

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 September 29, 2017.	4. Expiration Date: November 30, 2023
1. Alfred I. duPont Hospital for Children of the Nemours Foundation 2. 1600 Rockland Road Wilmington, DE 19803			5. Docket No.: 030-10568 Reference No.:
3. License number: 07-16199-01 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. Hydrogen-3	A. Any	A. 300 millicuries total	A. For research and development as defined in 10 CFR 30.4, including animal studies.
B. Carbon-14	B. Any	B. 60 millicuries total	B. For research and development as defined in 10 CFR 30.4, including animal studies.
C. Fluorine-18	C. Any	C. 100 millicuries total	C. For research and development as defined in 10 CFR 30.4, including animal studies.
D. Sodium-24	D. Any	D. 100 millicuries total	D. For research and development as defined in 10 CFR 30.4, including animal studies.
E. Phosphorus-32	E. Any	E. 500 millicuries total	E. For research and development as defined in 10 CFR 30.4, including animal studies.

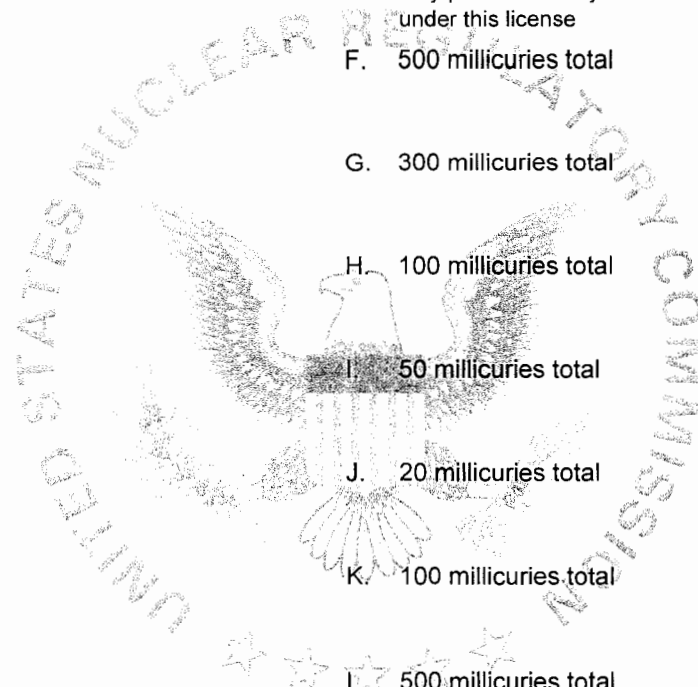
**MATERIALS LICENSE
SUPPLEMENTARY SHEET**

License Number
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Docket or Reference Number
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Amendment No. 21

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
F. Phosphorus-33	F. Any	F. 500 millicuries total	F. For research and development as defined in 10 CFR 30.4, including animal studies.
G. Sulfur-35	G. Any	G. 300 millicuries total	G. For research and development as defined in 10 CFR 30.4, including animal studies.
H. Potassium-42	H. Any	H. 100 millicuries total	H. For research and development as defined in 10 CFR 30.4, including animal studies.
I. Chromium-51	I. Any	I. 50 millicuries total	I. For research and development as defined in 10 CFR 30.4, including animal studies.
J. Iron-59	J. Any	J. 20 millicuries total	J. For research and development as defined in 10 CFR 30.4, including animal studies.
K. Copper-64	K. Any	K. 100 millicuries total	K. For research and development as defined in 10 CFR 30.4, including animal studies.
L. Rubidium-86	L. Any	L. 500 millicuries total	L. For research and development as defined in 10 CFR 30.4, including animal studies.
M. Zirconium-89	M. Any	M. 100 millicuries total	M. For research and development as defined in 10 CFR 30.4, including animal studies.
N. Molybdenum-99	N. Any	N. 2 curies total	N. For research and development as defined in 10 CFR 30.4, including animal studies.



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O. Technetium-99m	O. Any	O. 2 curies total	O. For research and development as defined in 10 CFR 30.4, including animal studies.
P. Iodine-125	P. Any	P. 100 millicuries total	P. For research and development as defined in 10 CFR 30.4, including animal studies.
Q. Iodine-131	Q. Any	Q. 100 millicuries total	Q. For research and development as defined in 10 CFR 30.4, including animal studies.

CONDITIONS

10. Licensed material may be used or stored at the licensee's facilities located at:
 - A. Life Science Center, 1600 Rockland Road, Wilmington, Delaware, 19803
 - B. Rockland Center 1, 1701 Rockland Road, Wilmington, Delaware, 19803
 - C. Dupont Experimental Station, 200 Powder Mill Road, Wilmington, Delaware, 19803
11. Licensed material shall be used by, or under the supervision of, Robert Akins, Ph.D.; Matthew Butchbach, Ph.D.; Vicky Funanage, Ph.D.; Zhaoping He, Ph.D.; Grace M. Hobson, Ph.D.; Sigrid Langhans, Ph.D.; and Robert Mason, Ph.D. Licensed material listed in Item 6.C shall be used by, or under the supervision of, Shaohui Zhang, Ph.D.
12. The Radiation Safety Officer (RSO) for this license is Robert W. Mason, Ph. D..
13. The licensee shall not use the licensed material in or on humans.

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SUPPLEMENTARY SHEET**License Number
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Amendment No. 21

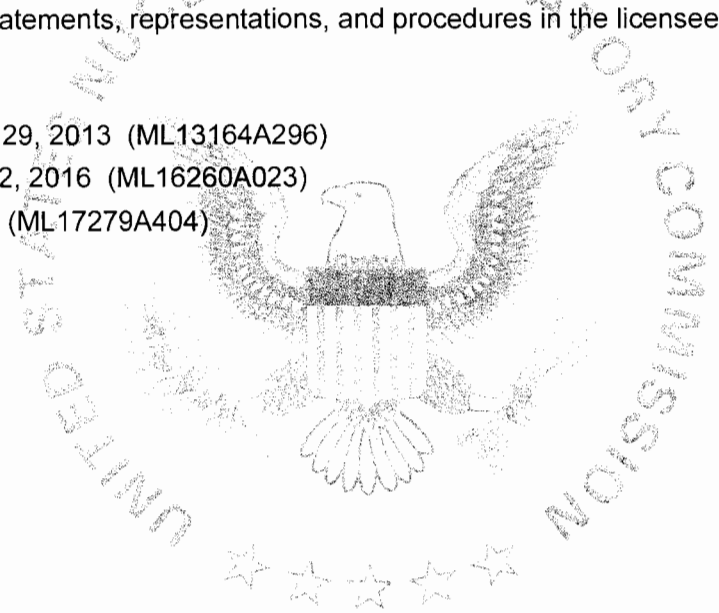
14. Experimental animals, or the products from experimental animals, that have been administered licensed material shall not be used for human consumption.
15. The licensee shall not use licensed material in field applications where activity is released except as provided otherwise by specific condition of this license.
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, except for radiation labels on materials that are within containers and that will be managed as biomedical waste after they have been released from the licensee.
 - B. A record of each such disposal permitted under this license condition shall be retained for 3 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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Amendment No. 21

17. 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 and application dated May 29, 2013 (ML13164A296)
- B. Letters dated September 9 and 12, 2016 (ML16260A023)
- C. Letter dated September 29, 2017 (ML17279A404)
- D. Letter dated December 5, 2017



FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Date: December 18, 2017By: *Elizabeth Ullrich*
Elizabeth Ullrich
Region 1