.287 microcuries
I. Cobalt-57	I. Sand Matrix	I. 0.011 microcuries
J. Tellurium-123	J. Sand Matrix	J. 0.014 microcuries
K. Chromium-51	K. Sand Matrix	K. 0.357 microcuries
L. Tin-113	L. Sand Matrix	L. 0.052 microcuries
M. Cesium-137	M. Sand Matrix	M. 0.048 microcuries
N. Cobalt-60	N. Sand Matrix	N. 0.056 microcuries
O. Yittrium-88	O. Sand Matrix	O. 0.109 microcuries
P. Strontium-85	P. Sand Matrix	P. 0.066 microcuries
Q. Radium-226	Q. Sand Matrix	Q. 19 nanocuries

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9. Authorized use:

A. , C, and D. Possession and storage only with intent to dispose.

B. May be used for research and development as defined in Section 30.4 of 10 CFR Part 30 and may be used for student instruction.

E. To be used in in vitro laboratory testing and in vivo animal studies as described in application dated January 25, 2006, and letter dated June 20, 2006.

F. through P. For use in an Eckert & Ziegler Model 7503 Multinuclide Marinelli Gamma Standard – EG – LVM for instrument calibration.

Q. For use in an Eckert & Ziegler Analytics, Inc. custom source for instrument calibration.

CONDITIONS

10. A. Licensed material listed in Items 6.A., and 6.C. through 6.Q. shall be stored and used at the licensee's facilities located on the campus of Missouri State University, 901 S. National Ave, Springfield, Missouri, as described in application dated January 25, 2006, and letter dated June 20, 2006.

B. Licensed material listed in Item 6.B. may be used at the licensee's facilities located at the Department of Fruit Science, Missouri State University Research Campus, 9740 Red Spring Road, Mountain Grove, Missouri.

C. Licensed material listed in Item 6.E. may also be used at the licensee's facilities located at the Roy Blunt Jordan Valley Innovation Center located at 524 N. Boonville, Springfield, Missouri.

11. A. Licensed material listed in Item 6 above is authorized for use by, or under the supervision of, the following individual(s) for the materials and uses indicated.

Erin E. Parrish, **Ph.D.**	Nickel-63 and carbon-14.
Thomas E. Tomasi, Ph.D.	Iodine-125 and iodine-129.
Laszlo Kovacs, Ph.D.	Phosphorus-32.
Dennis Schmidt	Iodine-125.
Paul L. Durham, Ph.D.	Iodine-125 and phosphorus-32.
Robert Pavlowsky, Ph.D.	For material listed in Item 6.**F**. through 6.**Q**.

B. At least one individual named in Condition No. 11.A. shall be physically present at the authorized place of use whenever licensed material is being used.

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12. The Radiation Protection Officer for the activities authorized by this license is Erin E. Parrish, **Ph.D.**

13. A. Sealed sources shall be tested for leakage and/or contamination at intervals not to exceed 6 months or at such intervals as specified by the certificate of registration referred to in 10 CFR 32.210.

    B. In the absence of a certificate from a transferor indicating that a leak test has been made within the interval 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.

    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 10 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 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.

    E. 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.

    F. Records of leak test results shall be kept in units of microcuries and shall be maintained for 3 years.

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

15. 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 Commission or an Agreement State to perform such services.

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 5 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. Except as otherwise specified in this license, the licensee shall have available and follow the instructions contained in the manufacturer's instruction manual for the chromatography device.

18. Licensed material shall not be used in or on human beings.

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19. 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, byproduct material shall be surveyed at the container surface with the appropriate survey meter 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 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 radio nuclides 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.

20. The licensee is authorized to transport licensed material in accordance with the provisions of 10 CFR Part 71, "Packaging and Transportation of Radioactive Material."

21. 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 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. Applications dated January 25, 2006, and July 3, 2008 (as it pertains to changes requested in letter dated July 3, 2008); and

    B. Letters dated June 20, 2006, February 9, 2007, March 30, 2007, May 25, 2007, June 19, 2007, July 3, 2008, August 25, 2010, November 11, 2010, February 24, 2011, **May 2, 2013**, and **June 27, 2013**.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date AUG 01 2013

By _____
Cassandra F. Frazier
Materials Licensing Branch
Region III