

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, 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.

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<p style="text-align: center;">Licensee</p> <p>1. Department of Commerce NOAA/GLERL</p> <p>2. 4840 South State Road Ann Arbor, MI 48108</p>	<p>In accordance with application dated November 24, 2008,</p> <p>3. License number 21-16544-01 is amended in its entirety to read as follows:</p> <hr/> <p>4. Expiration date August 31, 2014</p> <hr/> <p>5. Docket No. 030-11209 Reference No.</p>
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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. 99 millicuries
B. Phosphorus-33	B. Any	B. 50 millicuries
C. Hydrogen-3	C. Any	C. 500 millicuries
D. Sulfur-35	D. Any	D. 50 millicuries
E. Nickel-63	E. Plated sources (Hewlett-Parkard Electron Cell Detector Model 19312)	E. No single source to exceed 15 millicuries
F. Cesium-137	F. Any	F. 11 millicuries
G. Cesium-134	G. Any	G. 2 millicuries
H. Polonium-209	H. Any	H. .010 millicuries
I. Polonium-210	I. Any	I. 2 millicuries
J. Sodium-22	J. Any	J. 2 millicuries
K. Americium-241	K. Sealed or plated source	K. 0.0005 millicuries
L. Curium-244	L. Sealed or plated source	L. 0.0002 millicuries
M. Plutonium-239	M. Sealed or plated source	M. 0.0006 millicuries
N. Cobalt-60	N. Any	N. 2 millicuries
O. Mixed gamma reference	O. Standard solution (Amersham Reference No. QYC.46)	O. 0.005 millicuries
P. Strontium-85	P. Any	P. 2 millicuries

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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
Q. Cerium-144	Q. Any	Q. 2 millicuries
R. Iron-59	R. Any	R. 2 millicuries
S. Zinc-65	S. Any	S. 2 millicuries
T. Cadmium-109	T. Any	T. 2 millicuries
U. Mercury-203	U. Any	U. 2 millicuries
V. Phosphorus-32	V. Any	V. 10 millicuries
W. Chromium-51	W. Any	W. 2 millicuries
X. Selenium-75	X. Any	X. 2 millicuries
Y. Antimony-125	Y. Any	Y. 2 millicuries
Z. Any byproduct material	Z. Activated soil/ sediment samples	Z. See Item 9.Z below
AA. Calcium-45	AA. Any	AA. 5 millicuries
BB. Iron-55	BB. Any	BB. 10 millicuries
CC. Silver-110m	CC. Any	CC. 2 millicuries
DD. Tin-113	DD. Any	DD. 1 millicurie
EE. Iodine-129	EE. Any	EE. 1 millicurie
FF. Cerium-139	FF. Any	FF. 2 millicuries
GG. Chlorine-36	GG. Any	GG. 5 millicuries
HH. Manganese-54	HH. Any	HH. 2 millicuries
II. Cerium-141	II. Any	II. 2 millicuries
JJ. Scandium-46	JJ. Any	JJ. 2 millicuries
KK. Antimony-124	KK. Any	KK. 2 millicuries
LL. Silver-110m	LL. Any	LL. 2 millicuries

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9. Authorized Use:

A. through D. To be used for in vitro laboratory research studies.

E. To be used in gas chromatographs for sample analysis.

F. through Y. To be used for in vitro laboratory research studies and for instrument reference/calibration standards.

Z. Possession incident to the performance of neutron activation studies on soil/sediment samples.

AA. through GG. To be used for in vitro laboratory research studies.

HH. To be used for in vitro laboratory research studies.

II. through MM. To be used for in vitro laboratory research studies.

CONDITIONS

10. **Licensed material shall be used only at the licensee's facilities located at Lake Michigan Field Station located at 1431 Beach Street, Muskegon, Michigan, and on board the R/V Laurentian anywhere in the Great Lakes.**

11. The Radiation Safety Officer for this license is Kimberly Kulpanowski, CIH.

12. Licensed material listed in Item 6 above is only authorized for use by, or under the supervision of, the following individuals for the materials and uses indicated:

Authorized Users

Material and Use

Brian J. Eadie

All

Henry A. Vanderploeg

All

Peter F. Landrum

All

Duane C. Gossiaux

Carbon-14, Hydrogen-3, Camium-109, and Cesium-137

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John Robbins, Ph.D. All

Gary L. Fahnensteil All

13. A. Sealed sources and detector cells shall be tested for leakage and/or contamination at intervals not to exceed 6 months or at such other intervals as specified by the certificate of registration referred to in 10 CFR 32.210.
- B. Notwithstanding Paragraph A of this Condition, sealed sources designed to 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 6 months prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.
- D. Sealed sources need not be leak tested if:
- (i) they contain only hydrogen-3; or
 - (ii) they contain only a radioactive gas; or
 - (iii) the half-life of the isotope is 30 days or less; or
 - (iv) they contain not more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material; or
 - (v) they are not designed to emit alpha particles, 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 or detector cell 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.

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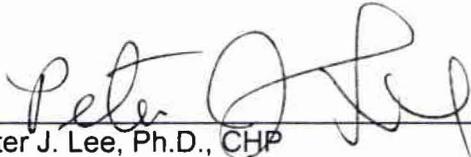
- F. Tests for leakage and/or contamination shall be performed by the licensee or by other persons specifically licensed by the Commission or an Agreement State to perform such services.
14. Licensed material shall not be used in or on human beings.
 15. This license does not authorize commercial distribution of licensed material.
 16. The licensee shall not use licensed material in field applications where activity is released except as provided otherwise by specific condition of this license.
 17. The licensee shall conduct a physical inventory every 6 months to account for all sources and/or devices received and possessed under the license.
 18. Sealed sources or detector cells containing licensed material shall not be opened or sources removed from source holders by the licensee.
 19. The licensee is authorized to hold radioactive material with a physical half-life of less than 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 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.
 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."

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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. Application dated February 27, 2004.
 - B. Letter dated September 19, 2007.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date 2-24-09By 
Peter J. Lee, Ph.D., CHP
Materials Control, ISFSI, and Decommissioning Branch
Region III