U.S. NUCLEAR REGULATORY COMMISSION

Amendment No. 05

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, 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 **November 12, 2015,**
1. Van Andel Research Institute	3. License No. 21-32841-01 is amended in it entirety to read as follows:
2. 333 Bostwick Avenue, NE Grand Rapids, Michigan 49503	4. Expiration Date: December 31, 2022
	5. Docket No. 030-38554 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. Hydrogen-3	A. Any	A. 100 millicuries
B. Carbon-14	B. Any	B. 60 millicuries
C. Phosphorus-32	C. Any	C. 100 millicuries
D. Phosphorus-33	D. Any	D. 100 millicuries
E. Sulfur-35	E. Any	E. 100 millicuries
F. Technetium-99m	F. Any	F. 60 millicuries
G. Iodine-123	G. Any	G. 60 millicuries
H. Iodine-125	H. Any	H. 300 millicuries
I. Thallium-201	I. Any	I. 60 millicuries
J. Indium-111	J. Any	J. 200 millicuries
K. Fluorine-18	K. Any	K. 50 millicuries
L. Copper-64	L. Any	L. 100 millicuries
M. Iodine-124	M. Any	M. 44 millicuries
N. Yttrium-86	N. Any	N. 31 millicuries
O. Zirconium-89	O. Any	O. 31 millicuries
P. Rhenium-186	P. Any	P. 42 millicuries
Q. Gold-198	Q. Any	Q. 37 millicuries
R. Lutetium-177	R. Any	R. 58 millicuries
S. Germanium/Gallium-68	S. Sealed source (Eckert & Ziegler Isotope Products Model UPET 06-068-30U)	S. 30 microcuries
T. Cesium-137	T. Sealed source (Eckert & Ziegler Isotope Products Model RV-137-250U)	T. 261.1 microcuries

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U. Cobalt-57	U. Sealed source (Eckert & Ziegler Isotope Products Model PF18C-057-10M)	U. 10 millicuries

9. Authorized Use:

A. through R. For research and development as defined in 10 CFR 30.4, including animal studies.

S. For reference and instrument calibration.

T. and U. For storage only incident to disposal.

CONDITIONS

10. Licensed material shall be used or stored only at the licensee's facilities located at 333 Bostwick Avenue, NE, Grand Rapids, Michigan.

11. The Radiation Safety Officer (RSO) for this license is David W. Lutkenhoff, M.S., CIH, CIEC.

12. Licensed materials listed in Subitem Nos. 6.A. through 6.S. above are only authorized for use by, or under the supervision of, the following individuals for the materials and uses indicated:

Authorized User	Materials and Use
Arthur S. Alberts, Ph.D.	Phosphorus-32, phosphorus-33 and sulfur-35
Ting-Tung A. Chang, Ph.D.	Technetium-99m, iodine-123, iodine-125, thallium-201, indium-111, fluorine-18, copper-64, iodine-124, yttrium-86, zirconium-89, rhenium-186, gold-198, lutetium-177, and gallium-68
Nicholas S. Duesbery, Ph.D.	Hydrogen-3, carbon-14, phosphorus-32, phosphorus-33, iodine-125, and sulfur-35
Karsten Melcher, Ph.D.	Hydrogen-3, phosphorus-32, phosphorus-33, and sulfur-35
Jeffrey P. MacKeigan, Ph.D.	Hydrogen-3, phosphorus-32, phosphorus-33, and sulfur-35
Cynthia K. Miranti, Ph.D.	Hydrogen-3, carbon-14, phosphorus-32, phosphorus-33, and sulfur-35
Steven J. Triezenberg, Ph.D.	Hydrogen-3, carbon-14, phosphorus-32, phosphorus-33, iodine-125, and sulfur-35
Bart O. Williams, Ph.D.	Phosphorus-32 and sulfur-35
Eric H. Xu, Ph.D.	Hydrogen-3, phosphorus-32, phosphorus-33, iodine-125, and sulfur-35

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Authorized User	Materials and Use
Ning Wu, Ph.D.	Hydrogen-3 and phosphorus-32
Scott Edward Counts, Ph.D.	Phosphorus-33
Darren Moore, Ph.D.	Phosphorus-32, phosphorus-33, and sulfur-35
Piroska E. Szabo, Ph.D.	Phosphorus-32
Scott B. Rothbart, Ph.D.	**Hydrogen-3, phosphorus-32, phosphorus-33, and carbon-14**
Anderson S. Peck, M.S.	**Technetium-99m, iodine-123, iodine-125, thallium-201, indium-111, fluorine-18, copper-64, iodine-124, yttrium-86, zirconium-89, rhenium-186, gold-198, and lutetium-177**

13. Licensed material shall not be used in or on humans except as provided otherwise by specific condition of this license.

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

15. Experimental animals or the products from experimental animals that have been administered licensed materials shall not be used for human consumption.

16. The licensee shall conduct a physical inventory every six months, or at other intervals approved by the U.S. Nuclear Regulatory Commission, to account for all sources and/or devices received and possessed under the license. Records of inventories shall be maintained for **three** 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. Sealed sources containing licensed material shall not be opened or sources removed from source holders by the licensee.

18. The licensee shall not acquire licensed material in a sealed source or device that contains a sealed source unless the source or device has been registered with the U.S. Nuclear Regulatory Commission under 10 CFR 32.210 or with an Agreement State.

19. 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 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 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 **and the test results received**.

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C. Sealed sources need not be leak 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 no more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material.

D. 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.

E. 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.

F. Tests for leakage and/or 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.

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

20. 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."

21. 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.

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22. 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. Application dated January 31, 2012 (ML120330295)
B. Letter dated June 20, 2012 (ML13009A149)
C. Letter dated October 23, 2012 (ML12299A497)
D. Letter dated April 25, 2014 (re: lab diagrams) (ML14118A474)
E. Letter dated March 6, 2015 (ML15068A286)
F. Letter dated March 12, 2015 (including Delegation of Authority Memorandum dated March 11, 2015) (ML15075A099)
G. Letter dated May 27, 2015 (ML15152A212)
H. Letter dated **November 12, 2015** (ML15335A491)
I. Letter dated **February 5, 2016** (ML16039A281)

FOR THE U. S. NUCLEAR REGULATORY COMMISSION

Date FEB 19 2016

By _____
Cassandra F. Frazier
Materials Licensing Branch
Region III